









AN

✦ ILLUSTRATED ✦ WEEKLY ✦ MAGAZINE ✦

FOR THE

ARCHITECT, ENGINEER, ARCHÆOLOGIST, CONSTRUCTOR,  
SANITARY REFORMER, AND ART-LOVER.

CONDUCTED BY

H. H. STATHAM,

FELLOW OF THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

"Every man's proper mansion-house, and home, being the theater of his hospitality, the seat of self-fruition, the comfortablest part of his own life, the noblest of his sonne's inheritance, a kinde of private princedome, nay, to the possessors thereof, an epitome of the whole world, may well deserve, by these attributes, according to the degree of the master, to be decently and delightfully adorned."

"Architecture can want no commendation, where there are noble men, or noble mindes."—SIR HENRY WOTTON.

"Our English word To BUILD is the Anglo-Saxon Bylðan, to confirm, to establish, to make firm and sure and fast, to consolidate, to strengthen; and is applicable to all other things as well as to dwelling-places."—DIVERSIONS OF PURLEY.

"Always be ready to speak your mind, and a base man will avoid you."—WILLIAM BLAKE.

VOLUME L.—JANUARY TO JUNE, 1886.

OFFICE: No. 46, CATHERINE STREET, COVENT GARDEN, LONDON, W.C.







## INDEX TO VOLUME L.

JANUARY TO JUNE, 1886.

## CONTENTS.

Articles and Reviews .....	iii	Letters, Writers of .....	ix
Notes .....	v	Miscellaneous .....	ix
Reports of Meetings, Papers Read, Law Cases, &c. ....	vi	Architects, &c., of Buildings Illustrated .....	xi
Letters .....	viii	Illustrations .....	xi

## ARTICLES AND REVIEWS.

- ABBEY**, Malmesbury, 149  
**Aberdeen street railway**, 504  
**Académie des Beaux Arts**, Paris, 602  
**Academy**, Royal: architecture at, 631, 668, 703, 737, 772, 807, 848, 876, 910; origin of, 935; pictures at, 668, 704; sculpture at, 591, 739, 769, 773  
**Academy**, Royal Scottish, 332, 432, 599  
**Acion sewerage**, the, 121  
**Additions to "The Park,"** Ledbury, 849  
**Adjoining and overhanging rights of**, 298  
**Admiralty and War Office**, Mr. Marvin's design, 778  
**Albany Capitol**, New York, 574, 657  
**Albert Dock**, the, 108  
**Amateur**, the distinguished, 7  
**American: cement tests**, 900; lighthouse, a, 558; plumbing, 70, 119  
**Apollo Plooy**, statue of, 603  
**Ancient Rome in 1885**, 1  
**Anglesey House**, Carnarvon, 812  
**Antiquities: of Malvera**, 77; of Paris, 916  
**Architect**, a fine old English, 668, 834  
**Architects**, French, in congress, 877  
**Architects' pocket-books**, 319  
**Architectural: amateur**, the, 7; background, 373  
**Architectural Examination**, the, 322  
**Architecture: of ancient Rome**, 1; in Berlin, 10; Christian emblems in, 120  
**Architecture at the Paris Salon**, 689  
**Architecture of our parish churches**, 109  
**Architecture at the Royal Academy**, 631, 668, 703, 772, 807, 848, 876, 910  
**Architecture**, Royal Scottish Academy, 432  
**Art**, Japanese, 689, 810  
**Art Exhibitions: Berlin**, 333; Folkestone, 773; Paris, 8, 227, 368, 502, 635  
**Artificial foundations**, 144  
**Artisans' dwellings**, Liverpool, 881  
**Arts of the Middle Ages**, 319  
**Arsenal House**, 329  
**Assize Courts**, Birmingham, 439  
**Associations of St. Martin's-lane**, 935  
**Atkins Monument**, Clapham, 60, 145, 672  
**Atmospheric owl**, 657, 698  
**Attic gravestones**, 834  
**Arlis**, San Vicente, 703
- BACKGROUNDS**, architectural, 673  
**Bainbridge Chapel**, Newcastle, 568  
**Bath**, an improved, 692  
**Baudry**, the late M., 227  
**Benford's theory of the sculptured column** from Ephesus, 840  
**Berlin: Art Exhibition**, 333; English Chairs, 78; mosaic pavement at, 658; street architecture, 10  
**Berlitz statue**, Paris, 812  
**Beverly's Synagogue**, 194  
**Bever's Builders' Price Book**, 626  
**Bidston Village**, Cheshire, 937  
**Birch**, the late Dr., 59, 146  
**Birmingham: Assize Courts**, 439; Market Buildings, 774  
**Bishop of the Marchia's tomb**, Wells Cathedral, 548  
**Blackburn Municipal works**, 320  
**Bodley & Garner's, Messrs.**, design for Liverpool Cathedral, 191, 198, 207, 351  
**Bodkin**, excavations in, 603, 657  
**Books**, pamphlets, &c.: notices, reviews, and excursions in, 635  
**Almanacs and Diaries**, 65  
**American Journal of Archaeology**, 625  
**Anderson, R.**, Lightning Conductors, 72  
**Architectural Association Sketchbook**, 465  
**Art-Union Edition of "The Bridal of Triermain,"** 163  
**Bekon, G.**, Freshold Disinfectament, 701  
**Bennett, J. T. W.**, Compensation for Personal Injuries, 798  
**Benson, G.**, and **Anderson, J. M.**, Picture-resque York, 934  
**Bever's Builders' Price Book**, 626
- Books, Pamphlets, &c. (continued):**—  
**Bishop, H. H.**, Architecture in relation to Parish Churches, 109  
**Blake's Works**, 7  
**Books on Architecture**, 776  
**Brade, D.**, Picturesque Sketches in Italy, 910  
**Broecker, A.**, Ornament und Form des Attischen Grabsteins, 834  
**Castle, E. J.**, Law of Rating, 327  
**Chadwick, W.**, Combined Number and Weight Calculator, 320  
**Collignon, M.**, Manual of Greek Archaeology, 628  
**Courtney, J.**, Boiler-makers' Ready Reckoner, 357  
**De Lisle, E.**, The Majesty of London, 285  
**Diaries and Almanacs**, 65  
**Dobson, M. J.**, Memoir of the Late John Dobson, M.R.I.B.A., 568, 634  
**Domesday Book in Relation to the County of Surrey**, 798  
**Douthwaite, W. E.**, Gray's Inn, 565  
**Dresser, Dr.**, Modern Ornamentation, 236  
**Dumont, A.**, & **Chaplain, J.**, Les Céramiques de la Grèce Propre, 834  
**Dunlop, J. C. & A. H.**, "The Book of Old Edinburgh," 728  
**Duplessis, G. & Bouchot, H.**, Dictionnaire des Marques et Monogrammes des Graveurs, 528  
**Essays on the Reconstruction of Central London**, 493  
**Garthorp, T. J.**, Hints on Repoussé Work, 627  
**German Archaeological Institute's Publications**, 601  
**Griffey, J.**, Histoire de la Tapisserie, 293  
**Hedges, K.**, Precautions to be adopted on Introducing the Electric Light, 492  
**Holden, J.**, Easements and Rights of Light, 109  
**Houses and Building Societies**, 184  
**Lacroix, P.**, Arts in the Middle Ages, 319  
**Laird, Transfer**, Hints for, 228  
**Laxton's Builders' Price Book**, 492  
**Les Lettres et les Arts**, 193  
**Levi, Leone**, Wages and Earnings of the Working Classes, 492  
**Lookwood's Builders' Price Book**, 319  
**Lownds, M.**, Proposals for Antiseptic Drainage, 736  
**McCallum, J. B.**, Municipal and Sanitary Works of Blackburn, 320  
**McGovern, J. H.**, How to Select Property before Purchasing, 184  
**Metropolitan Board of Works, Annual Report**, 847  
**Michel, A.**, François Boucher, 492  
**Middleton, J. H.**, Ancient Rome in 1885, 1  
**Miller, E.**, Interior Decoration, 626; Wood-carving, 358  
**Monographs of American Architecture**, 397  
**Morris, E. B.**, Registration of Titles, 798  
**Nott, J. A.**, Antiquities of Moche Malvern, 77  
**Photographs of Old London**, 804  
**Plumbing Problems**, 119  
**Practical Problems and Lines for Working Drawings**, 357  
**Reynolds, M.**, Locomotive Engineering, 902  
**Reynolds, M.**, Stationary Engineering, 902  
**Richter, Otto**, Über Antike Steinmetzwerke, 109  
**Roscoe, E. S.**, Digest of the Law of Light, 628  
**Sargent, C. H.**, Ground-rents and Building Trades, 833  
**Scott's "Bridal of Triermain,"** Art-Union edition, 193  
**Seldon, H. O.**, Builders' Work and the Building Trades, 833  
**Sketch Book**, Architectural Association's, 465  
**Stiles, S.**, James Nasmyth, 320  
**Spaul's Architect's Pocket Book**, 319  
**Standage's Artists' Manual**, 626
- Books, Pamphlets, &c. (continued):**—  
**Stoney, B. B.**, Strength and Proportions of Riveted Joints, 320  
**Street Alignment of London**, 463  
**Templeton, W.**, Engineer's and Millwright's Assistant, 357  
**Tredgold's "Carpentry,"** 119  
**Tubill, W. B.**, The Suburban Cottage, its Design and Construction, 185  
**Vacher, S.**, Fifteenth-Century Italian Ornament, 685  
**Variorum**, 65, 691, 728, 802  
**Wagon, A.**, La Sculpture Antique, 357  
**Westgarth Essays**, the, 463  
**Winters, W.**, Queen Eleanor Memorial, Waltham Cross, 109  
**Worth, R. N.**, History of Devonshire, 429  
**Boucher, François**, 492  
**Bouquet monument**, the, 426  
**Brasses**, the Marney, 499, 580  
**Brickwork**, Layer Marney Towers, 497  
**Bridge**, the Forth, 10, 107, 193  
**Brocade**, design for, a, 637  
**Brooks, Mr. Jas. J.**, design for Liverpool Cathedral, 116, 122, 230, 370  
**Brussels**, letter from, 121  
**Builders' price books**, 319, 492, 626  
**Building on disused burial-grounds**, 180  
**Building of stables**, the, 603  
**Building stones**, our, 424, 459, 491, 635, 660, 684, 628, 655, 684, 727, 763, 797, 833, 868, 901, 939  
**Building stones at Colonial Exhibition**, 839  
**Building leases and ground-rents**, 834  
**Building societies**, 184  
**Building trades**, depression in, 63  
**Building Trades' Exhibition**, 535, 592, 628  
**Buildings entitled to light within the Prescription Act**, 464  
**Banyan window**, Elstow Church, 351  
**Burial-ground**, St. Saviour's, Southwark, 89  
**Burlington House**, pictures at, 75  
**Busts in Paris**, unveiling, 399
- CADOGAN SQUARE**, new houses, 708  
**Capitals**, Lincoln Cathedral, 810  
**Capitol**, Albany, New York, 574, 657  
**Cardiff Exchange**, 268  
**Carnarvon**, house at, 812  
**Casts at South Kensington**, 632  
**Cathedral**, Lincoln, capitals, 810  
**Cathedral**, Liverpool, proposed, 69, 78, 266; Messrs. Bodley & Garner's Design, 190, 198, 207, 351; Mr. Brooks's Design, 116, 122, 230, 370; Mr. Emerson's Design, 150, 158, 261, 302, 318; Mr. Hay's Design, 182, 225; infringement of copyright of Builder's illustrations, 230, 302, 351  
**Cathedral St. Paul's**: north porch, 69  
**Cathedral**, Winchester, 259, 265, 531  
**Cathedral and Rathhaus**, 9  
**Cement-tests**, American, 900  
**Central London**, reconstruction of, 463  
**Ceramics**, Greek, 834  
**Chadwick's Weight-Calculator**, 320  
**Chair**, St. Nicholas' Church, Rye, 639  
**Chairs**, Egyptian, 107  
**Chambers**, Mount-street, 73  
**Champigny Monument**, the, 468  
**Chancel-piers**, generally, 189, 62  
**Chapel's East-street**, Strand, 329; Newcastle-on-Tyne, 553  
**Charges**, railway, 430  
**Charter of the Institute**, the, 398, 503, 533  
**Charterhouse**, the, 78, 168, 398, 759  
**Cheltenham Grammar School**, 370, 672  
**Chemical laboratories**, Liverpool, 469  
**Chicago water-supply**, 189, 62  
**Chimney-piece** from Mottisfont Abbey, 680  
**Christian emblems in architecture**, 120  
**Church architecture**, 109  
**"Church and State,"** 9  
**Churches**: Clapham old, 60; doomed, in London, 73, 183; English, Berlin, 78; Grantham, 404; Holy Trinity, Minorities, 73; Marshland, 803; Presbyterian, Highgate, 472; Sacred Heart, Liverpool, 818; Sacred Heart, Montmarie, 227; St. Andrew, Willesden, 59; St. Bartholomew-the-Great, 663, 672; St. James, Spanish-place, 742; St. Laurence, Catford, 725; St. Magnus, London Bridge, 602, 608; St. Michael and All Angels, Waltham-stow, 351, 362; St. Thomas, Liberty of the Rolls, 73; Walsoken, 854, 812  
**Cistern-valve**, a new, 559  
**Clapham**, sculpture discovered at, 60, 143, 473  
**Classification of railway goods**, 224  
**Claygate Schools**, 302  
**Cleaning of sewers**, 600, 299  
**College buildings**, old, Glasgow, 266  
**College**, Royal Holloway, Egham, 636  
**College of Physicians**, the old, 369  
**Colleges of Physicians and Surgeons'** Examination Hall, 438, 472  
**Collignon's Manual of Greek Archaeology**, 628  
**Colonial and Indian Exhibition**, 354, 665, 639, 843, 907, 934  
**Column** from the Temple of Diana, Ephesus, 840  
**Competitions (see under section of index headed "Miscellaneous")**  
**Compton Wynantze**, 438  
**Congressbury**, font-cover at, 472  
**Congress of French architects**, 877  
**Construction of prisons**, 354  
**Contractors' Exhibition**, Paris, 7  
**Cottages**, Leigh, Kent, 708  
**Cottages**, suburban, 185  
**Corvent-garden**, Tavistock-row, 155  
**Cowl**, atmospheric, 657, 698  
**Crematorium**, Milan, 899
- DANGERS** from lightning, 73  
**Death of Dr. Birch**, 69, 146  
**Death of Mr. Ferguson**, 113, 121, 180  
**Decay in stone**, 461  
**Decoration**, interior, 526  
**Decorative: design**, "Peace and Plenty," 302; panel, 812  
**Devon Cathedral**, window at, 508  
**Depression in the building trades**, 63  
**Designs: Birmingham Assize Court**, 439; Liverpool Cathedral, 69, 78, 266 (see also "Cathedral"); museum and library, 472; Paris Exhibition, 808; for a silk brocade, 637; for stained glass, 158, 194, 540; for suburban cottages, 185; for Sunderland Municipal Buildings, 769; for town mansions, 351, 370, 874; for wall-papers, 623  
**Details from Staple Inn**, 302  
**Devonshire**, history of, 429  
**Dickens**, a memorial of, 738  
**Disconnector**, a new, 683  
**Discovered**, in Epsom, 493; at Winchester Cathedral, 259, 265, 531  
**Distinguished amateur**, the, 7  
**Dobson, John**, architect, 568, 634  
**Docks**, the Albert, 105, projected, 62; Tilbury, 605  
**Domesday Book**, County of Sussex, 798  
**Doomed London Churches**, 73, 183  
**Doorways**, Institute of Painters in Water Colours, and School Board Offices, 404  
**Draft Charter**, Institute of Architects, 351  
**Drain-disconnecting chamber**, 693  
**Drainage**, house, American, 3, 70, 119  
**Drainage of London**, 108  
**Drawings: Royal Scottish Academy**, 432  
**Students**, at the Institute, 400, 469  
**Dry-rail**, playground, a, 738; Theatre, 738  
**Drury-coat**, 656  
**Durand's account-trap**, 900  
**Dustbins**, 890  
**Dwellings**, Waltham-Creton, 10  
**Dwellings for artisans**: Liverpool, 881; Westminster, 471
- EARNINGS** of the working classes, 482  
**Easements and rights of light**, 109  
**East London**, People's Palace, 914  
**Easthamstead Church**, windows at, 603







## ARTICLES AND REVIEWS (continued).—

Surgens, College of: Examination Hall, 488, 472.  
Suss and the Domesday Book, 798.  
Sydney, sculpture at General Post Office, 9.  
Synagogues: Bevis Marks, 841; Rue de la Victoire, Paris, 914.

TAIT Monument, Canterbury, 605.  
Tapestry, 283.  
Tavistock-row, Covent-garden, 155.  
Templars, the, 42.  
Temples, the old, 323.  
Temple of Diana, Ephesus, sculptured column, 840, 841.  
Terra-cotta, Layer Marney Towers, 497.  
Terra-cotta porch, East Sheen, 672.  
Tests for cement, 500.  
Thamesian drum of the Ephesus column, 840.  
Theatre, Drury-lane, 738.  
Thresh, Dr., on sewage purification, 115, 118.  
Tickhill Church, window at, 672.

Abbey, Westminster, 875.  
Aberdeen Infirmary, 364.  
Abuse of Joint Stock Companies Acts, 154.  
Acropolis, Athens, 75, 806, 903.  
Action of cements on lead, 875.  
Adalia, fortifications of, 806.  
Admiralty and War Office site, 364, 365, 385, 422, 838, 702.  
Advertisement, an architect's, 875.  
Aerial navigation, 432.  
Affairs of the F.R.A.S., the, 75.  
Agnew's Gallery, Messrs, 328.  
Agricultural Hall roof, Kensington, 567.  
Air, compressed, as a motive power, 164.  
Air, G. A. K. A., on the neglect of architecture, 465.  
Alcazar, Toledo, 70.  
Ailingham, Mrs., pictures by, 502.  
Amalgamation of railways, 6.  
America, registration of plumbers, 256, 501.  
American: architecture, 183, 397; Exhibition in London, 910; rolling stock, 364.  
Analysis of gas accounts, 875.  
Antiquarium, Berlin, 909.  
Antiquities at the Louvre, 465.  
"Anti-scrapers," the, and St. Bartholomew's, 736, 841.  
Antisepsis drainage, 738.  
Antwerp water-pipe, 847.  
Architect's Department, Metropolitan Board of Works, 702.  
Architects: certificates, 736; charges, 261.  
Architectural Association: Italian tour, 6; sketch-book, 405.  
Architectural: drawings, ownership of, 118; Examination, the, 432; Federation, 465; restoration, 841.  
Architecture: in America, 193, 397; neglect of, 465.  
Armstrong's, was in Italy, 6.  
Art: Greek, 7; Japanese, 688.  
Art exhibitions: Berlin, 736; Folkestone, 602.  
Art Journal, the, 634.  
Art-Union plates, the, 193.  
Artillery engineers, Portsmouth, 843.  
Artisans' dwellings: and the prison sites, 701; unhealthy, 633.  
Association of the Institute, 432.  
Athens: discoveries at, 75, 193, 328; new museum, 193.  
Atties monuments, Clapham, 432.  
"Authority" on architecture, an, 263.  
Autographic records in testing materials, 328.  
Award of Gold Medal to M. Garnier, 225.  
Awards of architecture, 805.

Baths, Roman, at Bath, 667, 805.  
Beckett, Sir Edmund, 283.  
Belgium, railway rates in, 118.  
Berlin: Antiquarium, the, 909; Art Exhibition, 736; Archaeological Society, 806; archaeology, in, 771; building in, 154; Schliemann Museum, 74; Winckelmann's, 154.  
Bills of quantities, 6, 107, 154.  
Birmingham: Post-Office, 806; workhouse infirmary competition, 534.  
Blake's works, 7, 568.  
Blowholes, District Railway, dangers of, 296.  
Bogus companies, 15, 842.  
Boiler explosions, 567.  
Bologna, tombs of, 328.  
Bolsen, S. E., on London water, 500.  
Bombay, ancient monuments in, 226.  
Bonni, Sig. G., 263.  
Bonn, discoveries at, 263.  
Borough, wages, salaries of, 398.  
Bric-a-brac in Paris, 422.  
Bridges: Pont Neuf, Paris, 6; Tower, London, 809.  
British Museum, the, in Chancery, 842.  
Brighton Railway: proposed amalgamation with Chatham and Dover, 6; revenue, 154.  
British Museum: hidden sculpture, 534; library, 601; lectures on sculpture, 910; re-arrangement of contents, 568.  
Brooklyn: growth of, 772; proposed monument, 397.  
Brunswick and its castle, 75.  
Buccleuch Memorial, Edinburgh, 295.  
Building in Berlin, 154.

Tilbury Docks, 605.  
Tilbury, presentation of, 351.  
Timbers, Colonial, 934.  
Tomb, registration of, 798.  
Tomb of Bishop Wm. de la Marchia, Wells Cathedral, 845.  
Tombs, Layer Marney, 500.  
Tower of St. Magnus, London Bridge, 602.  
Town mansion, designs for, a, 351, 370, 874.  
Trade depression, 83.  
Trade-guards of Europe, the, 361.  
Tramways, projected, 62.  
Transit window, Denver Cathedral, 506.  
Trap, Durran's, 909.  
Trevig Schools, Redruth, 506.  
Tunnel, the Mersey, 219.  
UNDERPINNING, 254.  
University College, Liverpool, 469.  
VALVE, Mann's, cistern, 559.  
Ventilation: of the Houses of Parliament, 879; of sewers, 260, 269.  
Ventilator, atmospheric, 657.  
Vestry-hall, Fulham, 639.

Building in concrete, 192, 218.  
Building without advice, 601.  
Building industries in France, 667.  
Building-trade charges, 328.  
Building trades of Rome, 534.  
Buildings, sanitary registration of, 841.  
Burlington Fine Arts Club, 236, 738.  
Cabs, London, 465.  
Calcutta, the Pulse Works, 634.  
Cambridge, Slade Professor, 431.  
Causale, Manchester Ship, 347, 341, 634.  
192; Zoid-Beveland, 262.  
Capital invested in gas undertakings, 875.  
Capitol, H. H. Ford, Connecticut, 397.  
Carbolium, American, 339.  
Carpentry, Tredgold's, 119.  
Carrington House, Whitehall, 535, 559.  
Carriage, relics from, 842.  
Carriage, H. H. Ford, Connecticut, 397.  
Castle of Brunswick, the, 75.  
Cathedral, proposed, at Liverpool, 225, 261, 318, 910; Mr. Emerson's design, 261, 318.  
Cathedrals: Florence, 365; Milan, 262, 432, 666, 805; Winchester, 295.  
Cements and lead, 876.  
Certificates, architects', 736.  
Cesspool system in Continental towns, 601.  
Chambers, Piccadilly, 667.  
Charges: in Florence, 601; in Rome, 262.  
Chapel debts, Mr. Burlingame, 349.  
Charges: architects', 261; railway, 192, 327, 364, 503, 533, 600, 669, 701, 771, 874.  
Charities, trade, 323.  
Charleshouse, the, 408, 701.  
Charles Vestry: and the electric light, 6; and sewer ventilation, 431.  
Chemical basis of water purification, 534.  
China, railways in, 193.  
China, mosaic found at, 812.  
Chronic monument of Nikias, 808.  
Christ Church, Brixton Hill, 808.  
Church, Deerhurst, 609.  
Church at Ripoll, Catalonia, 702.  
Church of St. Bartholomew, Smithfield, 667, 736, 841.  
Church Times, the, on the Liverpool Cathedral designs, 910.  
Clapham, the Fackins monuments, 432.  
Cleansing of sewers, 192, 431.  
Clerkenwell prison sites, the, 701.  
Cloisters, San Juan de los Reyes, Toledo, 667.  
Code of Arbitration Bill, 397.  
Collinson & Lock's showrooms, 910.  
Colonial and Indian Exhibitions, 296, 567.  
Commissions, illicit, 806.  
Companies, bogus, 154.  
Competition designs, estimates of cost, 398.  
Competition designs for the Paris Exhibition, 772.  
Competitions, a new form of execution in, 296, 355, 365.  
Compressed air as a motor, 154.  
Concrete-building in the metropolis, 192, 218.  
Construction of lock-floors, 263.  
Continental fortifications, 228.  
Contracts, reckless, 736.  
Contracts under Public Health Act, 364.  
Corinth, excavations at, 634.  
Cost of industrial drainage, 364.  
Country houses, sanitary condition of, 771.  
Cremation, Haysinger's apparatus, 501.  
Crypt of St. Mark's, Venice, 667.  
Dangers of the railway blowholes, 296.  
Death by fire, statistics of, 735.  
Death of Prince Torlonia, 295.  
Decorations, Persian, 150.  
Decorations, Italian Church, Hutton-garden, 772.  
Deerhurst Church, 909.  
Defection of the Thames, 431, 600.  
Delos, explorations at, 262.  
Design by Mr. Emerson for Liverpool Cathedral, 261, 318.  
Design by Mr. Hay for Liverpool Cathedral, 225.  
Designs for the Paris Exhibition, 772, 875.  
Disner to M. Garnier, Paris, 803.  
Discoveries: at Athens, 75, 193, 328, 909; at Bonn, 263; in Crete, 601; in Greece, 736; in Italy, 74, 75; at Mycenae and Tiryns, 667; at Naukratis, 185; at Orvieto, 465; at Pompeii, recent, 75; in Rome, 193, 225, 328, 842; near Siena, 601; in Syros, 702; at Trier, 328; at Winchester Cathedral, 295.  
Disfranchisement of freeholds, 701.

Vicars, St. Bride's, Fleet-street, 729.  
Victorian patent, 204.  
Village of Bidston, Cheshire, 937.  
Vinegar-yard and an old playhouse, 738.  
Villamary, Mr., resignation of, 780.  
Winchester, 518.  
WAGES of the working-classes, 492.  
Walker Art Gallery, Liverpool, 693.  
Wall-papers, designs for, 623.  
Waloken Church, 804, 823.  
Waltham Cross, 190.  
Walthamstow, Church of St. Michael and All Angels, 361, 392.  
War Office and Admiralty, Mr. Marvin's design, 778.  
Warehouses: Ludgate-hill, 506; Manchester, 302.  
Water schemes, projected, 62.  
Water supplies of great cities, 169.  
Weight-calculator, Chadwick's, 320.  
West: Cathedral, tomb of Bishop de la Marchia, 845.  
Westgarth essays, the, 463.  
Westgate-on-Sea, house at, 848.

Disposal of London sewage, 431, 500, 505.  
Dissolution of Social Science Assoc., 633.  
District Railway blowholes, 296.  
District Surveyors' elections, 192.  
Dividends, railway, 6, 75, 154, 262, 295.  
Dome of Mr. Emerson's design, Liverpool Cathedral, 261, 318.  
Dorland, Dr., and the buildings of the Acropolis, 806.  
Dowdell's Gallery, exhibitions at, 263, 635, 668.  
Drainage, antisepsis, 738.  
Drainage experiments, Washington, 119.  
Drainage of House of Commons, 805.  
Drainage of Lake Copais, Greece, 909.  
Drawings, ownership of, 118.  
Drawings: by Mr. Albert Goodwin, 702; by Mr. Herbert Marshall, 263; for St. George's Guild, 730; at the Society of Painters in Water Colours, 501.  
Dudley Gallery, water-colours at, 328.  
Dumlo, Orvieto, 875.  
Dutch pictures, 193, 702.  
Dwellings for workers, 334.  
East India Association, 192.  
Edinburgh: Buccleuch memorial, 295; proposed municipal buildings, 119, 601.  
Election of Slade Professor, Cambridge, 431.  
Elections of district surveyors, 192.  
Electric lighting in Chelsea, 5.  
Ellis, Triastan, water-colours by, 508.  
Emigration question, the, 74.  
Employers' liability, 534.  
Energy of fuel in locomotives, 223.  
Enfranchisement of leaseholders, 361.  
Engineering projects, big, 909.  
English industries in Italy, 6.  
Engravings of Turner's works, 296.  
Enlargement of House of Commons, 225, 327, 431.  
Estimates of cost of competitive designs, 398.  
Etrurian city, a, 74.  
Evidence before Select Committees, 534.  
Excavation, a new form of, 296, 355, 395.  
Examination, the Architectural, 432.  
Excavations: at Athens, 323; at Corinth, 634; in Greece, 736; at Orvieto, 465; at Paris, 262.  
Exhibitions: American, in London, 910; Centenary, Paris, designs for, 772, 875; Colonial and Indian, 296, 567; International, 294; Metal-work, Rome, 81; pictures, 193, 263, 296, 325, 432, 501, 502; Royal Society of Painters in Water Colours, 667; Society of Painters in Water Colours, 601.  
Experiments: in drainage arrangements, Washington, 119; with lead water-pipes, 875; with mortar joints, 634.  
Exploration, an, 193.  
Explorations at Delos, 262.  
Explosions of boilers, 567.  
Exports, French, 328.  
Federation, architectural, 465.  
Ferguson, Mr.: illness of, 74; on the tomb of Porosena, 296.  
Field's analysis of gas accounts, 875.  
Finances of Inventions Exhibition, 294.  
Fine Art Society, exhibitions at, 263, 702, 736.  
Fire, deaths by, 735.  
Fires, inquiries into, 841.  
Fire-percentage, 261.  
Fist, issuinary, 183.  
Florence: changes in, 601; the Mercato Vecchio, 842; Philistino in, 735; St. Maria del Fiore, 365.  
Folkstone art exhibition, 602.  
Foreign tramways, 633.  
Fortifications: Adalia, 808; Continental, 228.  
Frag, the tract of, 328.  
Frankland, Dr. Percy, on water purification, 534.  
Freehold disfranchisement, 701.  
Fries: building industries, 667; pictures, 193.  
French Gallery, Pall-mall, 501.  
Fries, the Parthenon, 568.  
Frog, voice of, Berlin, 809.  
Frontage line, 500.  
Fuel in locomotive engine, 154, 226.  
Fulham Vestry-hall competition, 155, 227, 295, 668.  
Furniture at Collinson & Lock's, 910.  
Galley of Tiberius on Lake Nemi, 293.  
Garnier, Ch., Royal Gold Medalist, 225, 805.

Westminster, industrial dwellings, 471.  
Whitehall Court, 10.  
Willesden, St. Andrew's Church, 59.  
Winchester Cathedral, discoveries at, 269, 295, 631.  
Winckelmann's ice-making machinery, 330.  
Windows, 733, 765.  
Wonders: stained glass, designs for, 10, 158, 194, 540; Denver Cathedral, 506; Edeaschamptel Church, 675; Eilston Church, 351; Tickhill Church, 672.  
Wood-block floor, Geary and Walker's, 556.  
Wood-carring, 556; Hindoo, 843.  
Woodwork at the Charterhouse, 759.  
Wooliams's wall-papers, 623.  
Working classes, earnings of, 492.  
Workmen's dwellings, Westminster, 471.  
Works of James Ferguson, 113.  
Works in Paris, 227, 398, 502, 635, 805.  
Worth's History of Devonshire, 429.  
Wren's work, a relic of, 369.  
Würzburg, the Three Crosses Inn, 914.

YORK, picturesque, 634.

## NOTES.

Gas companies, metropolitan, 875.  
Gas undertakings of United Kingdom, 875.  
Gas-engines, 261.  
German, archaeological publications, 601.  
Germany: competition in the iron trade, 362.  
Germans: new railways in, 262; railway rates in, 118.  
Gheto, the, in Florence, 601.  
Gibbons, Orlando, monument to, 7.  
Gizeh, the sphinx of, 842.  
Gold Medalist of the Institute, 225, 805.  
Goodwin, Albert, drawings by, 702.  
Gortyna, discoveries at, 155, 601.  
Goscher, Mr., on planning, 365.  
Goupil galleries, the, 193.  
Government Offices, site of, 364, 365, 398, 426, 633, 702.  
Graham collection of pictures, 502.  
Great Eastern Railway, 228.  
Greece: excavations in, 735; land reclamation in, 603.  
Greek: art, 7; inscriptions, 296; room, a, 772; vase painting, 193.  
Ground-rents, taxation of, 431.  
Guillaume, Eugene, and Greek art, 7.  
Gunners at Portsmouth, 843.  
Harbours of refuge, 397.  
Hardship in taking up awards, 805.  
Harford State Capital, 367.  
Harvard University Law Schools, 193.  
Hay, Mr., design for Liverpool Cathedral, 225.  
Haysinger's method of cremation, 501.  
Hidden sculpture, 534.  
Highgate, open space at, 163.  
Hints: to holiday-makers, 771; for land transfer, 228.  
Holland, railway rates in, 118.  
Holman Hunt, pictures by, 432.  
Home Office inquiry at Mile End, 133, 633.  
Hornsea, Aberdeen, 364.  
Hounslow sewerage, 397.  
House of Commons: proposed enlargement, 225, 327, 431; sanitary condition of, 842.  
House of L. L. Carrington, Whitehall, 535, 558.  
House tenure in Ireland, 364, 534.  
Houses in towns, tenure of, 534.  
Howard, the artist's exhibition of painting on china, 702.  
Huddleston, Baron, on five-per-cent, 261.  
Hyde Park, 464.  
Ill-fitted commissions, 806.  
Illuminated MSS., 736.  
Imports, French, 328.  
Improvement in St. Paul's Churchyard, 75.  
India: ancient monuments in, 226; canals in, 192; proposed railway works, 119.  
Indian and Colonial Exhibition, 296, 567.  
Indian Engineer, the, 635.  
Industries, migration of, 6, 118, 262.  
Infirmary: Aberdeen, 364; Birmingham, 534.  
Inquests as to fires, 841.  
Insanitary houses, landlords' liability for, 533.  
Inscription, the Gortyna, 155.  
Inscriptions, Greek, 296.  
Institute of Architects, 75, 151, 225; annual report, 602; Gold Medalist, the, 225, 805.  
Interest out of capital, 397.  
Inventions Exhibition, advances of, 294.  
Ireland, house-tenure in, 364, 534.  
Iro, German, 262.  
Iron churches, Mr. Ruskin on, 843.  
Iron roof, Agricultural Hall, Kensington, 567.  
Israel, the, 118, 153, 262.  
Irrigation in India, 192.  
Italian Church, Hutton-garden, 772.  
Italian tour, Architectural Association, 6.  
Italy: discoveries in, 74, 75; migration of English industries to, 6; sanitary shortcomings, 534.  
Japanese art, 668.  
Jebb, Dr., and discoveries at Tyrins, 667.  
Jerusalem, Qbours-e-Molok, 295.  
Joint Stock Companies Acts, the, 154.  
Joins, mortar, strength of, 634.  
Journal of the Hellenic Society, 293.  
Kilburn, open spaces at, 153.  
Kunstausstellung, Berlin, 771.  
Kylze Society, the, 329.  
Labour and capital, 600.  
Labour statistics, 431.  
Land Bank, a, 226.



## Sphinx of Gizeh, the, 842

Sphinx of Gizeh, the, 842  
 State Capital, Hartford, Connecticut, 367  
 Statistics: deaths by fire, 735; labour, 491  
 Statue of Liberty, New York, 393; dis-  
 covered at Gortyna, 601; found at Mantis-  
 ene, 634; found at Naukratis, 156;  
 found at Tréves, 325  
 Statue of Mercury at the Louvre, 702  
 Steam boiler explosions, 567  
 Stone, a, discovered at Rome, 193  
 Street lamps, in London, the, 465  
 Street nomenclature, 192, 290, 295  
 Stræt, Piccadilly to Bloomsbury, 192, 290, 295  
 Strength of mortar joints, 634  
 Strikes and wages disputes, 118, 600  
 Studies by Mr. Whistler, 635, 668  
 Sundry Municipal Holdings competi-  
 tion, 256, 355, 365, 389, 397, 601, 634, 701  
 Superintending Architect, Metropolitan  
 Board of Works, 702  
 Swayre, baronet, 465  
 Syros, discoveries in, 702  
 Taxation of ground-rents, 431  
 Tegea, sculptures from, 772  
 Temple of Athens. Athens, 806  
 Temple found at Corinth, 634  
 Temple of Solomon, the, 474  
 Tender, non-acceptance of lowest, 601  
 Tenure of houses, 364, 634  
 Tertulianus, Myrina, 465  
 Tinting materials, the, 338  
 Thames, sewage in the, 431, 630, 505  
 Thamey Valley Sewerage, 254, 397  
 Theatre, the, 465  
 Times, the, on Sir Edmund Beckett, 263  
 Tynns and Mycenæ, 667, 609  
 Tynns's tomb, the, 465  
 Toledo, the Alcázar, 701; cloisters at, 667  
 Tombs: Bologna, 328; the Doge Dandolo,  
 Venice, 119; Porsenna, 260; Jewish, 295  
 Tontine, the, 431  
 Tourney's experiments with mortar joints,  
 634  
 Tower at the Paris Exhibition, 875  
 Tower Bridge, the, 909  
 Town houses, tenure of, 364, 634  
 Trade charities, 322  
 Trade of France, the, 328  
 Trade unions abroad, 600  
 Traffic regulations, railway, 75  
 Transcripts, photographs of, 433  
 Tredgold's "Carpentry," 119  
 Trèves, discoveries at, 325  
 Tristram Ellis, water-colours by, 568  
 Trophæum, the, 736  
 Tunnel, the, Siphon, 909  
 Tunnel, submarine, Prince Edward's,  
 465  
 Turner's works, engravings of, 296  
 Vandalism in Florence, 735  
 Vase-painting, Grecian, 465  
 Venice: St. Mark's, 667; tomb of the  
 Doge Dandolo, 119  
 Ventilation: of the House of Commons,  
 295; of France, 192, 431  
 Verboekhoven, 263  
 Vestry Hall, Fulham, 155, 227, 295, 568  
 Vexation and snow-storms in London, 74, 183  
 Vetulonia, site of, 74  
 Vallianry, Mr., resignation of, 702  
 Waiting-rooms, railway, 6  
 War Office site, the, 364, 395, 398, 426, 633,  
 772  
 Warning to holiday-makers, 841  
 Water supply: Antwerp, 872; London,  
 396, 597, 599; Rome, 634  
 Water-courses: near the Agnæ's, 328;  
 at the Dudley Gallery, 328; by Mr.  
 Orrock, 263; Royal Society of Painters  
 and Sculptors, the, 465  
 Water-main, new, Calcutta, 634  
 Water-pipes, leaden, 875  
 Water-purification, 334  
 Water-storage in London, 192  
 Westminster Abbey Restoration Bill, 875  
 Whistler, studies by Mr., 635, 668  
 Whistler, the, and his discoveries at, 295  
 Wickelmannsfest, Berlin, 156  
 Windows, Church Oburob, Brixton Hill, 296  
 Workhouse infirmary, Birmingham, 634  
 Wortley, Wellington, 465  
 Works of William Blake, 7, 508  
 Zenodorus, 702  
 Zuid-Beyland Canal, 362

533; Scott v. Pape, law of light, 700;  
Vestry of St. George, Hanover-square,  
v. Sparrow, line of frontage, 363; West-  
wood v. Government of Cape Colony,  
arbitration of awards, 806; Williams v.  
Wallasey Local Board, Public Health  
Act, 665; Woodford Local Board v.  
Elliot, obstructing footway with building  
materials, 66

Adams, C. A.: on architectural education  
726; on the survey of works, 301

Admiralty and War Offices site, 367, 426

Adulteration Acts, the, 280

Africa, Roman remains in, 741

Agricultural Hall, Kensington, 776

Aitchison, G. A. B.: on architecture  
education, 331, 329; on Japanese archi-



## REPORTS, &amp;c (continued):—

- lecture, 830; on mouldings, 363, 402; on the neglect of a-citecture, 465
- Allen, Romilly, on sculptured doorway at
- Amateur photography, 436, 467
- American: architects, 465; methods of construction, 434
- Anderson, J. Macvicar, on the Admiralty and War Offices site, 367; on the Architectural Examination, 298; on distinguished visitors at the Institute, 912, 913
- Angell, Dr., on the disposal of sewage sludge, 423
- Appleton, H. D., on the towers of Bologna, 389; on the survey of works in press, 300
- Appointments for paving, 187
- Architecture cases: Lecture Hall, 901; Tibbury Docks, 145, 367, 402
- Archæological societies: British Archaeological Association, 146, 218, 287, 368, 421, 471, 594, 680, 801, 870
- British Museum, unpublished sculptures, 239, 352, 368, 534
- Brooks, E. P. L., on engravings, 604
- Brown, P. M., on Wren, 198
- Bryant, Powis, & Bryant (limited), 835
- Buckingham Palace, infringement of copyright, 902, 365
- Builders, the Institute of, 181
- Builders' Benevolent Institution, 761
- Builders' Clerks' Benevolent Institution, 354, 470, 778
- Builders' Foremen's and Clerks of Works' Institution, 354, 427
- Building Act, Metropolitan: cases under, 187
- Neglect to submit plans to District Surveyor, 761, non-deposit of plans, 785; timber stages, are they buildings?; unincorporated places of amusement, 145; what is a party-wall? 761; withe what is a, 593
- Building law of Sweden, 288
- Building materials, philosophy of, 470
- Building regulations for Scotland, 623
- Burnham, pag. dss. in, 470
- By-laws for concrete building, 216, 228, 247, 369
- Carina's restoration of Solomon's Temple, 426
- Carpenter, Dr. A., on sanitary legislation, 675, 867
- Carpenters' Hall lectures to artisans (see "Lectures")
- Carpentry as influenced by architecture, 668
- Carrington House, 558, 628
- Cathedral facades, 251, 263
- Centrals: Erector, 728; Liverpool, 180, 182, 286; St. Andrews, 670, 798; St. Patrick's, Dublin, 393
- Central Association of Master Builders, 388
- Chadwick, E.: on sanitary legislation, 691; on sanitationism v. humanitarianism, 867
- Chambers, F., on clerks of works, 668
- Changes in sanitary law, 691
- Charter question at the Institute, 328
- Charterhouse scheme, 188, 228, 661, 740
- Chesley District Surveyors, 800, 843
- Chemical analysis of sewage, 367
- Christie, E., on the Admiralty and War Offices site, 368; on the Architects' Benevolent Society, 400; on the late Mr. Ferguson, 180; on the Godwin Bursary, 436
- Chubb's locks, 256
- Church restoration, 865
- Civil buildings, architecture of, 458
- Civil and Mechanical Engineers' Society, 801, 834
- Clarke, T. Chafield, on the architecture of civil buildings, 458; on disks of works, 465
- Clarkson, S. F., on architectural photography, 458; on the survey of works in progress, 201
- Cleaning-up of sewers, 181, 192
- Clerk of works, assaulding, 623
- Clerks of Works' Association, 558
- Club, National Liberal, 725
- Cockrill, J. W., on works at Great Yarmouth, 866
- Cole, A. S., on paper-making, 673
- Coleridge, Lord, on art and artists, 865
- Colles, John, 387
- Collie, J. H., on architects, 470
- Concave, 433, 467; buildings in London, 216, 228, 257, 389; constructive treatment of, 831
- Conder, J., on Japanese architecture, 829
- Congress of French architects, 675, 877
- Constitutional Club, 595
- Construction: on architectural methods of, 434; 1; on French, 385, 319
- Copyright in *Builder's* illustrations, 302, 351
- Corfield, Prof., on water-traps, 353
- Cotton, J., on architectural education, 662
- County surveyors' Society, 730
- Cox, E. L., on books, 776
- Cross, Waltham, 397
- Croydon meeting of Surrey Archaeological Society, 623
- Crystal Palace School of Engineering, 628
- Cunning, Syer, on Westminster Hall, 218
- Cunningham, G. C., on Booky Mountain Railway, 593
- Cutler, H. A., on vousoir arches, 426
- Damp houses, 186
- Dawson, H., on architects' remuneration, 228
- Day, L. F., on stained glass, 158, 194, 198
- Declaratory Bill, 287
- Departmental action at the Institute, 229
- Design in stained glass, 156, 194
- Donners: Artists' Benevolent Fund, 685; Architects' General Benevolent Institution, 766; Birmingham Architectural Association, 623; Builders' Clerks' Benevolent Institution, 470; Builders' Foremen's Institution, 354; Civil and Mechanical Engineers' Society, 801; Clerks of Works' Association, 558; Sanitary Inspectors' Association, 667
- Disposal of sewage sludge, 226, 423, 426, 457, 464, 505, 940
- District Surveyors' elections, 192, 198, 800, 843
- Docks, Tibbury, 146, 357, 867
- Domestic fireplaces, 235, 319, 355
- Donaldson, the late Prof., 228
- Doorway at Alisa, Yorks, 146
- Dowling, Mr. J., on terra-cotta, 537
- Dublin, St. Patrick's Cathedral, 393
- Dundee Institution of Architecture, 198
- Duties of architects, 457
- Dwellings: sanitary, of, 322; for the working-classes, 426
- Earnings of the working-classes, 181
- Essie, W., on the waters of the Begholt sands, 800
- East India Association, 103
- Edinburgh: Fettes College, 387; O. d., 421
- Edinburgh Architectural Association, 193, 265, 387, 421, 623, 672, 726, 781, 808
- Education: architectural, 331, 706; technical, in Ireland, 266; of the working-classes, 181
- Egypt, exploration in, 835
- Election of pensioners, Builders' Benevolent Institution, 470
- Elections of District Surveyors, 193, 198, 848
- Employers' liability, 142, 388
- Engineers at Crystal Palace, 623
- Engineering Societies: Liverpool, 186, 393, 598; London, 389, 562
- Engravings of the Italian schools, 804
- Etymology, architectural, 142
- Etchings-light, the, 438
- Examinations: Architectural, 298, 322, 434, 637; Municipal Engineers' Association, 628, 699; Sanitary Institute, 870; Surveyors' Institution, 186, 198, 706
- Erektor: Cathedral, 725; Diocesan Architectural Society, 725
- Experiments, hydraulic, 392
- Exploration in Egypt, 835
- Facades of cathedrals, 251, 263
- Failure of steel boilers, 186
- Fall of walls at Holloway, 252, 263
- Federation, architectural, 456, 508
- Female School of Art, 367
- Ferguson, Jas. M., Christian on, 180
- Ferguson's restorations of Solomon's Temple, 139
- Fettes College, Edinburgh, 387
- Fine art aspect of woodwork, 603
- Fireplace construction, 285, 319, 355
- Fletcher, B., M.P., on the influence of
- Foundations of Blackfriars Bridge, 358
- Freem, Prof., on sanitary aspect of geography, 691
- French architects, congress of, 671, 877
- Fulham Vestry, 742
- Gale, A. J., on American construction, 435
- Garnier, M., and the Royal Gold Medal, 228, 913
- Gas manufacture, 870
- Gass, J. B., on American methods of construction, 434
- Geology: engineering and, 662; sanitary aspect of, 691
- German working, 265
- Giffen, R., on the progress of the working-classes, 181
- Glasgow Architectural Assoc., 824, 761
- Glass, old, lent at, 189, 194
- Gloucestershire Archaeological Society, 909
- Godwin Bursary, the, 223, 434
- Gordon, V., at Artists' Benevolent Fund
- Golden, the, 223, 913
- Gordon, J., on Gothic ornament, 672
- Gothic ornament, 672
- Granham, A., on Roman remains in Tunisia, 741
- Granham, R. F., on separate sewerage systems, 216
- Greek: sculpture, 910; sepulchral monuments, 298
- Grüning, E. A., on Prof. Donaldson, 229
- Hag, P., on the Paris Metropolitan Railway, 502
- Hakewill's restoration of Solomon's Temple, 106
- Hartwood refuge, 397
- Harris, G. F., on geology and engineering, 662
- Harris, Lord, on irrigation in India, 192
- Harrow, new buildings at, 627
- Hay, J. M., on the Liverpool Cathedral site, 180, 182
- Helenic Society, 404
- Hellyer, S. B., on the registration of plumbers, 197
- Hirant Tunnel, the, 528
- Hodgson, J. S., on architectural ethnography, 142
- Holden, J., on architects' duties and aims, 457
- Holloway, fall of walls at, 252, 263
- Hooper, F., on cathedral facades, 265
- House, Lord Carrington's, 658, 628
- Houses: damp, 186; new, at Kensington, 299, 458
- Housing the working-classes, 426
- Huddleston, Baron, on architects' remuneration, 228, 287
- Hull, Prof., on exploration in Egypt, 835
- Hunt, E. M., at the Institute, 912
- Hydraulic experiments, Bookee, 392
- I'Anson, E.: on M. Garnier, 912; on municipal works in Rome, 759
- Improvements in gas manufacture, 870
- Indoor architecture and War Offices site, 367
- Influence of architecture on carpentry, 668
- Infringement of copyright of *Builder's* illustrations, 302, 351
- Inquest, held at Holloway, 252, 263
- Inquiries, Local Government Board, 493
- Institute of Builders, the, 181
- Institute, Royal, of British Architects:—Indoor architecture and War Offices site, 367; American Methods of Construction, 434; Archi cets' remuneration, 287; Architectical Examination, the, 228, 398, 322, 434, 637; business meeting, 184; request of books by Mr. Ferguson, 911; Charter, proposed new, 228, 506; Charterhouses, the, 238, 467; death of Mr. Ferguson, 180; death of Mr. H. H. Richardson, 740, 911; Departmental action, 229; Jona dss., the late Prof., 228; election of President, the late Mr. J. Ferguson, the late Jas. M., 180, 911; Godwin Bursary,
- 228; G. I. Medal, award to M. Garnier, 228, 912; Japanese Architecture, 829; London and Bristol, 228, 387, 403, 404, 460; presentation of Gold Medal, 912; President, the new, 829; Eugénie Studentship, 228, 400; Report of the Council, 636; Roman Remains in Tunisia, 741; Students' drawings, 400; Studentships, 228; Swedish Building Law, 298
- Institution of Civil Engineers, 128, 523, 623, 634, 694, 695, 801, 846
- Institution of Civil Engineers of Ireland, 265
- Inventors' Institute, 216, 931
- Ireland: architects in, 457; technical education in, 265
- Iron, Hardware, and Metal Trades Pension Society, 224, 335
- Ironworkers' forge, a modern, 229
- Irrigation in India, 192
- Italian: brickwork, 368, 388, 423; excursion, Architectural Associat on, 637, 698, 726
- Japanese: architecture, 829; Village, the, 145
- Jerram, G. B., on sanitary legislation, 873
- Johnson, W., on brick manufacture, 216
- Junior Engineering Society, 662
- Kennington: Agricultural Hall, 778; new houses, 299, 458
- Kerr, Prof., on American Construction, 435; on architects' remuneration, 297; on the Architectural Examination, 298; on the Philosophy of Building Materials, 400; on Solomon's Temple, 141
- Land, sales of, 798, 800, 801
- Law Courts, the new, 623
- Laws, sanitary, 467, 573
- Lectures: on Architecture at the Royal Academy: Mr. Atchison on architectural education, 331; Mr. Atchison on mouldings, 365, 402
- Lectures at Carpenters' Hall: Mr. T. Bashill on timber, 302; Mr. Hanister Fletcher, M.P., on the Influence of Architecture on Carpentry, 568; Mr. T. Chafield Clark, on the Architecture of City Buildings, 458; Prof. Corfield on Water-traps, 353; Mr. James Doulton on Terra-Cotta, 537; Mr. Eger on the Philosophy of Building Materials, 400; Mr. John Slater on Concrete, 433, 467; Mr. H. H. Statham on the Fine Art Aspect of Woodwork, 603
- Lectures at the Royal Institution, 235, 296, 352, 368
- Lectures at the Royal School of Mines, 86, 147, 181, 220, 257, 367, 332, 358, 392, 426
- Leeds and Yorkshire Architectural Society, 63, 389, 465, 726, 918
- Legg, W. A., on the Hiram Tunnel, 528
- Legislation, sanitary, 673, 690
- Leicester Society of Architects, 230, 421
- Leighton, Sir F., on M. Garnier, 813
- Lessons from old glass, 194, 194
- Lewis, Prof. T. H., on the Architects' Benevolent Society, 470
- Liability of employers, 142, 383
- Light, the Kibosh, 438
- Lincoln Cathedral, 263
- Line of frontage, 182, 383, 500
- Liverpool: Architectural Society, 180, 182, 226, 465, 570, 761, 786; cathedral, 180, 182, 266; Engineering Society, 186, 393, 598, 766; new waterworks, 625
- London: Board of Board inquiries, 493
- Locks, Chubb's, 256
- Lodes, displaced, 68
- Loire, architecture of, the, 198
- London and Bristol, 228, 387, 403, 404, 460
- London Sanitary Protection Assoc., 389
- London sewage question, the, 228, 426, 457
- 484, 500, 505, 673, 940
- London sewers, the, 192
- London and County Banking Company, 256
- Lovgrove, H., on indoor architecture, 662
- MacBride, J. A. P., on Greek sculpture, 910
- Machinery: brickmaking, 216; stone-sawing, 439, 569, 633, 634, 637
- MacLachlan, J., on Old Edinburgh, 421
- Magnum, A. J., on the failure of steel boilers, 186
- Maquire, W. R., on technical education in Ireland, 265
- Manchester: Architectural Association, 193, 142, 198, 467, 508; Society of Architects, 809
- Masonry arches, 393
- Master Builders' Association, 198, 389
- Materials of Lord Carrington's house, 568, 628
- Materials: philosophy of, 400; testing, 328
- Medals and prizes at the Institute, 228, 387, 400, 494, 460
- Memorial of the Institute on the Government Offices site, 397
- Meteorological Society, 187, 469
- Methods of coas ruotion, American, 434
- Metropolitan Board of Works: Architects' Department, 368, 760; Battersea Bridge, 255, 765; the Charterhouse scheme, 186; cleaning and ventilation of sewers, 181; 191; concrete by-laws, 216, 229, 287, 369; Disposal of the London sewage, 228, 426, 457, 494, 500, 505, 940; District Surveyors' elections, 192, 198, 800, 848; fall of walls at Holloway, 252, 263; member, a, 904; prison site, Clerkenwell, 900; staircase construction, 730; street nomenclature, 192, 280, 283
- Metropolitan Railway for Paris, 502
- Micklethwaite, J. T., a plea for old churches, 865
- Middlebrough Town Hall, 672
- Millard, W. J. N., on architect training, 778, 726; on cathedral facades, 265
- Mills, W. E., on subsidence of buildings, 698
- Mineral, lectures on, 69, 110, 147, 181, 220, 237, 297, 322, 358, 369, 426



## REPORTS; ETC. (continued):—

- Mont Cenis Tunnel, 267  
 Monuments, sepulchral, 286, 352, 368  
 Morley, Lord, on the Admiralty and War Office, 382  
 Morris, W., on "restorations," 805  
 Mosso manufacture, 489, 580, 593, 624, 657  
 Mountings, 395, 402, 438  
 Mundella, Mr., on harbours of refuge, 397  
 Municipal Engineers' Assoc., 628, 690, 698  
 Municipal works in Rome, 765  
 Murgatroyd, J., on the architecture of the Loire, 198  
 Museums: Architectural, 421; Parkes, 219  
 National Agricultural Hall, Kensington, 776  
 National Assoc. of Master Builders, 198  
 National Club, 726  
 National Liberal Land Company, 392  
 National Refuge Harbours Society, 397  
 National Smoke Abatement Inst., 596  
 Neglect of architecture, the, 465  
 Newman's forges, Mr., 220  
 Newton, Prof., on the late Dr. Birch, 146;  
 on untraced sculptures in the British Museum, 296, 352, 438  
 Non-acceptance of lowest tender, 388  
 Northern Architectural Assoc., 441, 506, 672  
 Nursery, R. F., on engineering topics, 550  
 Offices of London School Board, 367  
 Old glass, lessons from, 168  
 Organisation, sanitary, 573  
 Ornament, Gothic, 672  
 Oxford Architectural and Historical Society, 471  
 Pagodas in Burmah, 470  
 Papworth, Wyatt, on Prof. Don's don, 228  
 Paris Metropolitan Railway, 602  
 Parkes Museum, the, 219, 504  
 Party-wall case, 761  
 Paving opportunities, 197  
 Payment for quantities, 232, 261  
 Penny, W. G., on terra-cotta, 471  
 Perry & Co., Limited, 322  
 Peterborough Cathedral, 263  
 Photography of buildings, 400  
 Photography, architectural, 438, 467  
 Pike, C. R., on architectural education, 728;  
 on architectural photography, 467;  
 on books, 777;  
 on brickwork, 388;  
 on cathedral facades, 265;  
 on Mr. Ferguson, 180;  
 on isidor architecture, 602;  
 on stained glass, 196;  
 on the survey of works in progress, 301  
 Pile, A. B., on cathedral facades, 251, 283  
 Pile for old churches, 8, 895  
 Plumbers, registration of, 185, 193, 196, 226, 256, 322, 358, 659  
 Plumbers' Company, 185, 192, 198, 282, 659  
 Pollution of water supplies, 105  
 Pottery manufacture, 437  
 Practical survey of works in progress, 300  
 Pratt, H. W., on cathedral facades, 265;  
 on stained glass, 196;  
 on the towers of Bologna, 388  
 President's address, Society of Engineers, 230  
 Preston, R. B., on the University and Cathedral city of St. Andrews, 570, 790  
 Principles of design in stained glass, 168, 194  
 Prizes: Architectural Association, 776;  
 at the Institute, 224, 357  
 Progress of the working classes, 181  
 Projections beyond line of frontage, 182  
 Pugin Studentship, the, 258  
 Quantities, payment for, 252, 261  
 Railway, Metropolitan, for Paris, 502  
 Railway, Rocky Mountain, 523  
 Records, autographic, of tests, 328  
 Reigate, G. B., on indoor architecture, 591  
 Registration of plumbers, 185, 192, 196, 226, 322, 358, 659  
 Remodelled London, 404  
 Remuneration of architects, 252, 261, 297  
 Reports: Art-Union of London, 692  
 Council of the Institute of Architects, 685  
 Resignation of Mr. Williams, 760, 796  
 Restorations: architectural, 805; Solo-  
 mon's Temple, 103, 139  
 Richardson, the late H. H., 740  
 Richmond, T. M.: on American construction, 435;  
 on Solomon's Temple, 141  
 Rhodes, E. C., on Solomon's Temple, 103, 139  
 Rocky Mountain Railway, 523  
 Ross, E. C., on builders, 490  
 Royal Academy, the, 141; sepul-  
 chral monuments, 352, 368  
 Rome, municipal works in, 759  
 Royal Academy experiments, the, 392  
 Royal Academy: lectures (see "Lec-  
 tures") students, 796  
 Royal Architectural Museum, 431  
 Royal Institute of the Architects of Ireland, 457  
 Royal Institute of British Architects (see "Institute")  
 Royal Institution, 696  
 Royal Institution lectures, 285, 296, 368  
 Royal School of Mines, 65, 110, 147, 181, 220, 257, 297, 322, 358, 392, 425  
 Saint Andrews, N.B., 570, 796  
 St. Patrick's Cathedral, Dublin, 938  
 St. Paul's Ecclesiological Society, 220  
 St. Thomas, Charterhouse, School of Art, 572  
 Sale of materials, Lord Carrington's house, 558, 628  
 Sanitary aspect of geology, 691  
 Sanitary Protection Association, 359  
 Sanitary: organisation and legislation, 573, 690;  
 works at Yarmouth, 660  
 Sanitary Assurance Assoc., 186, 290, 322, 658  
 Sanitary Inspectors' Association, 105, 290, 423, 467, 573, 690, 867  
 Sanitary Inst. of Great Britain, 464, 832, 870  
 Sanitary Protection Association, 359  
 Sanitation of dwellings, 322  
 Schools of Art: Female, 366; St. Thomas, Charterhouse, 672  
 School Board Offices, the, 287  
 Science lectures for the people, 627  
 Scott, J. G., on pagodas in Burmah, 470  
 Sculpture, Greek, 510  
 Sculpture, unexecuted, British Museum, 296, 352, 368, 534  
 Sculptured doorway, Alce, Yorks, 146  
 Seabill, F., at the Institute, 911  
 Seine, tidal works on the, 766  
 Sellars, J., on building regulations for Scotland, 723  
 Separate sewage systems, 219  
 Sewage, chemical treatment of, 867  
 Sewage question, London, 228, 423, 426, 457, 464, 510, 526, 873, 947  
 Sewerage systems, separate, 219  
 Sewers, cleansing and ventilating, 181, 192  
 Shaw, G., on registration of plumbers, 186  
 Skelton, J. N., on tidal works on the Seine, 766  
 Shoring buildings, 696  
 Signs, old, in Westminster Hall, 218  
 Simon, Mr., on wood-carving, 265  
 Sinc Collyer, 387  
 Site for Admiralty and War Office, 367, 426  
 Site for Liverpool Cathedral, 180, 182  
 Slater, J., on American construction, 435;  
 on books, 777;  
 on brickwork, 388;  
 on concrete, 433, 467  
 Smith, Prof., on masonry, 66, 110, 147, 181, 189;  
 on Japanese architecture, 830;  
 on Roman remains in Tunisia, 741  
 Smoke abatement institution, 596  
 Smyth, Prof., on mining, 66, 110, 147, 181, 220, 257, 297, 322, 358, 392, 423  
 Société Centrale des Architectes, 502  
 Société of Antiquaries of Scotland, 421  
 Society of Arts, 329, 470, 573  
 Society of Biblical Archaeology, 146  
 Society of Chemical Industry, 867  
 Society for Encouragement of Fine Arts, 123, 604  
 Society of Engineers, 230, 392, 870  
 Society of Medical Education, 800  
 Society for Promoting Hellenic Studies, 404  
 Society for Protection of Ancient Build-  
 ings, 601, 541, 685  
 Sotheby's: Architectural Association, 506;  
 Engineering Society, 359  
 Solomon's Temple, 103, 139  
 Spies, R. P., on manufacture, 870  
 Spies, R. P.: on American architects, 435;  
 on Japanese architecture, 830;  
 on woodwork, 141  
 Stability of voussoir arches, 428  
 Stained glass, lessons from, 166, 184  
 Staircase construction, 720  
 Stannard, J. C., on Solomon's Temple, 141;  
 on the towers of Bologna, 388  
 Statham, H. H., on the fine-art aspect of woodwork, 141  
 Statistical Society, 181  
 Steel boilers, failure of, 166  
 Steele, 296, 352, 359  
 Stening, J. C., on photography, 467  
 Stokes, Leonard: on architectural educa-  
 tion, 727;  
 on cathedral facades, 265;  
 on photography, 467;  
 on stained glass, 166  
 Stone-sawing machines, 489, 560, 659, 624, 657  
 Students at the Royal Academy, 78  
 Studentships: Architectural Association, 776;  
 at the Institute, 228  
 Sunday Society, 800  
 Superintendent Architect, Metropolitan Board of Works, 760  
 Survey Archaeological Society, 523  
 Survey of works in progress, 300  
 Surveyors and Auctioneers' Clerks' Pro-  
 vident Association, 266, 322  
 Surveyors' Institution—Annual meeting, 826  
 Stevens, J. B., on the Great, 727  
 Surface of the Earth's Surface in its Secular Aspect, 691  
 London remodelled, 404;  
 Municipal Works in Rome, 765  
 Sussex Archaeological Society, 471  
 Swans, tenders for sewerage works, 638  
 Swedish building law, 298  
 Tapestry-making, 673  
 Teale, T. P., on replacements, 285, 319, 355  
 Technical education in Ireland, 265  
 Teddington, proposed bridge, 463  
 Temple of Solomon, the, 103, 139  
 Tendering at Swansea, 659  
 Tenders, non-acceptance of, 388  
 Terra-cotta, 471, 537  
 Testing materials, 325  
 Thames: state of the, 426, 457, 494, 500, 505;  
 Tunnel, the, 267  
 Thoughts on architectural training, 706  
 Thrupp's theory as to Solomon's Temple, 104  
 Tidal works on the Seine, 766  
 Tidy, Dr., on sewage treatment, 867  
 Tilbury Docks arbitration case, 146, 387, 867  
 Timber: growth of, 302, 390, 424;  
 preservation of, 322  
 Timber stages, 517  
 Towers of Bologna, the, 268, 388, 422  
 Town-hall, Middleborough, 672  
 Training, architectural, 706  
 Traps, 235  
 Troploe, G. H., on builders' clerks, 470  
 Tunisia, Roman remains in, 741  
 Tunnels: Hiram, 225; Mont Cenis, 267;  
 Thames, 237  
 Unexecuted sculptures in the British Museum, 296, 352, 368, 534  
 University of St. Andrews, 570, 796  
 Unwin, Mr., on testing materials, 328  
 Ventilation of sewers, 181, 192  
 Vestry, Fulham, 742  
 Victoria Institute, 535  
 Visits of the Architectural Association (see "Architectural Association")  
 Vogt's, Count de, restoration of Solomon's Temple, 104  
 Vulliamy, resignation of Mr., 796, 796  
 Voussoir arches, 426  
 Wymryn Waterworks, Liverpool, 628  
 Wages of the working classes, 181  
 Waltham Abbey and Cross, 937  
 War Office, site of, 387, 459  
 Ward, H., on brickmaking, 604  
 Warner, W., on the disposal of sewage sludge, 423  
 Water storage in India, 163  
 Water supplies, pollution of, 105  
 Water-traps, 353  
 Waterhouse, A., on architects' remunera-  
 tion, 298  
 Waters of the Bagshot sands, 810  
 Waterworks for Liverpool, new, 428  
 Watson, T. H., on brickwork, 388  
 West, F., on concrete, 331  
 Westminster Hall, traders' signs, 218  
 Waterhouse, A., on brickwork, 368, 388, 422;  
 on stained glass, 196  
 Whitgift Hospital, Croydon, 523  
 Whitgift's restoration of Solomon's Temple, 104  
 Windows, stained-glass, 156, 194  
 Wither, what is it? 693  
 Wood-carving, German, 265  
 Woodward, W., on remodelled London, 404  
 Woodwork, fine-art aspect of, 603  
 Working classes: housing the, 426;  
 progress of, 181  
 Works in progress, survey of, 300  
 Wren, Sir Christopher Brown, on, 196  
 Yarmouth, sanitary works of, 668  
 York Architectural Association, 230

## LETTERS.

- Albany Capitol, staircase of, 657  
 Appeal for benevolence, 490  
 Approaches to St. Paul's Cathedral, 318  
 Architect's power to employ surveyor, 318  
 Architectural Association: excursion to Italy, 782; lectures, 762  
 Architectural Examination, 143, 182, 217, 252  
 Architecture at the Royal Academy, 624  
 Artists, lady, 424  
 Arts Club, proposed new, 468  
 Associates of the Institute, 590  
 Beaufort Castle, woodwork at, 390, 423  
 Beauty, a tax on, 490  
 Belper Union Infirmary, competition, 763  
 Bernini's staircase at the Vatican, 389  
 Bill of quantities, what is it? 64, 107, 168  
 Bishop de la Marchia's tomb, Wells, 801  
 Brasses, Marney, 690  
 Brewery chimney-shaft, 694, 727, 761, 796  
 Bridge, the North, 107  
 Builders, swindling, 263  
 By-laws for concrete building, 267, 389  
 Cathedrals: Liverpool, 318; Truro, 390, 693  
 Cement in tall chimneys, 796  
 Cements, patents for, 624, 658, 693, 730  
 Certificates, Health Exhibition, 595  
 Charter of the Institute, 634, 660  
 Cheltenham Grammar School competition, 253  
 Chimney construction, 64, 694, 727, 761, 796  
 Christ Church, Streatham, 795  
 Church, Saxon, Deerhurst, 655  
 Church of St. Bartholomew-the-Great, 727, 796  
 Church of St. Thomas, Liberty of the Rolls, 183  
 Clapham station, the, 143  
 Club, proposed new, for architects, 458  
 Competitions: money deposits in, 355  
 Concrete building in the metropolis, 287, 359  
 Concrete floors, 524  
 Cost of removing snow, 183  
 Deerhurst Church, 655  
 Distress in professional circles, 355  
 Dome of Mr. Emerson's design for Liver-  
 pool Cathedral, 318  
 Doomed London churches, 183  
 Drainage of London, 106  
 Drawings, ownership of, 107  
 Dustbins, 532  
 "Economiser," the, 319, 355  
 Enlargement of House of Commons, 523  
 Examination in Architecture, 143, 182, 217, 252  
 Female artists, 424  
 Fireplaces, domestic, 319, 355  
 Floors, concrete, 524  
 Forth Bridge, 167  
 Fuel economy, 319, 355  
 Fulham Vestry-hall competition, 593, 762  
 Goods Depot, Midland Railway, 832  
 Government Offices, stone for, 657  
 Government tenders, 262  
 Greek sculptors, ancient, 657  
 Guildford sewage, 158, 218, 263  
 Hartlepool Public Offices, 390  
 Haskell v. Bradburn, 658  
 Health Exhibition certificates, 595  
 Help for unemployed, 318  
 House of Commons enlargement, 523  
 Improvements St. Paul's Churchyard, 318  
 Infirmary, Belper Union, 763  
 Institute of Architects, 64, 624, 660  
 Institute Examination, 143, 182, 217, 252  
 Italian excursion, Architectural Associa-  
 tion, 762  
 Lady artists, 424  
 Lectures, Architectural Association, 763  
 Lists & Upper Thames-street, 182  
 Light, law as to, 322  
 Liverpool Cathedral, Mr. Emerson's de-  
 sign, 318  
 London drainage, 106  
 London Pavilion Music-hall, lifts at, 107  
 Machinery, stoneworking, 660, 693, 624, 657  
 Marney monuments, the, 690  
 Measurement of timber, 64, 107, 143, 218, 287  
 Metropolitan Board and concrete building, 267, 389  
 Midland Railway goods depot, 832  
 Money deposits in competitions, 355  
 Municipal Buildings, Sunderland, 690, 624  
 Newcastle-under-Lyme Public Buildings, 693  
 Non-acceptance of lowest tender, 64, 107  
 Nuisance, Thames river, 365  
 Ownership of drawings, 107  
 Patents for cements, 624, 658, 693, 730  
 Plumbers, registration of, 63, 142, 182, 218, 225, 253, 287, 390, 423, 469  
 Preston, Mr., and St. Andrew's, 796  
 Public Buildings, Newcastle-under-Lyme, 693  
 Public Offices, Hartlepool, 390  
 Purification of sewage, 158, 218, 263  
 Quantities, what is a bill of? 64, 107, 168  
 Registration of plumbers, 63, 142, 182, 218, 225, 287, 390, 423, 469  
 Restoration of St. Bartholomew's, 727, 796  
 St. Bartholomew's, Dr., and London drainage, 106  
 Richardson, the late H. H., 612  
 Robinson's cement, 624, 658, 693, 730  
 Royal Academy, the, 524  
 Royal Institute of British Architects, 64  
 Saint Andrews, N.B., 570, 796  
 St. Bartholomew's, Dr., and London drainage, 106  
 St. Paul's Cathedral approaches, 318  
 St. Thomas's Church, Liberty of the Rolls, 183  
 Sancton Wood, the late, 795  
 Sculptors, ancient Greek, 657  
 Seaton Delaval, 634  
 Sewage purification, Guildford, 158, 218, 263  
 Sewer ventilation, 299, 424, 459, 493  
 Shaftbury Avenue, 253  
 Signs of distress in professional circles, 355  
 Skylights glazed with plate glass, 727  
 Slating, 490  
 Snowstorm and the Vesuvius, the, 163  
 Stairs: Albany Capitol, 657; Bernini's, at the Vatican, 389  
 Statues discovered at Clapham, 143  
 Stone for new Government Offices, 657;  
 for Westminster Abbey, 833  
 Stone-sawing machinery, 660, 693, 624, 657  
 Street nomenclature, 253  
 Street, Piccadilly to Bloomsbury, 253  
 Sunderland Municipal Buildings competi-  
 tion, 593, 624  
 Surveyor, architect's power to employ, 318  
 Surveyors in New Zealand, 355  
 Swindling builders, 263  
 Tax on beauty, a, 490  
 Tender, non-acceptance of lowest, 64, 107  
 Tenders, Government, 262  
 Thames river nuisance, 355  
 Timber measurement, 64, 117, 143, 218, 287  
 Tomb of Bishop de la Marchia, Wells Cathed-  
 ral, 801  
 Truro Cathedral, 390, 693  
 Unemployed, help for the, 318  
 Ventilation, 64, 143; of sewers, 209, 424, 459, 490  
 Vases and snowdrops, 183  
 Vestry-hall, Fulham, competition, 693, 763  
 Weather stains on walls, 663  
 Westminster Abbey, stone for, 833  
 Windsor, Christ Church, Streatham, 795  
 Wood, the late Mr. Sancton, 795  
 Woodwork, Beaufort Castle, 390, 423



## LETTERS, WRITERS OF.

- Aitchison, A. C., Bernini's staircase at the Vatican, 380  
 Angell, A., sewage purification, 218  
 Atkinson, J. A., Church of St. Thomas, Liberty of the Rolls, 183  
 Baker, B., Forth Bridge, 107  
 Bale, M. P., stone-sawing machinery, 560  
 Bancroft, R. M., chimney construction, 761  
 Banner Bros., Health Exhibition certificates, 365  
 Barnes, F., the late Mr. Sancton Wood, 795  
 Barry, C., enlargement of the House of Commons, 523  
 Bastin, E. F. & Co., stone-sawing machinery, 624  
 Bird, S. G.: appeal for benevolence, 490; registration of plumbers, 253  
 Black, W. G., Thames river nuisance, 355  
 Blashill, T.: Architectural Association's excursion to Italy, 763; woodwork, 424  
 Browne, T., the Clapham statues, 143  
 Buchan, W. F., sewer ventilation, 458, 490  
 Carpenter, R. H., Deerhurst Church, 655  
 Carr, A., Architectural Examination, 143, 217  
 Caws, F., concrete floors, 524  
 Chappell, J. T., help for unemployed, 318  
 Cbeers, H. A., quantities, 107, 158  
 Clark, E. B., Ellice, medical officers and engineers, 106  
 Conder, F. R., sewage purification, 158, 235  
 Cor, R., stone-sawing machinery, 557  
 Crain, R. A., staircase, Albany Capitol, 657  
 Cresswell, C. G., ancient Greek sculptors, 657  
 Crimp, W. S., snoutworks and vestries, 183  
 Cruickshank, A., woodwork, Beaufort Castle, 360  
 Dobson, M. J., Seaton Delaval, 634  
 Dove, F. J., plumbers and Parliament, 218, 287  
 Ellice-Clark, E. B., medical officers and engineers, 106  
 Faljs, H., cement in tall chimneys, 766  
 Fleming, D. H., Mr. Preston and St. Andrews, 796  
 Fletcher, B. M. P., ventilation, 143  
 Fletcher, T. F. C. S., ventilation, 61  
 Forrest, A. L., proposed new club for architects, 458  
 Francis & Co., "Robinson's cement," 693  
 Goodwin, H., by-laws for concrete building, 287  
 Helliwell, T. W., plate-glass skylights, 727  
 Henshaw, E. S.: registration of plumbers, 182; non-acceptance of lowest tender, 64  
 Hooper, F., Architectural Examination, 218  
 Howe, J., & Co., patents for cement, 624  
 Irvine, J. T., tomb of Bishop de Marchia, Wells, 907  
 Irving, H., on the late H. H. Richardson, 912  
 Julian, G. R., Associates of the Institute, 590  
 Kerr, Prof., Architectural Examination, 182  
 Knightley, T. E., architecture at Royal Academy, 624  
 Latham, Baldwin, sewer ventilation, 269  
 Lee, A., stone-sawing machinery, 693, 697  
 Low, F. A. W., Huskell's Braubee, 658  
 MacLaren, J. M., Institute of Architects, 64  
 Milbourn, T., Clapham statues, 143  
 Milliken, W. E., street through Soho, 253  
 Muir, W., tax on beauty, 490  
 Newman & Newman, Fulham Vestry-hall competition, 593, 763  
 Noley, R. P., domestic Replaces, 355  
 Peak, H., sewage at Galford, 253  
 Potter, T. & Sons, Midland goods depot, 832  
 Practice, A. R., architect's power to employ surveyor, 318  
 Riddett, L. C., fuel economiser, 319  
 Rider, T., & Son, non-acceptance of the lowest tender, 64  
 Ridge, L. W., the Institute Charter, 524  
 Robinson, J., & Co., "Robinson's cement," 638  
 Shaw, G., registration of plumbers, 142  
 Stailes, H., timber measurement, 143  
 Sugden & Son, Public Buildings, Newcastle-under-Lyme, 693  
 Summers, T., chimney construction, 64  
 Swain, R., Truro Cathedral, 399, 693  
 Tall, J., concrete building, 369  
 Taverer, R. J., lectures, Architectural Association, 763  
 Wardale, J., timber measurement, 64, 107, 118  
 Warrad & Co., lifts, 107, 182  
 Wild, J. W., windows, Christ Church, Streatham, 795  
 Wilson, G. R., brewery chimney-shaft, 727

## MISCELLANEA.

- Aberdeen, works at, 796, 940  
 Academy, Royal: Associates, 219; lectures 149  
 Academy, Royal, of Belgium, 220  
 Accidents: dangers of the District Railway blow-holes, 299; failure of a church tower, 185; fall of ironwork at "Shippers" Exhibition, Liverpool, 321; fall of Oney Bridge, Oxford, 183; fall of walls in Holmwood-road, 255, 262  
 Act of 1876, 188  
 Aeolus Waterspray ventilators, 290  
 Agriemant, "the ancient," 220  
 Alington Theatre, 608  
 Alley's almshouses, 690  
 Almshouses, Fulham, 637  
 Altar-pieces, Selborne Church, 768  
 America, convulsions labour in, 336  
 American: Exhibitions in London, 221; locks, 321  
 Amsterdam water supply, 636  
 Anniversary of Domesday Book, 628  
 Appointments, 146, 322, 363, 458, 662, 693, 699, 790  
 Archæology, Greek, 110  
 Architectural Examination, the, 322  
 Architecture, German Renaissance, 458  
 Army Cemetery Chapel, 387, 421  
 Art, Japanese, 638  
 Artists' dwellings, 321; art criticism, 183  
 Art needlework, 404  
 Art Gallery, Wolverhampton, 427, 661  
 Artillery, Hoxton, 904  
 Asphalt roads, 628  
 Assessment appeals, 146  
 Associates of the Royal Academy, 219  
 Asylum, Wandsworth, 186  
 Atmosphere of railway carriages, 660  
 Australian: railway viaduct, 730; timber, 321  
 Aylesbury Dairy Company, 252  
 Baker, Mr. B., on the preservation of iron structures, 527  
 Ballarat, new cathedral, 730  
 Ballroom, a steerable, 801  
 Banner Sanitation Company, 527, 800  
 Baronetcy for Sir F. Leighton, 77  
 Barron-in-Furness: railway bridge, 143  
 Bartholdi's statue of Liberty, 493  
 Baths: Basing, 768; St. George's-in-the-Road, 709  
 Battersea: bridge, 255, 765; dust-rand, 660  
 Buildings for Messrs. Douton, 146, 186  
 Beale, the late E. S., 656  
 Beech-wood as a paving material, 697  
 Belgian: ironwork, 256; Royal Academy, 220  
 Benzoline lamp, safety, 322  
 Berlin, Menzel Exhibition, 186  
 Birmingham: proposed exhibition, 696; Law Courts, proposed, 801; ship canal, 518; workhouse infirmary, proposed, 801, 823  
 Blackburn Poor Law Offices, 421  
 Blackfriars railway bridge, 358  
 Bombay screen, the, 78  
 Bourne, Leicestershire, 628  
 Boys' Institute, Liverpool, 362  
 Bricklayers' wages in Turin, 836  
 Bricklayers' Guild, London, 765; New York, 662  
 Bricks, Malvern, 67  
 Bridge, fall of, 183  
 Bridges: Barrow-in-Furness, 143; Battersea, 255; Putney, 801; Teddington, proposed, 493; the Tower, 389  
 Brighton, the first theatre, 460  
 British Museum Lectures, 776, 830, 882  
 Brockley, building estate at, 471  
 Brooklyn, building in, 256  
 Building at Clapham, 209  
 Building materials: Brockley, 471; Wandsworth, 426, 535; Woking, 647  
 Building-land at Wimbledon, 322  
 Building materials, porosity of, 392  
 Buildings, new, Lodge-hill, 536  
 Buildings for Poor Law administration, 693  
 Buildings to resist earthquakes, 494  
 Buildings for the "Salvation Army," 144, 558, 652, 797  
 Buildings at Spitalfields Market, 494  
 Burges, the late Mr. Alfred, 471  
 Burnham: engineering in, 660; teak forests, 404  
 Burt & Potts's iron casements, 220  
 Cabmen's shelters, 390  
 Calendar: the Science and Art Department, 187  
 Cambridge Slade Professorship, 230  
 Canals: Birmingham ship, 518; Cleveland, 366; Corinth, 620; Panama, 227  
 Cardiff: Exchange, 257; Unitarian Church, 387  
 Casements, iron, 220  
 Cathedral fabrics, 221  
 Cathedrals: Ballarat, 730; Lausanne, 427; Milan, 423  
 Cavendish Memorial station, 890  
 Cement trade, the, 189  
 Cements, volumes of, 904  
 Cemetery Chapel, Armlsey, 387, 421  
 Certificates of awards, Inventions Exhibition, 256, 555  
 Chapel, Armlsey Cemetery, 387, 421  
 Chapter-house of St. Paul's, 878  
 Charing-cross railway bridge, 804  
 Charter question at the Institute, 506  
 Cheltenham Grammar School, 61  
 Chimney, remarkable, 110  
 Christchurch, N.Z., municipal buildings, 198  
 Christmas at Exeter, 66  
 Church of St. Bartholomew, 800  
 Church Building News: Aisle-table, 183; Athorne, 64; Aylesbury, 801; Bamber Bridge, 283; Beccles, 797; Bestwood, 358; Blackburn, 801; Brindle Heath, 356; Brockham, 268; Ca Green, 498; Carnarthen, 358; Caiford, 723; Canidon, 490, 523; Cheshire, 801; Coleford, 460; Cowley St. John, 768; East Dereham, 494; Eddisbury, 490; Farnborough, 490; Garsington, 776; Glasgow, 368; Haigh, 368; Hebburn-on-Tyne, 183, 797; Herant, 288; Ipswich, 797; Kenn, 183; Kintyre, 730; Kingston-on-Thames, 185; Lambeth, 196; Leeds, 436; Lillingston, 185, 390; Little Wigborough, 400; Llandewi Bref, 797; London, 183, 356, 801; Middleton, 356; Newark, 108; Norwood, 115; Oldbury-on-Severn, 460; Paignton, 801; Parkfield, 356; Plymouth, 494; Pollockshields, 358; Polstead, 766; Rodney Stoke, 741; Southampton, 185; Stevenage, 183; Strachan, 730; Street ham, 801; Taunton, 490; Thirsk, 460; Tooting, 797; Uddington, 354; Walhamston, 351, 394; Wareick, 797; Wellington, 490; Wembury, 797; Wigborough, 490; York Town, Surrey, 108  
 Claters, earthenware, 186  
 City and Guilds of London Institute, 876  
 City of London College, 186  
 Clapham: building at, 290; school of art, 628  
 Cleopatra's Needle, 628  
 Clerkenwell prison sites, 900  
 Cleveland ship canal, 256  
 Clocks, 78, 183, 290, 393, 494, 730, 904  
 Clubhouses: Glamorganshire, 762; Heaton Chapel, 301; Junior Carlton, 628; Paisley, 798; Swansea, 438  
 Coastguard stations, ventilation of, 537  
 Cook Tavern, Fleet-street, 763, 801  
 College of Engineering, Tokio, 628  
 College, Medical, London Hospital, 426  
 Colling, the late W. B., 180  
 Colling, the late W. B., 180  
 Colvin, Mr., and Slade Professorship, 230  
 Competitions:—Baptist Chapel, Egremont, 189; Catholic Church, Liverpool, 68, 116, 122, 150, 158, 182, 190, 192, 221, 268, 267, 351, 370; Cathedral, Milan, 262, 806; Chapel and Mortuary, Armlsey Cemetery, 387, 421; Church, Fullockshields, 358; Clubhouse, Heaton Chapel, 301; Congregational Church, Paisley, 421; Congregational Church, Sidcup, 558; Designs for models, 421; Dispensary, Birmingham, 77; Drinking-fountain, Dunfermline, 778; Estimates of cost in, 398; Grammar School, Cheltenham, 61, 353, 870, 872; Housing for Children, Shadwell, 689; Hospital, Great Northern Central, 180; Hospital, Harrogate, 847; Infirmary, Kingston, 351; Infirmary, Belper Union, 423; Law Courts, Birmingham, 301, 438; Local Board Offices, Streiford, 421; Monument to Rousseau, Paris, 8; Municipal Buildings, Christchurch, New Zealand, 188; Municipal Buildings, Edinburgh, 601; Municipal Buildings, Sunderland, 296, 355, 358, 359, 360, 691, 694, 701, 727, 769; Noble's Isle of Man Hospital, 573; Poor-Law Offices, Blackburn, 421; Public Offices, Hartlepool, 361, 391; Recreation-ground, Whitehaven, 669; St. Clare Estate, Walmer, 321; School, Basingstoke, 77, 144; Schools, Clydebank, Dumbarton, 661, 689; Schools, Coltridg, 558; Schools, Horrabridge, 778; Schools, Wednesbury, 255; Ship for Sewage Sludge, 940; Street Improvements, Crofton, 289, 301; Town-hall, Motherwell, 198; Unitarian Church, Cardiff, 357; University College of Wales, Aberystwyth, 547; Vestry-hall, Fulham, 155, 227, 285, 300, 693, 698, 742, 762; Workhouse Infirmary, Birmingham, 311, 534  
 Concrete-mixing machines, 801  
 Congregational Church, Paisley, 421  
 Conquest, Medieval navigation, 353  
 Conservation of water, 220  
 Constantinople, English church at, 146  
 Control of temperature of rooms, 696  
 Costume, Society of Arts, 778  
 Convict-labor in America, 326  
 Corinth Canal, 680  
 Corn Exchange, Abingdon, 762  
 Cottage, Medway, 110  
 Couplings, railway, 157  
 Cowbuses, planning of, 765  
 Crystal street improvements, 288, 301  
 Cruciform staircases, 256  
 Crystal Palace School of Art, 592  
 Deaths:—diminished, 253  
 Decorations, Italian church, Heaton-garden, 624, 772  
 Decorative work, Plymouth, 494  
 Department of Education, Japan, 528  
 Derby Theatre, burned down, 730  
 Diplomas, Health Exhibition, 321  
 Disenting Church-building News:—Blackfriars, 358; Birkdale, 490; Bollington, 490; Cardiff, 387; Clapham, 940; Egremont, 189; Falmouth, 321; Highgate, 421; Leyton, 662; Liverpool, 491; Newcastle-on-Tyne, 110, 558; Paisley, 421; Sidcup, 558; Slatwhaithe, 904; Southwark, 355; Wicksworth, 491  
 Domesday anniversary, 628  
 Doultou's, Messrs., new building, 146, 186  
 Drainage of Richmond, 220  
 Drinking-fountain, Dunfermline, 778  
 Dublin, works in, 494  
 Dunfermline High School, 290  
 Earthquake, the, 321; sea-damage, 321  
 Duration of Kauri forests, 568  
 Durdard, the Battersea, 660  
 Failing public baths, 766  
 Earl's Court, house of John Hunter, 288  
 Earthenware cisterns, 186  
 Earthquake, the, as a restoring power, 289  
 Earthquakes, buildings to resist, 494  
 Ecumenical Art Exhibition, Wakefield, 905  
 Edinburgh: Exhibition, 628; Municipal Buildings, 598; proposed School of Forestry, 70  
 Edmonston Workhouse Schools, 693  
 Education, technical, 523, 875  
 Egremont Baptist Chapel, 188  
 Egyptian textile fabrics, 289  
 Election of Associate, Royal Academy, 219  
 Electric lighting at Hatfield House, 146  
 Electric railway, New York, 661  
 Electrical transmission of power, 533  
 Empress of Austria's hunting castle, 669  
 Engineering College, Tokio, 628  
 Engineering in Barnham, 680  
 English: ironwork, 256; locks, 321  
 Enlargement of Junior Carlton Club, 628  
 Erdborg gaometer, the, 256, 290  
 Essex Hall, Strand, 460  
 Examinations, Architectural, 322  
 Exchange, Cardiff, 267  
 Exeter, Christmas at, 66  
 Exeter Hall, lectures at, 73  
 Exhibitions: American, in London, 221; Colonial, 76, 121; Colonial and Indian, 76, 122, 586, 681, 697, 756, 890, 940; coming, 681, 696, 835; Edinburgh, 628; Menzel, Berlin, 186; metals, Rome, 392; meteorological instruments, 423; "Shippers," Liverpool, 321, 336, 534; Sportsman's, 860  
 Exhibits for Edinburgh and Liverpool, 669  
 Extension of Woolwich Arsenal, 286  
 Factory chimney, a, 110  
 Festivals, 186  
 Filter, the Aeri, 186  
 Finances of the Inventions Exhibition, 198  
 Fire-engines and escapes, 827  
 Fire-protection for the metropolis, 107  
 Flat-roofs, 523  
 Flat-roofs: "Cook" Tavern, 763, 801; Green Dragon, 220  
 Foats, 490  
 Foreign bids, 67  
 Forestry: lectures on, 186; proposed Forest, 70  
 Forest, a, in, in Burnham, 494  
 Foundations, steel rails for, 870  
 Fountain, Cavendish Memorial, 880  
 Foundation, prehistoric, 730  
 Fox, Sir C. D., 426  
 Frost, building stones and, 669  
 Fulham, almshouses at, 637



"Salvation Army" Buildings, 144, 558.

[illegible]



## MISCELLANEA (continued).—

Value of City property, 801  
Yarnish, a new, 47  
Venise, sanitary, 904  
Ventilating and heating, 67  
Ventilation of coastguard stations, 537  
Ventilation of railway carriages, 669  
Ventilation of sewers, 289, 321  
Ventilators, *Zeolus waterspary*, 290  
Vestry-hall, Fulham, 155, 227, 295, 301,  
568, 569, 589, 742, 762  
Viaduct, Juma, 765  
Vicarage, New Westminster, 363

Virginia Water, the lake at, 63  
Volumes of cements, 904  
Wages in New South Wales, 472  
Walmer, St. Clare Estate, 301  
Walthamstow drainage works, 696  
Wandsworth: Asylum, water-towers, 186;  
by Lewis, 426, 535; workhouses, 778, 866  
Warehouse-roof in Fore-street, 686, 727  
Water conservation, 293  
Water supply: Amsterdam, 536; Antwerp,  
842; Bagshot Sands, 500; Calcutta, 534;  
Chicago, 189; intermittent, 694; Leam-  
ington, 667; Liverpool, 628; London,

296, 397, 500, 628; New York, 189;  
Nottingham, 230; purification of, 631;  
Rome, 634; schemes, projected, 62;  
Stafford, 657; Tunbridge Wells, 426;  
Walton-le-Dale, 110  
Water-towers, Wandsworth Asylum, 186  
Wellingborough steeple, 494  
Wells for London water supply, 628  
Westmoreland green slate, 638  
Whitechapel, Jews' shelter, 504  
Wimbledon, building land at, 322, 523  
Windsor, 595  
Wolverhampton Art Gallery, 427  
Wood, a new, 67

Wood-carving, school of, 290, 808  
Woodworking machinery, 426  
Woolwich Arsenal extension, 286  
Work for the unemployed, 321  
Workhouses: Holborn Union, Mitcham,  
693; old Lambeth, 726; Wandsworth,  
778, 866  
Workhouses (Infirmary, Birmingham, 301, 534  
Workhouse schools, Edmonton, 693  
Working Lads' Institute, 661  
Works: Aberdeen, 796; Dublin, 494  
Works on Medieval costume, 110

York, proposed health exhibition, 464

## ARCHITECTS, ETC., OF BUILDINGS ILLUSTRATED.

Architects of buildings, and authors of  
designs and works, illustrated:—  
Adams, A. G., drawings of All Saints'  
Church, Walsoken, 822, 823, 827  
Adams-Acton, J., statue of Mr. D. F.  
Carmichael, 784  
Aldrophe, M., Synagogue, Rue de la  
Victoire, Paris, 831  
Am Ende and Walmisley, roof of National  
Agricultural Hall, 778  
André, M., Hôtel de Ville, Neuilly, 12, 13  
Appleton, H. D., house at Carshalton, 528  
Archer & Green, Whitehall Court, 24, 26  
Ardon, A., warehouse, Ludgate-hill, 620

Bailey, T. J., London Board Schools, 854,  
855  
Baker, B., and Fowler, Sir J., North  
Bridge, 36-43  
Barrie, M., Monument of the Siege of  
Paris, 476

Bell, R. A., decorative design, "Peace  
and Plenty," 308-311  
Bernini, staircase at the Vatican, 333  
Bignell, J., Church of St. Michael,  
Walthamstow, 344-349  
Binyon, B., Sunderland Municipal Build-  
ings, 698-699

Bodley & Garner, design for Liverpool  
Cathedral, 88, 200-215, 270-279, 341  
Boehm, J. E., R.A., Tait Monument,  
Canterbury, 608  
Boyes, H. C., house, Englefield Green,  
640, 642, 643

Brewer, H. W., "Church and State," 20, 21  
Brook, T. A.R.A., Statue of Sir Erasmus  
Wilson, 784  
Brooks, J., design for Liverpool Cathedral,  
80, 86, 110, 124-137, 232-249, 372-377;  
St. Andrew's Church, Wilsden, 49  
Brown, Ford Madox, Rossetti Fountain, 569  
Brown, Lancelot, plan of Claremont, 333  
Burne-Jones, J., windows at East-  
hampstead Church, 620

Camm, T. W., window, Elatow Church,  
338, 337  
Camm, restoration of Solomon's Temple,  
100  
Champigneulle, M., design for window, 546  
Champey, R., St. Bride's Vicarage, Fleet-  
street, 75, 76  
Chapu, M., monument of the Siege of  
Paris, 474

Coad, E., & Mackenzie, J. M., additions to  
house, Ledbury, 868  
Collyett, T. B., porch, East Sheen, 663  
Collins, H. B., industrial dwellings, West-  
minster, 498, 497  
Cresswell, H. O., design for town mansion,  
340

Dawber, E. G., design for museum and  
library, 482; design for town mansion,  
680, 681  
Day, Lewis F., designs for stained glass,  
178, 177, 195  
De Lisle, E., plan of approaches to St.  
Paul's Cathedral, 285  
Deslinières, M., monument of the Siege of  
Paris, 474  
Dubois, Paul, statue of "The Constable de  
Montmorency," 698  
Dunscombe, C., artists' dwellings, Liver-  
pool, 384-389  
Durrant, T., scour-trap, 900  
Dutoit & Simonet, Hôtel de Ville, Neuilly,  
12, 13

Edis, R. W., Assurance Offices, Fleet-  
street, 778, 722  
Emerson, W., Design for Liverpool Cathed-  
ral, 92, 93, 100-173, 179, 304, 305  
Fergusson, Jas., restorations of Solomon's  
Temple, 101  
Fontana, Sig. G., Sculpture, General Post  
Office, Sydney, 17  
Fowler, Sir John, & Baker, B., North  
Bridge, 36-43  
Frampton, E., window, Denver Cathedral,  
516, 517  
Frampton, G., Sculpture, "Cain the Out-  
cast," 688

George & Peto, Cottages at Leigh, Cent,  
722, 723; hall and staircase, Beetham  
Hill, Sussex, 710, 719; houses in Cadogan-  
square, 710, 711; shops and chambers,  
Mount-street, 714, 715  
Goldie, Child, & Goldie, Oratory, Liver-  
pool, 857, 851  
Gough, H. R., Church of St. Laurence,  
Canford, 729  
Graebach, Herr, premises in Berlin, 10,  
28, 29

Hadfield & Son, St. James's R.C. Church,  
Liverpool, 476, 479  
Hall, H., Cheltenham Grammar School,  
674, 693  
Hay, James, suggested plan for Liverpool  
Cathedral, 182  
Holmes, F. & G., Homoeopathic Hospital,  
Canford, 729  
Horsley, G. C., design for town mansion,  
380, 381

Ince, J. H., & Powell, F. A., design for  
Cheltenham Grammar School, 385  
Institute of Architects' plan for Admiralty  
and War Offices, 367  
Isaacs & Florence, Northumberland  
Avenue Hotel, 640, 642-645

Jones, E. Burne, stained-glass windows,  
Easthampstead Church, 620  
Lawson, G. A., sculpture, "Summer," 755  
Lee, E. C., chancel gate, St. Peter's,  
Teddington, 62  
Lenoir, A., Statue of Berlioz, Paris, 816  
Longepied, M., sculpture, "L'Immortalité,"  
697  
Longheau, Church of Sta. Maria delle  
Salute, Rome, 332  
Lovell, H. J., Schools, Claygate, Esher, 315

Mervin, P. J., design for Admiralty and  
War Offices, 780, 781  
Mericé, M., statues of Louis Philippe and  
his Queen, 692, 693  
Mitchell, A. B., measured drawings, Layer  
Marney Towers, 498, 508 513, 550-555  
Muirhead & Baldwin, warehouse in Man-  
chester, 314  
Nenot, P., the New Sorbonne, Paris, 922  
Newman & Newman, design for Fulham  
Vestry-hall, 638, 648, 653  
Nichols, J. R., schools, Trewigrie, Red-  
ruth, 521  
Noel, M. Tony, sculpture, Hôtel de Ville,  
Neuilly, 10

Osborn & Reading, Market Buildings, Bir-  
mingham, 574, 584, 585  
Oswald & Son, Bainbridge Chapel, New-  
castle, 647  
Paul, R. W., drawings of Tomb of Bishop  
William de la Marchia, Wells Cathedral,  
863, 863  
Peruzzi, Baldassare, Massimi Palace, Rome,  
333  
Pignotti, F. T., design for a panel, 812  
Pomroy, F. W., sculpture, "Cain the Out-  
cast," 583  
Potts, Bulman, & Hennings, Presbyterian  
Church, Highgate, 483  
Powell Bros., window, Tickhill, Yorks, 686,  
687  
Powell, F. A., & Ince, J. H., design for  
Cheltenham Grammar School, 385  
Pryce, T. E., a small studio, 793

Raschdorff, J. C., English Church, Berlin,  
96, 97  
Richardson, H. H., staircase, New York  
State Capitol, Albany, 576, 577  
Roberts, C. G., rainwater separator, 559  
Robins, E. O., restoration of Solomon's  
Temple, 100; the late Mr. Sancton  
Wood, 781  
Robson, E. R., Doorway, London School  
Board Offices, 405; doorway, Royal In-  
stitute of Painters in Water-colours,  
161; Exterior View from South-West, 164, 165; South  
Elevation, 168, 169; Longitudinal Section, 172, 173;  
ground plan, 179; West Elevation, 334, 305  
Cathedral, Liverpool, Plan proposed by Mr. Hay, 182  
Cathedral, St. Andrew's, N.B., Sketched by R. B. Preston,  
670, 872  
Cathedral, St. Paul's, North Porch, Drawn by F. W.  
Troup, 62-67  
Cathedral, Winchester, Remains found at, 532  
Chair, Old, from St. Nicholas Church, Rye, 639  
Chairs, Egyptian, 107  
Chambers, Mount-street, Ernest George & Peto, Archi-  
tects, 714, 715  
Chancel-Gates, S. Peter's, Teddington, E. C. Lee,  
Architect, 62  
Chapel, Bainbridge Memorial, Newcastle, S. Oswald &  
Son, Architects, 647  
Charterhouse, Woodwork at, Drawn by R. W. Paul, 766  
Chest, Ancient, St. John's, Glastonbury, 108  
Chimney-piece from Mottisfont Abbey, Haunts, 680  
Church, All Saints', Walsoken, Drawn by A. G. Adams,  
822, 823, 827  
Church, Deeshurst, Sketch Sections and Plan, 655, 656

ADMIRALTY and War Offices, designed by Mr. P. J.  
Marvin, 787, 781  
ADMIRALTY and War Office Site, Institute of Architects'  
Plan, 367  
Approaches to St. Paul's Cathedral, Plan by Mr. E. de  
Lisle, 285  
Arms, the Marney, 499  
Artisans' dwellings, Liverpool, Mr. Clement Dunscombe,  
M.A., Architect, 851, 859

BATH, an improved, 662  
Baths, Newcastle-under-Lyme, Messrs. Sugden & Son,  
J. Blood, W. H. Sugden, and Chapman & Snape, Archi-  
tects, 621  
Basses, the Marney, Little Horkesley, 499  
Bridge, the Firth: Details of Pier, Calsons, Girders, &c.,  
Sir John Fowler and Mr. B. Baker, Engineers, 38-43  
Bridge, Old Ouse, York, 933  
Brocade, design for, by Sydney Vacher, 637

CAPITALS, Angel Choir, Lincoln, sketched by W. H.  
Bidlake, 810

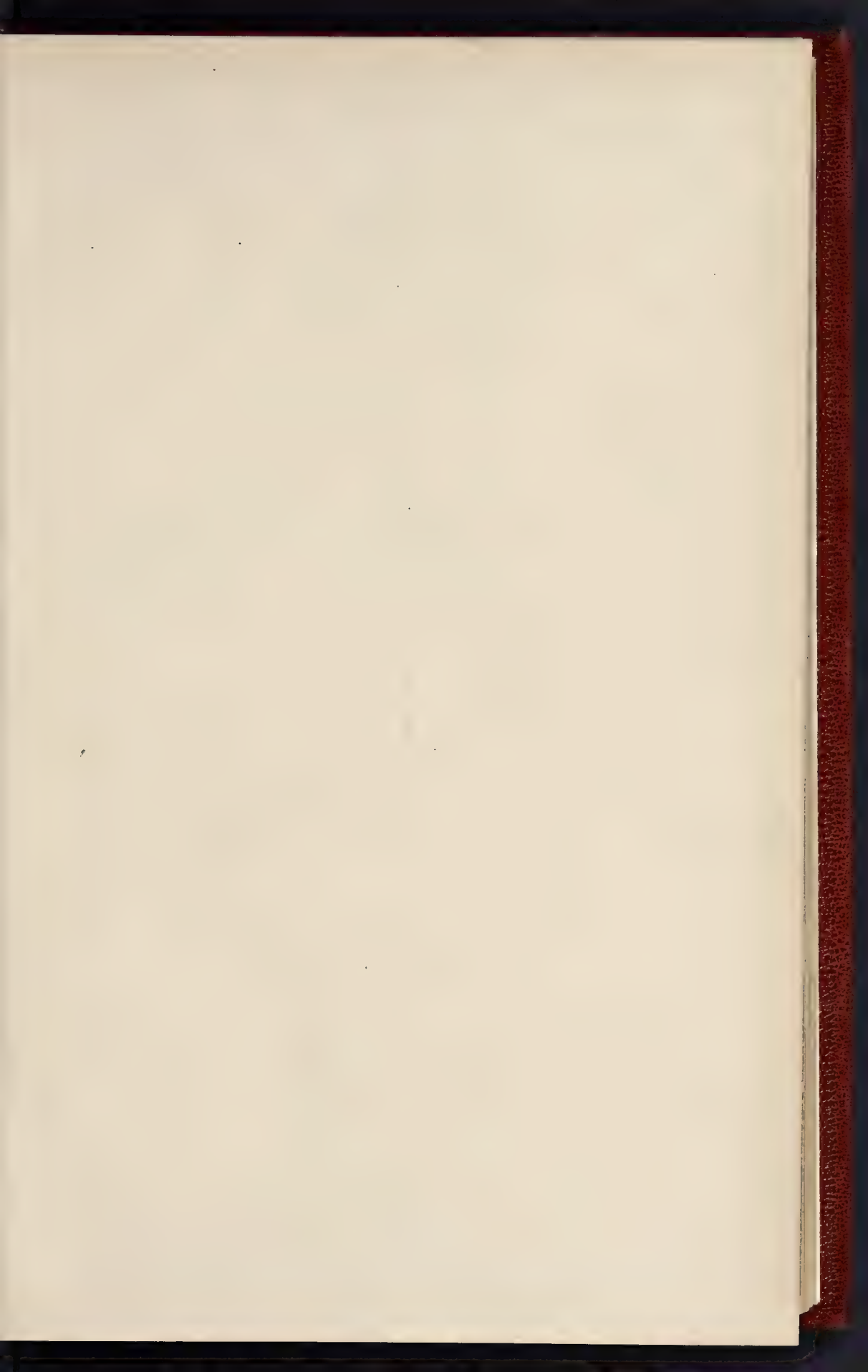
## ILLUSTRATIONS.

Carving: Gothic and Icelandic, 504; Hindoo, 843; Staple  
Iron, drawn by R. W. Paul, 317  
Cathedral and Bathans, drawn by H. W. Brewer, 2, 31  
Cathedral, Liverpool, Messrs. Bodley & Garner's Design:  
Interior View, looking West, 85, 89; View of West  
Front, 220, 221; Exterior View from North-West, 204,  
205; South Elevation, 208, 209; East Elevation, 212,  
213; Plan, 215; View in Choir, 270; West Portal, 271;  
Section through Nave, 274, 275; Longitudinal Section,  
278, 279; North Elevation, 341  
Cathedral, Liverpool: Mr. James Brooks's Design: View  
of West Front, 89, 88; Block Plans, 116, 117; Interior  
View, looking East, 124, 125; Interior View, looking  
West, 128, 129; North Elevation, 132; South Elevation,  
133; Ground Plan, 136; Triforium Plan, 137; External  
View of North Transept and Choir, 232-237; External  
View from South-East, 241, 241; Elevation of West  
Front, 244; Transverse Section, 245; Longitudinal Sec-  
tion, 249; East Elevation, 248; Section of Choir, 249;  
South-East Corner, with St. John's Chapel, 372, 373;  
View in South Choir Aisle, 378, 377  
Cathedral, Liverpool, Mr. W. Emerson's Design: Exterior  
View from the North-West, 82, 83; Interior View, 160,

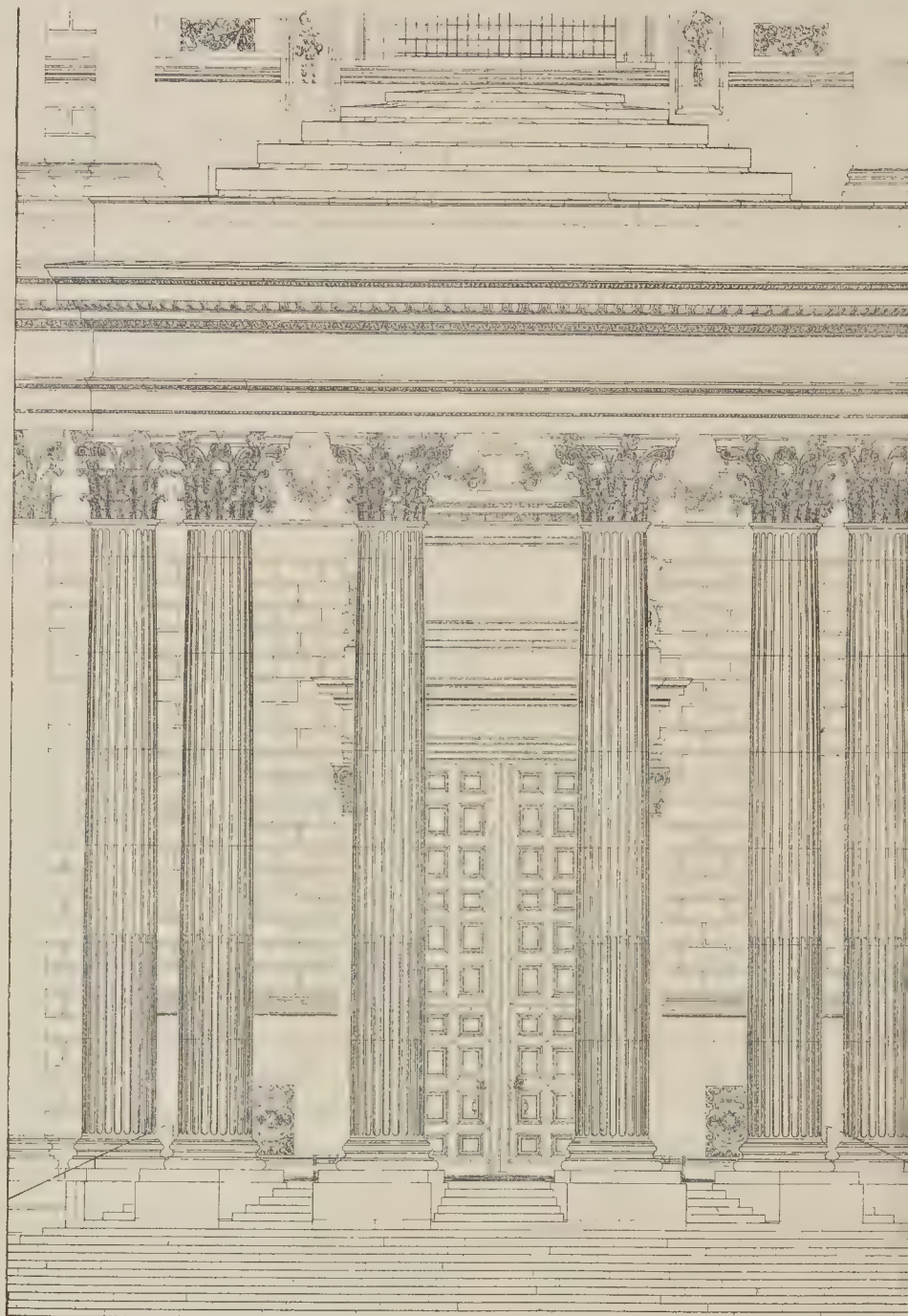
161; Exterior View from South-West, 164, 165; South  
Elevation, 168, 169; Longitudinal Section, 172, 173;  
ground plan, 179; West Elevation, 334, 305  
Cathedral, Liverpool, Plan proposed by Mr. Hay, 182  
Cathedral, St. Andrew's, N.B., Sketched by R. B. Preston,  
670, 872  
Cathedral, St. Paul's, North Porch, Drawn by F. W.  
Troup, 62-67  
Cathedral, Winchester, Remains found at, 532  
Chair, Old, from St. Nicholas Church, Rye, 639  
Chairs, Egyptian, 107  
Chambers, Mount-street, Ernest George & Peto, Archi-  
tects, 714, 715  
Chancel-Gates, S. Peter's, Teddington, E. C. Lee,  
Architect, 62  
Chapel, Bainbridge Memorial, Newcastle, S. Oswald &  
Son, Architects, 647  
Charterhouse, Woodwork at, Drawn by R. W. Paul, 766  
Chest, Ancient, St. John's, Glastonbury, 108  
Chimney-piece from Mottisfont Abbey, Haunts, 680  
Church, All Saints', Walsoken, Drawn by A. G. Adams,  
822, 823, 827  
Church, Deeshurst, Sketch Sections and Plan, 655, 656

## ILLUSTRATIONS (continued):—





## ST PAUL'S CATHEDRAL · NORTH PORCH



ELEVATION

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20  
Scale of Feet

J. K. COLE, J. L. & J. W.

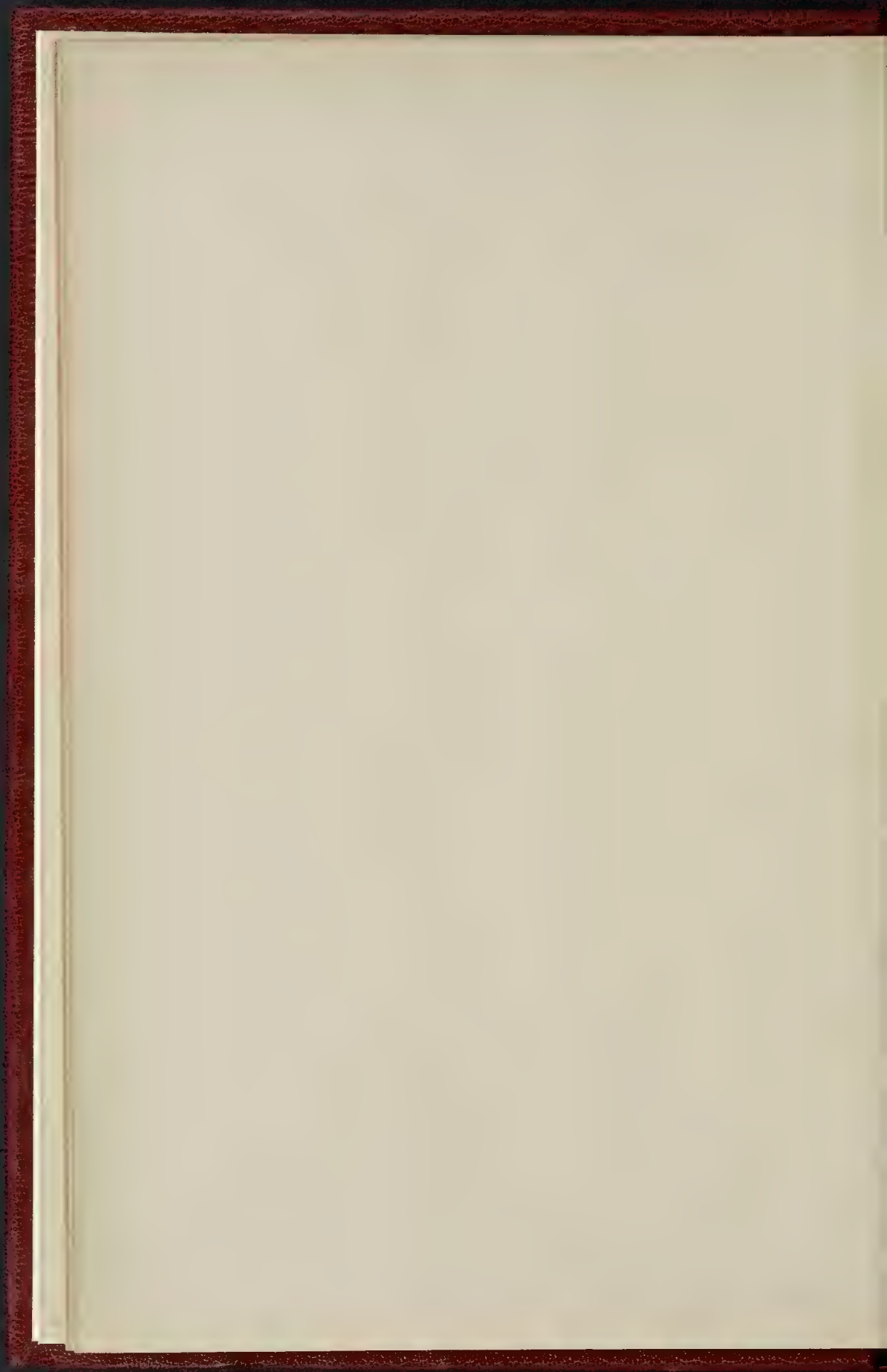
ROYAL ACADEMY FIRST SILVER MEDAL AWARDED TO MR F W TROUP, 1885



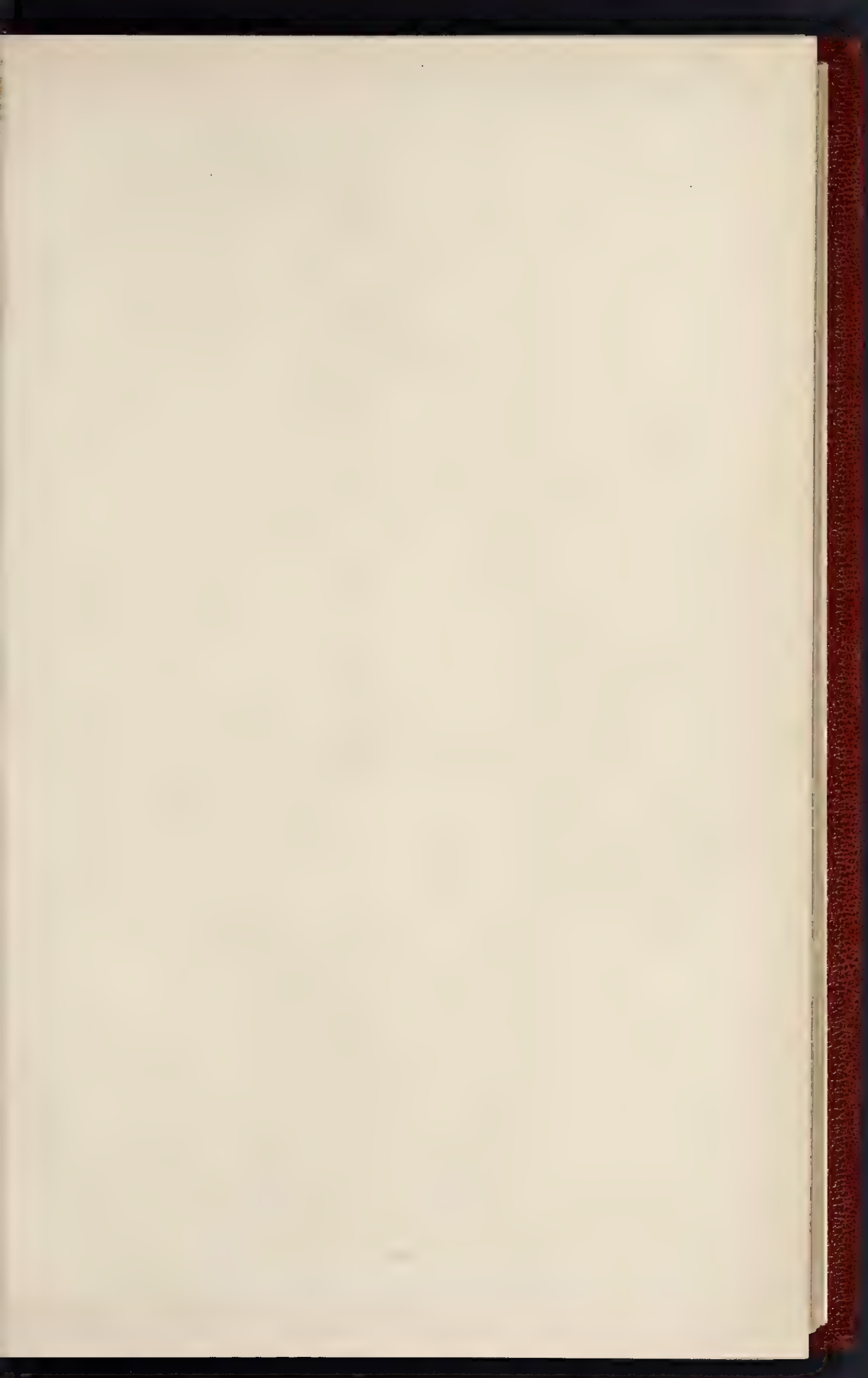
# ST. PAUL'S CATHEDRAL

## NORTH PORCH











THE BUILDER, JANUARY 2, 1886.





NEW HÔTEL DE VILLE, NEUILLY, PARIS.

DESIGNED BY M. ANDRÉ, ARCHITECT; EXECUTED UNDER THE SUPERINTENDENCE OF MM. DUTOCH AND SIMONET, ARCHITECTS.











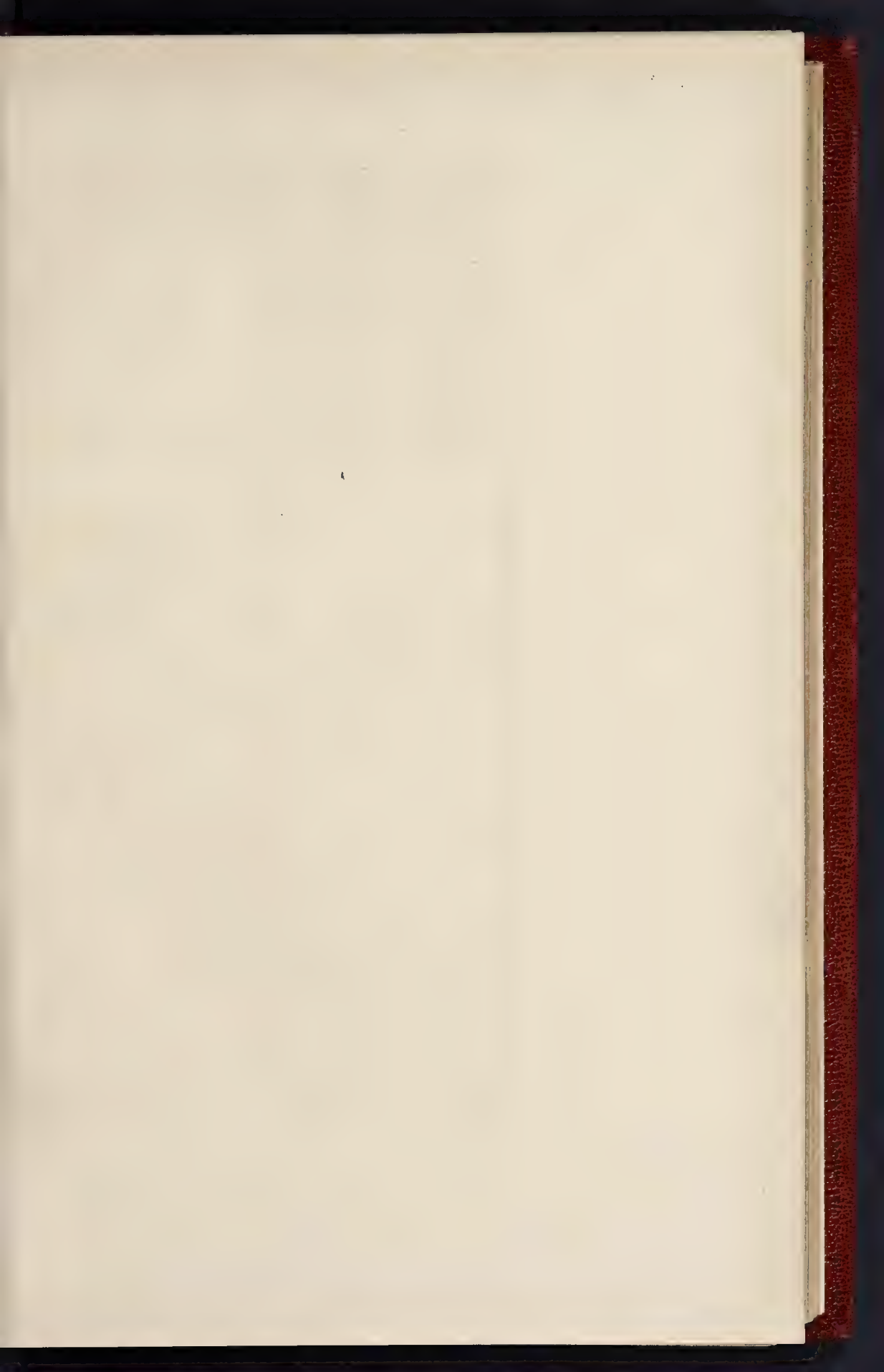
THE RETURN OF  
DESIGN FOR STAINED  
Exhibited at the Exhibition



CE AND LORRAINE  
 ASS BY M. WAGREZ  
 vatil, Paris, November, 1885

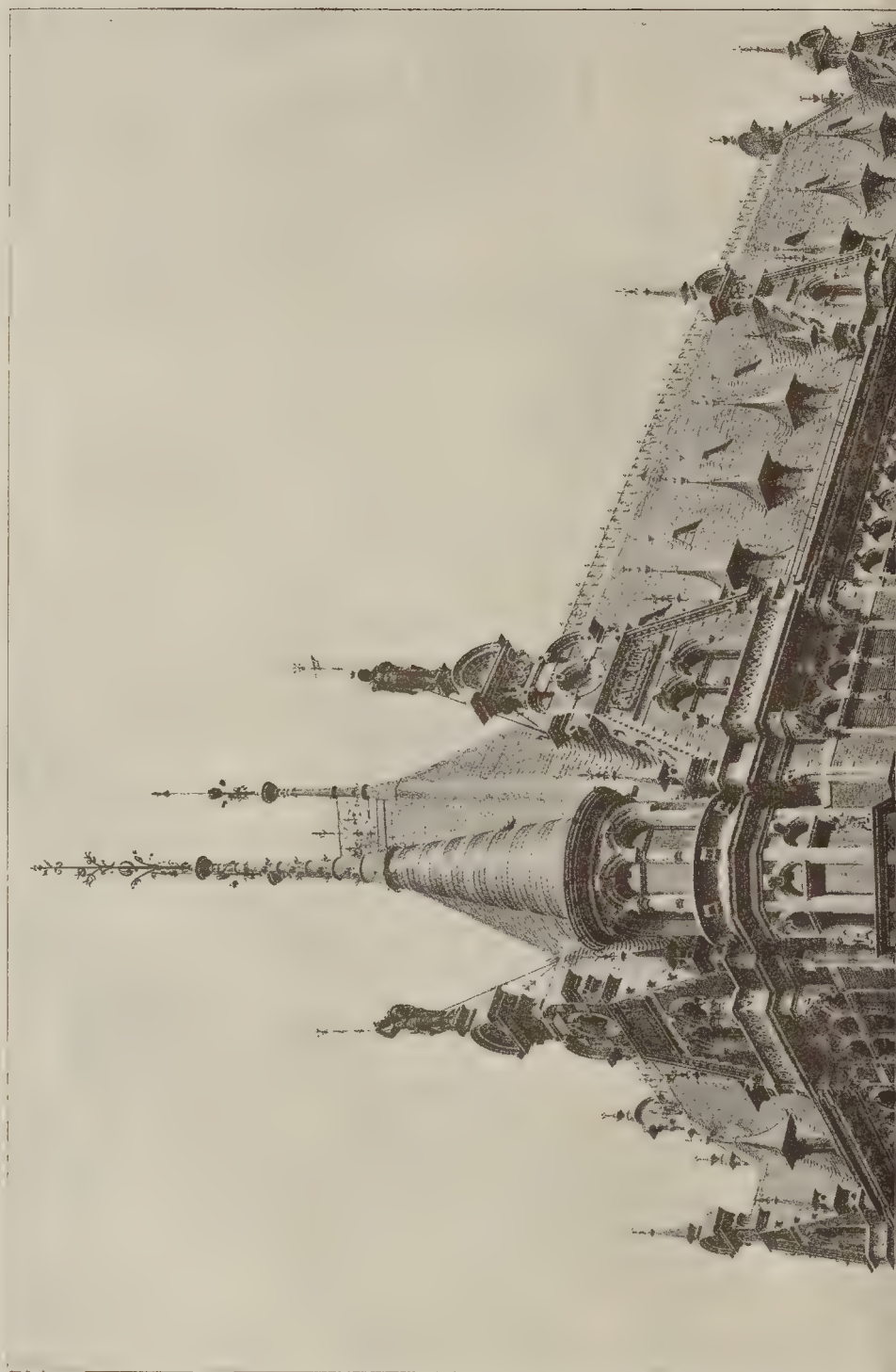


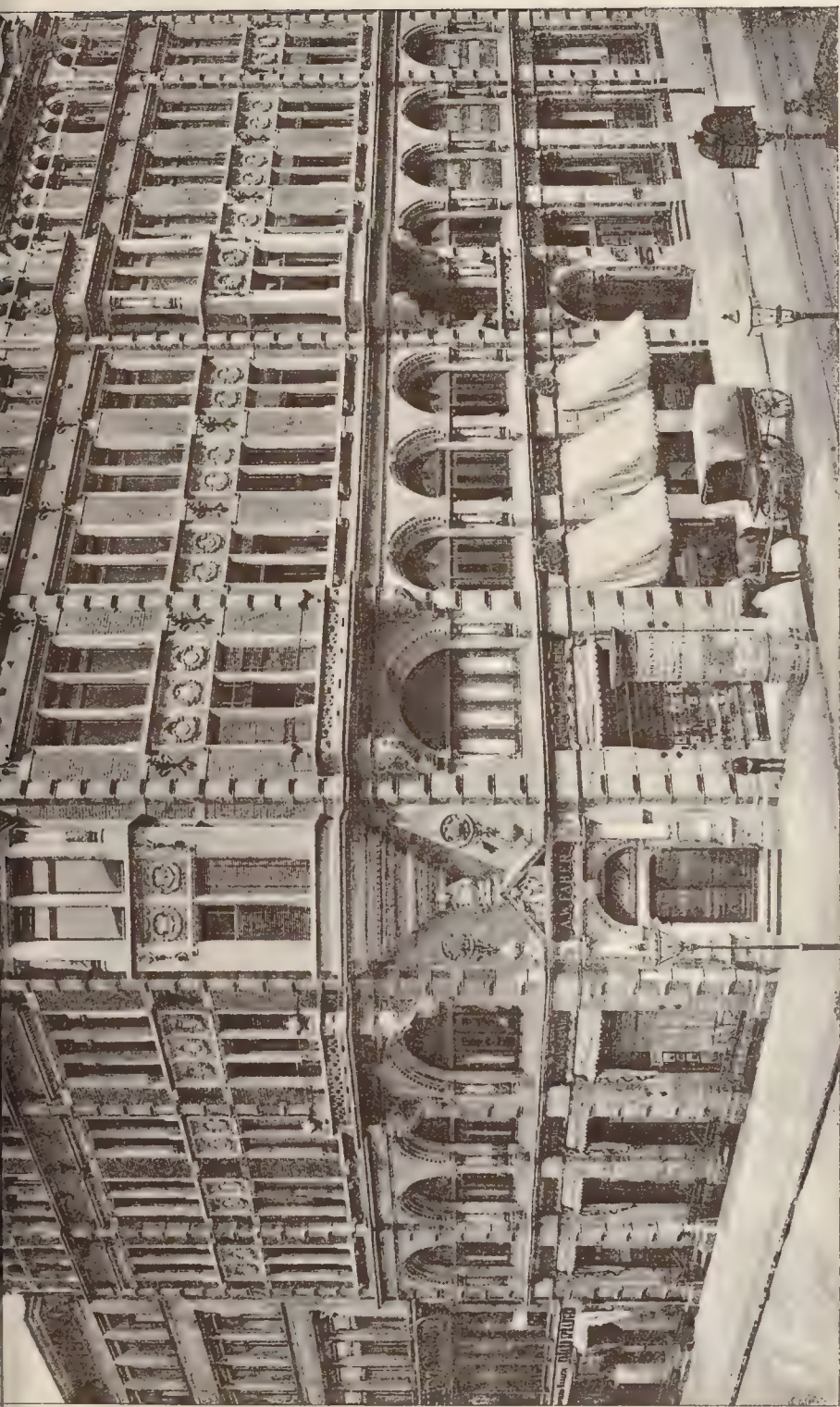






THE BUILDER, JANUARY 2, 1886.

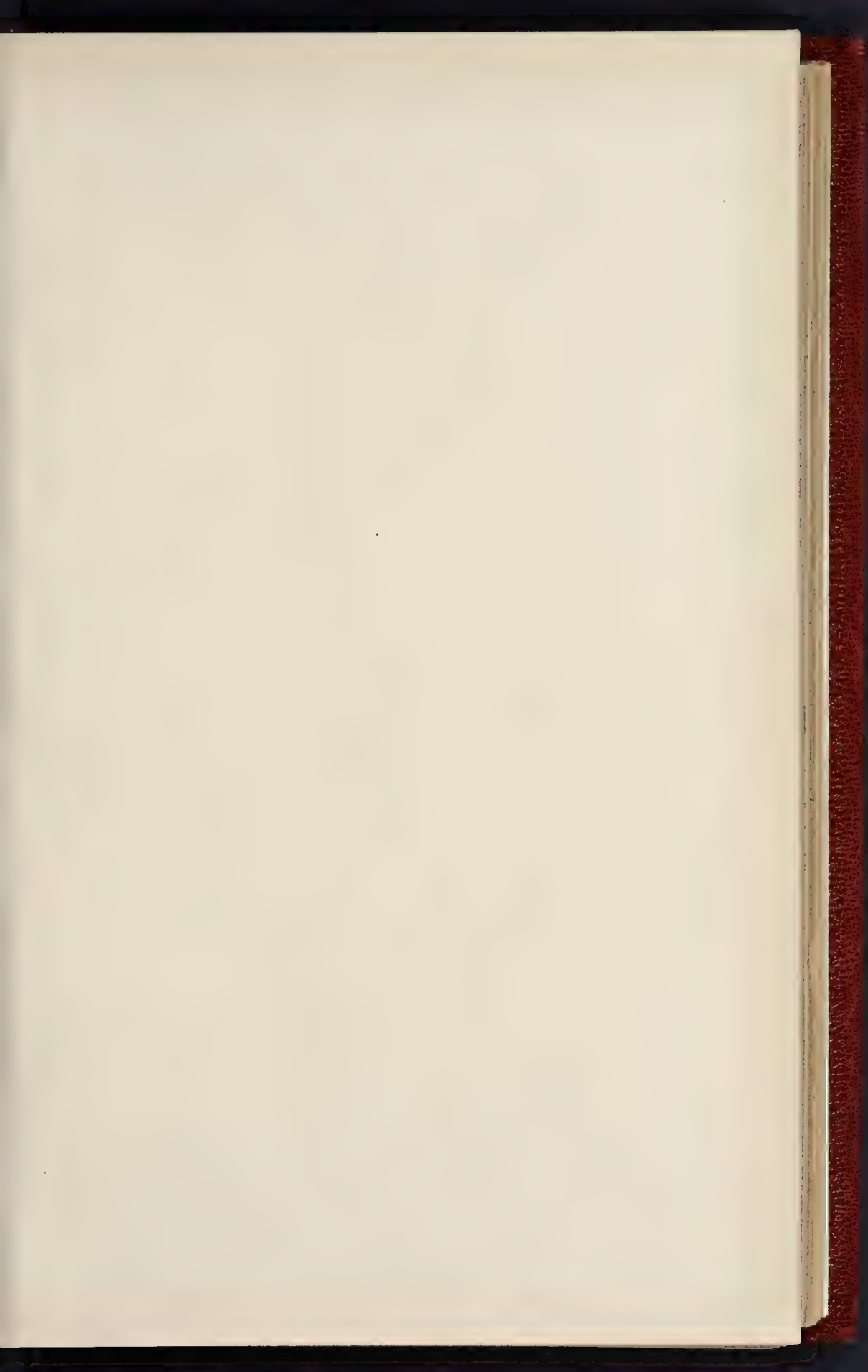




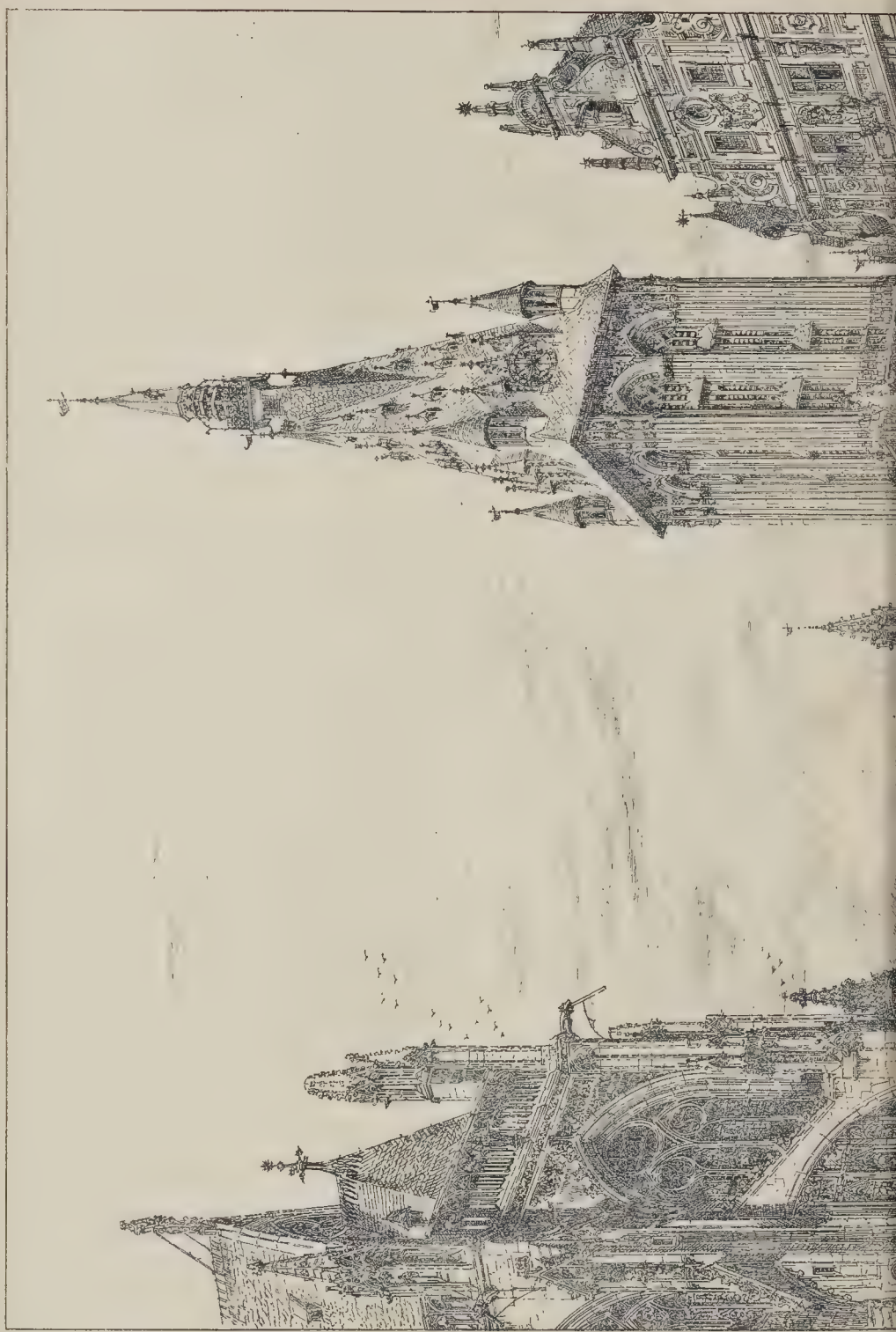
STREET ARCHITECTURE, BERLIN  
PREMISES ERECTED FOR HERR A. W. FABER  
HERR GRIEBACH, ARCHITECT



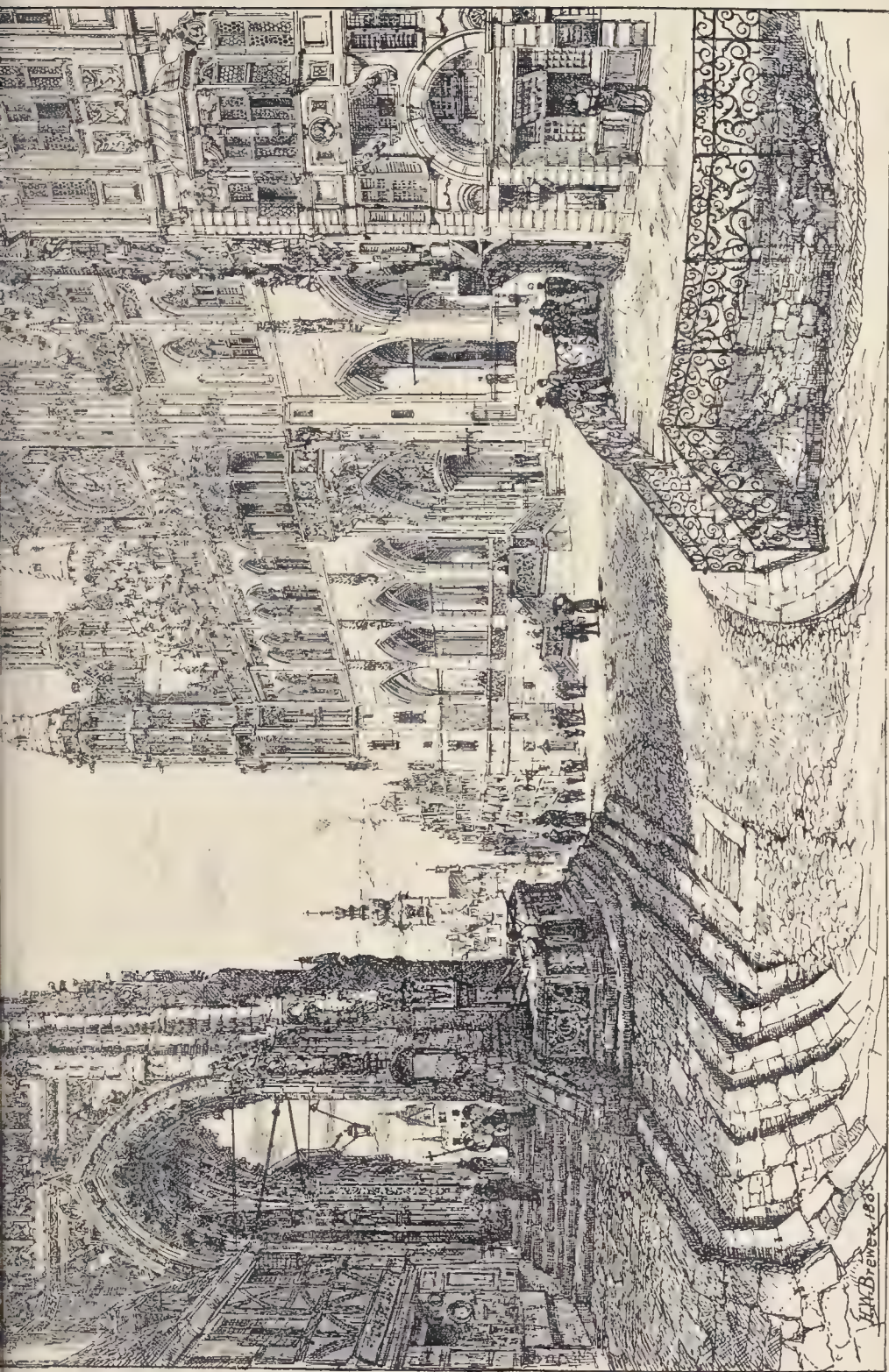








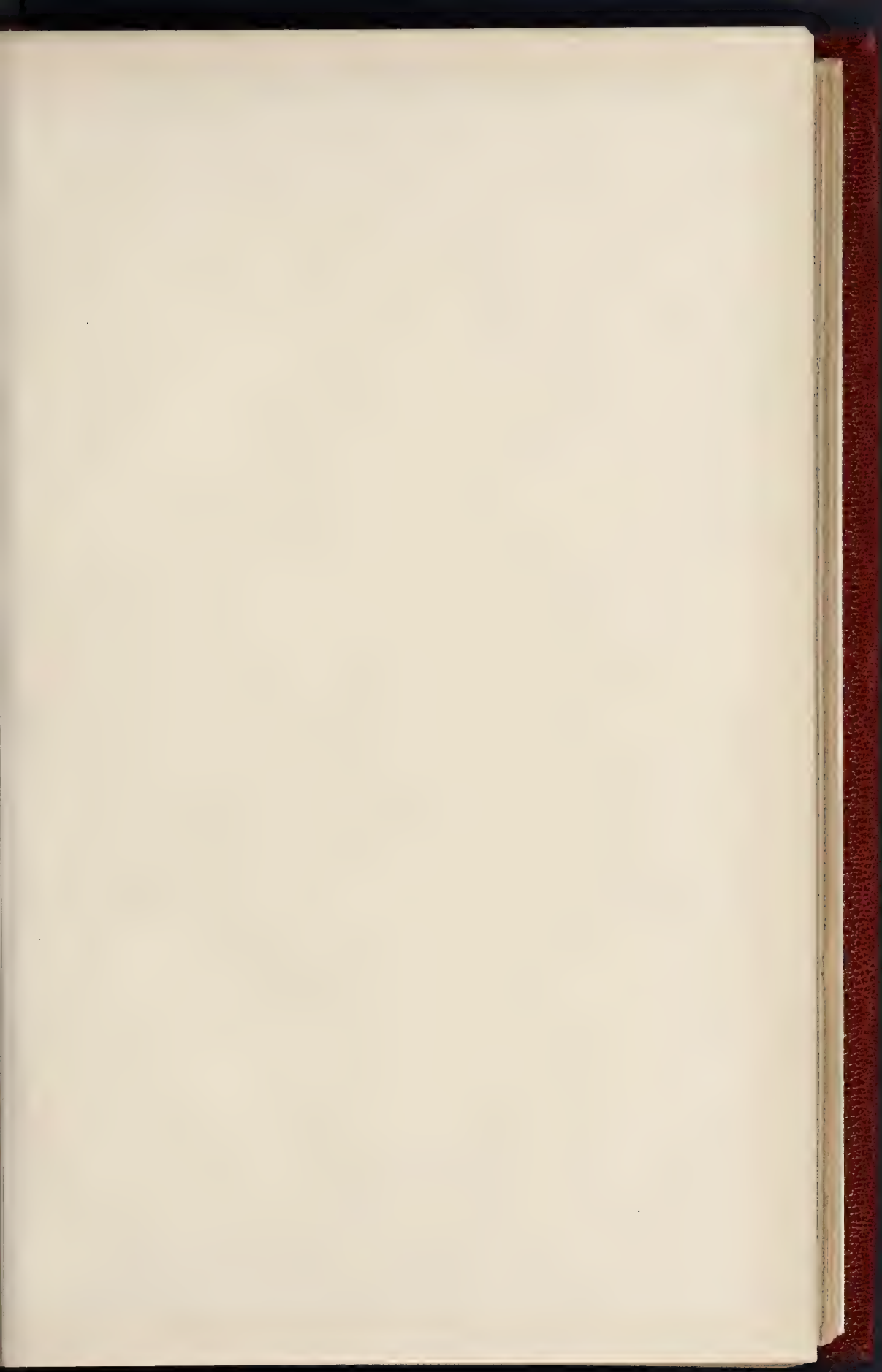




CHURCH AND STATE, DRAWN BY MR. H.W. BREWER.











WHITEHALL COURT.

MESSES. ARCHER & SONS.



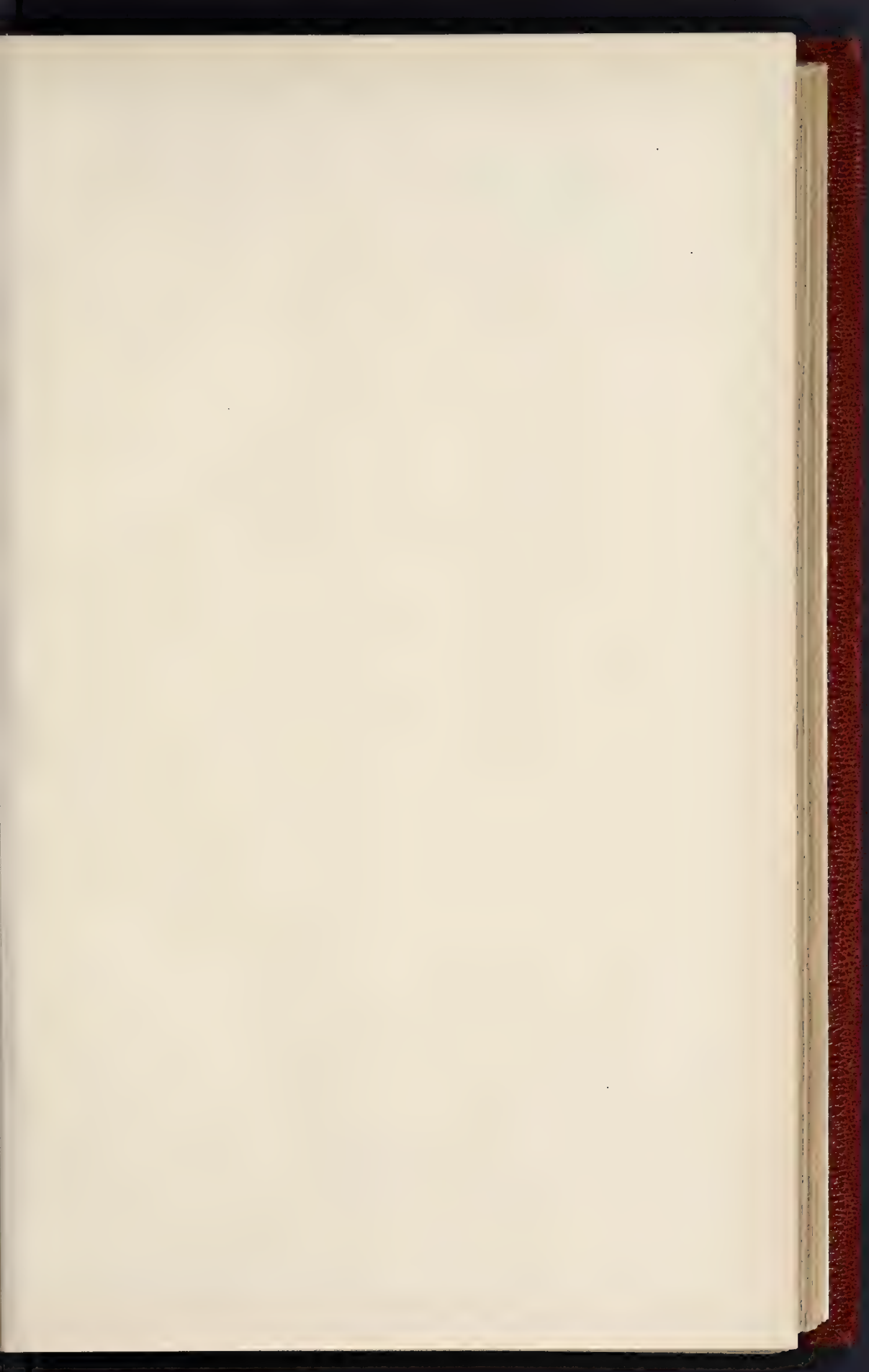
PHOTO LITHO. SPRAGUE & CO LONDON

FROM THE RIVER

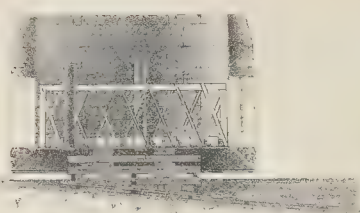
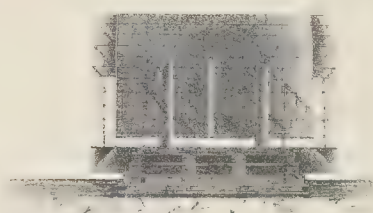
EN, ARCHITECTS



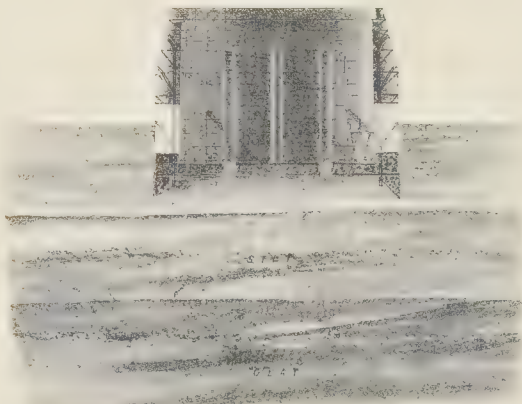




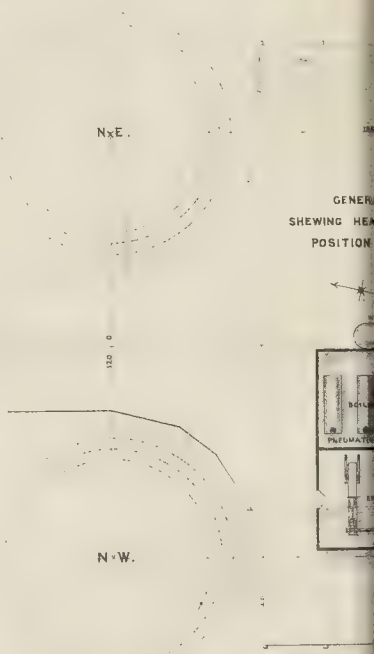




CAISSON ON LAUNCHING SLIPS



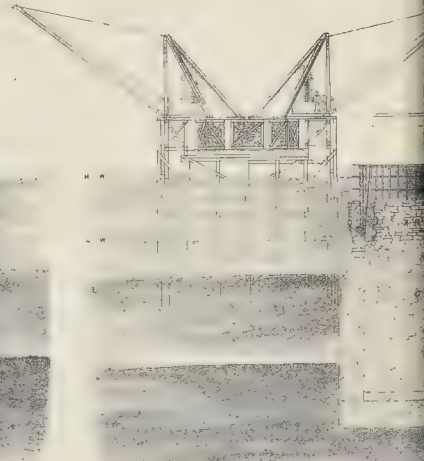
CAISSON BEING FLOATED TO PERMANENT SITE



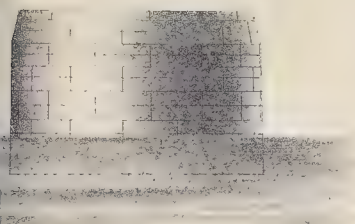
GENERAL  
HEADING  
POSITION



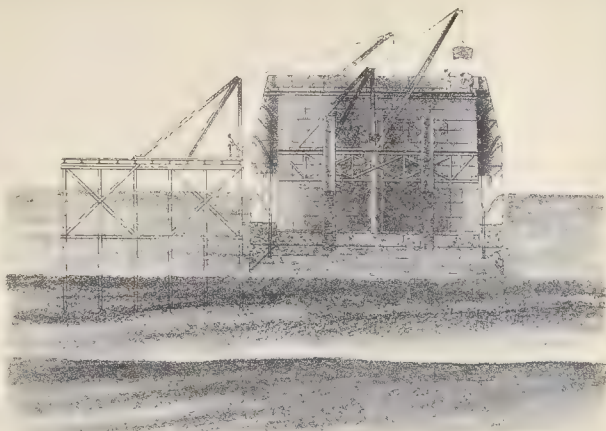
SECTION SHEWING TEMPORARY CAISSON ADDED, AND CONCRETE BEING FILLED IN



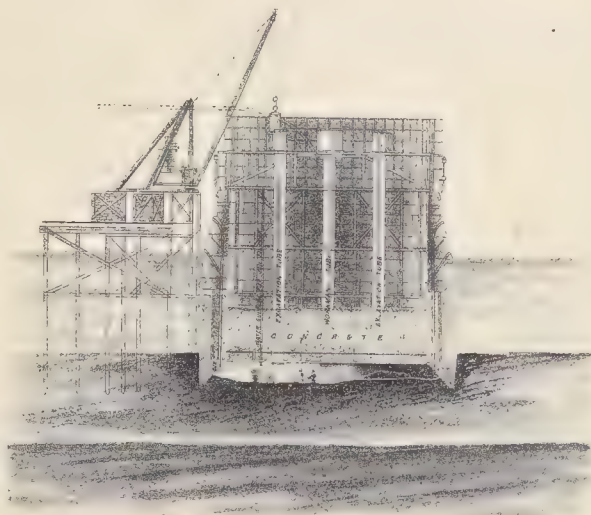
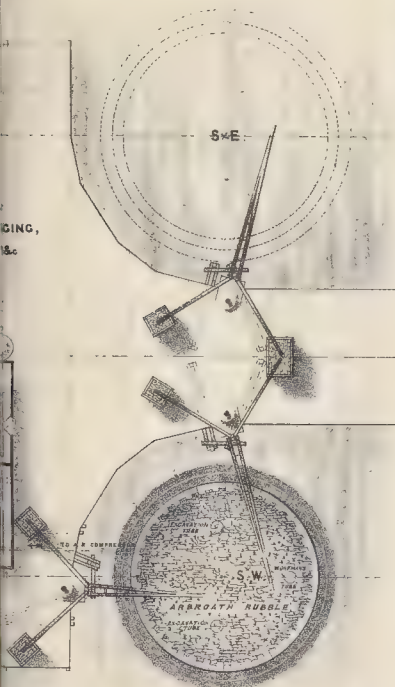
SECTION SHEWING CONCRETE COMPLETED



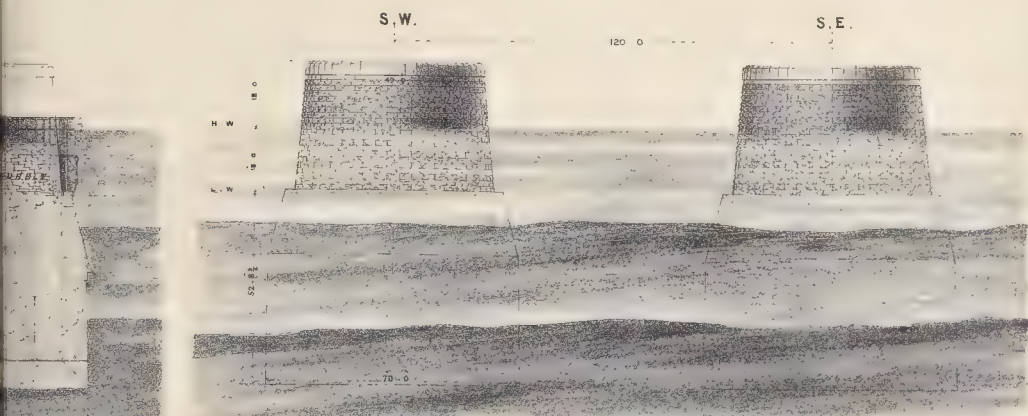
CAISSON BEING FLOATED OUT.



CAISSON MOORED ALONGSIDE STAGING TO HAVE CONICAL PART COMPLETED



CAISSON IN POSITION. AND EXCAVATORS AT WORK.



PIERS COMPLETED

RY COMMENCED.

PHOTO SPRAGUE & CO. LONDON





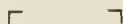




# FORTH BRIDGE

# STRUT No 1 [WINDBR]

SECTION A A



B

SECTION B B



C

SECTION C C

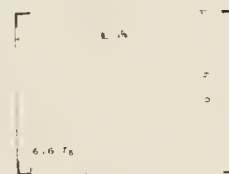


D

SECTION D D



SECTION E E

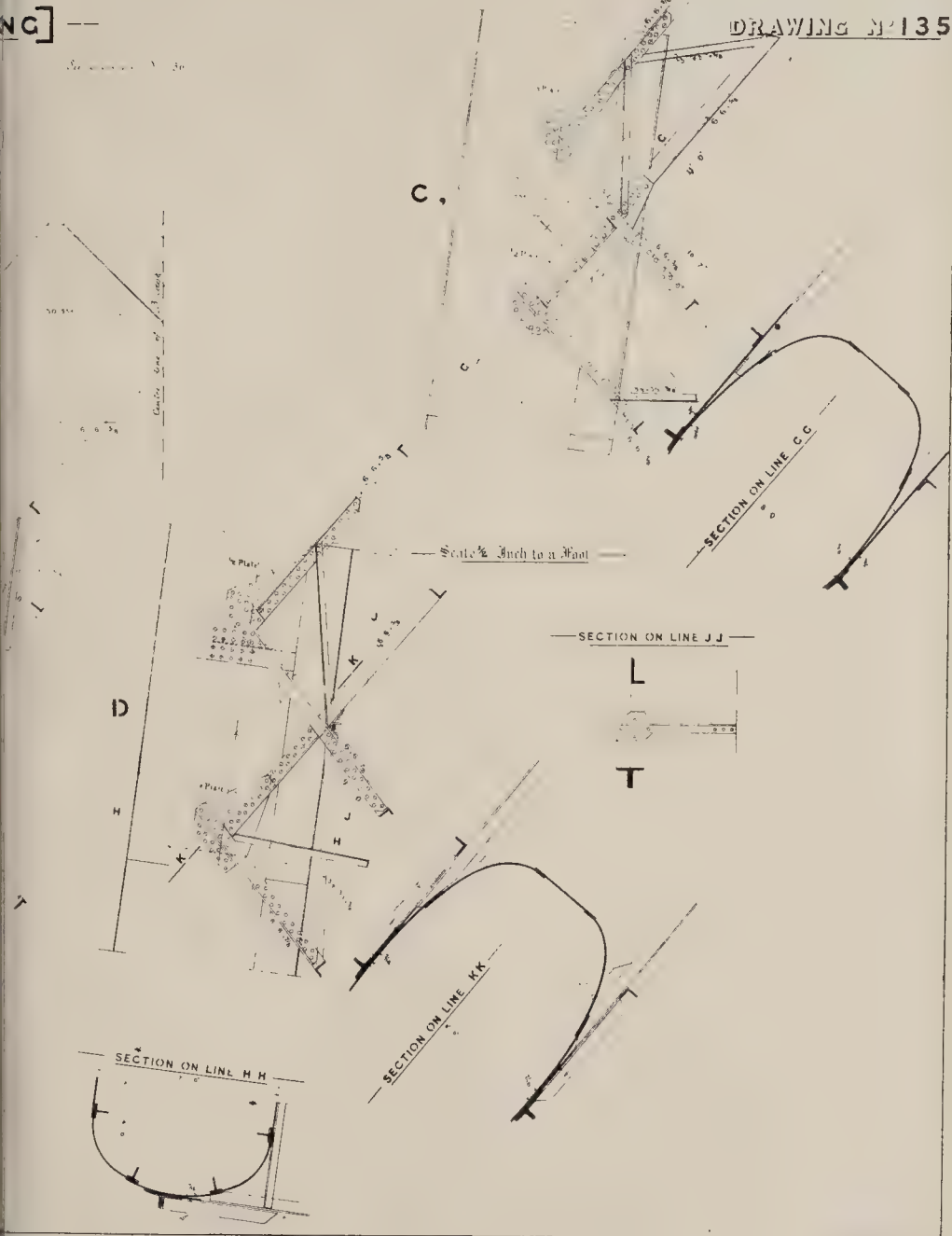


B

SECTION ON LINE F F

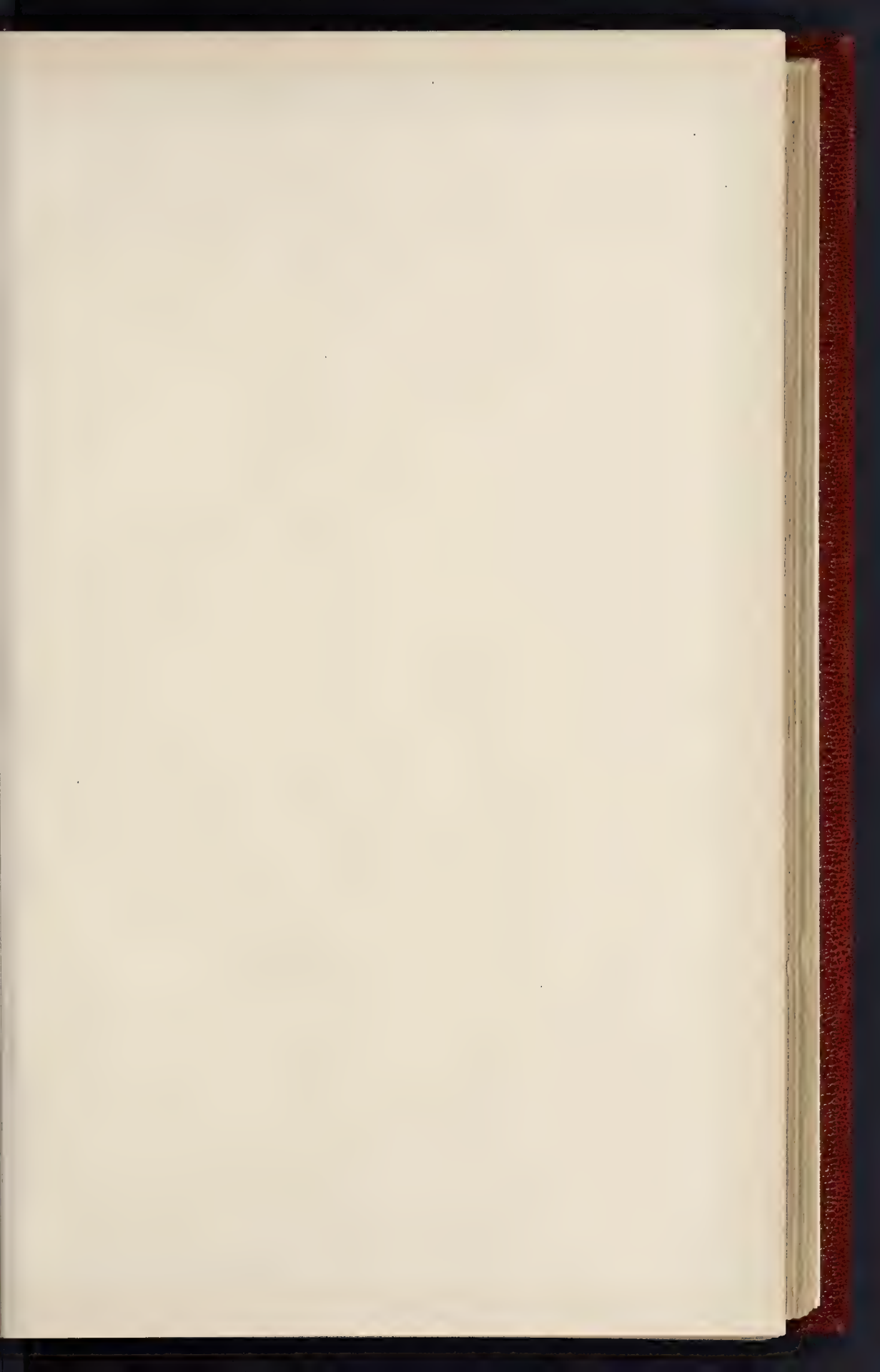


Scale 1/4 inch to a foot.











THE BUILDER JANUARY 2, 1886

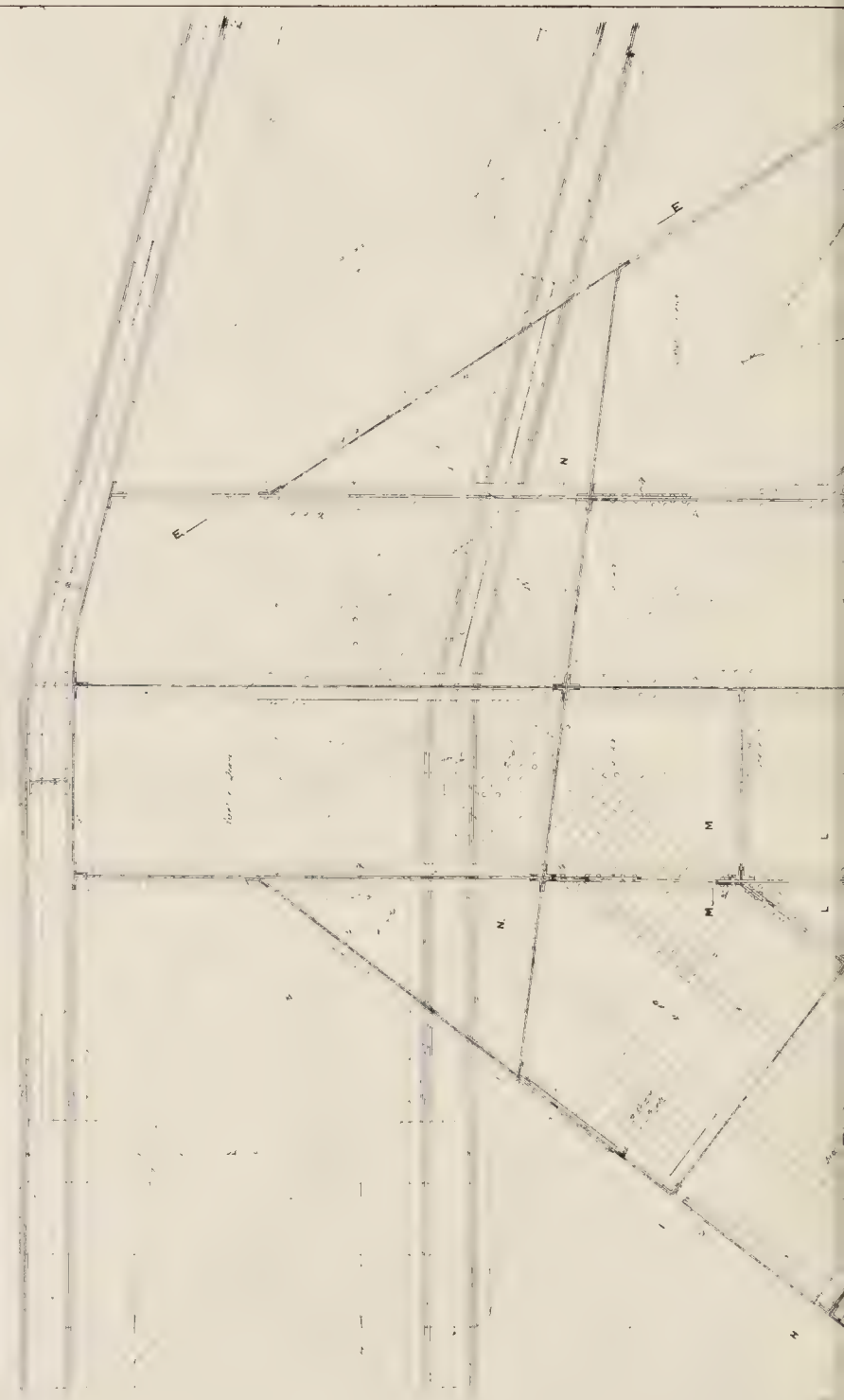
PORT BRIDGE  
INCH CARVIE PIER

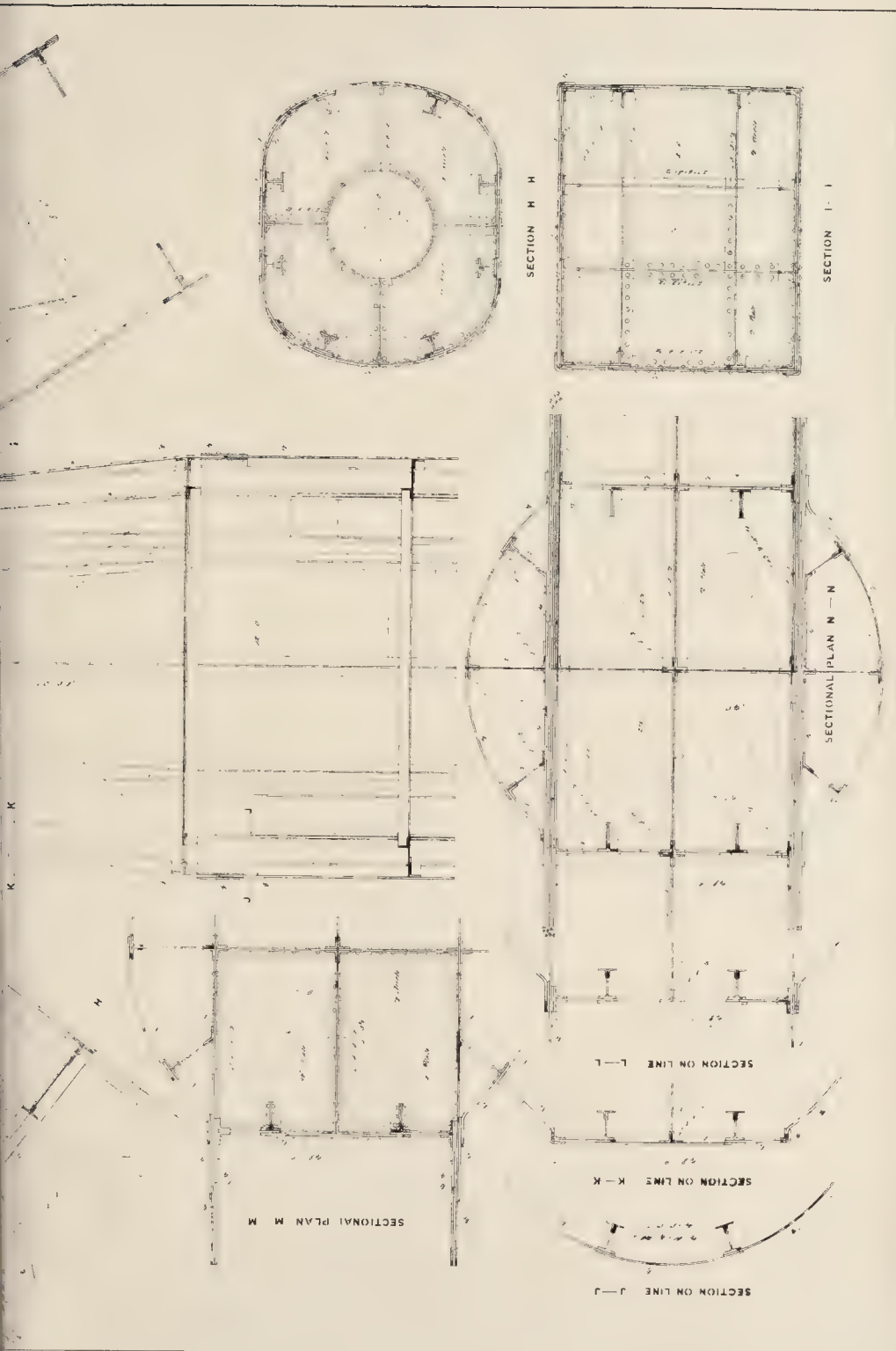
JUNCTION OF MEMBERS AT TOP OF VERTICAL COLUMN

DRAWING NO 144.

SECTIONAL ELEVATION

SCALE  $\frac{1}{2}$  INCH = 1 FOOT





FORTH BRIDGE: DETAILS OF IRONWORK.— Mr. B. HAKER, ENGINEER.

Arch. 125. 65. Photo 1270.







## ILLUSTRATIONS.

New Hôtel de Ville, Neuilly, Paris.—Designed by M. André, Architect; Executed under the Superintendence of MM. Dutocq & Simonet, Architects .....	1219
Sculpture, New Hôtel de Ville, Neuilly, Paris.—M. Tony Noël, Sculptor .....	18
Sculpture over Entrance of General Post Office, Sydney, N.S.W.—Signor Giovanni Fontana, Sculptor .....	17
"Church and State."—Drawn by Mr. H. W. Brewer .....	24-21
Whitehall Court: View from the River.—Messrs. Archer & Green, Architects .....	24-25
Street Architecture, Berlin.—Herr Grisebach, Architect .....	24-29
"The Return of Alsace and Lorraine."—Design for Stained Glass by M. Wagnez .....	32-33
Fourth Bridge: Drawings showing Construction and Placing of Caissons; Details of Ironwork; and Perspective View.—Mr. B. Baker, Engineer .....	36-48
Church of St. Andrew, Willesden Green.—Mr. James Brooks, Architect .....	19
North Porch, St. Paul's Cathedral: Plans, Sections, and Decorative Details.—Drawn by Mr. F. W. Tong .....	52-73, 54-57

## CONTENTS.

Ancient Rome in 1885 .....	1	Church of St. Andrew, Willesden Green .....	59	Tablet Measurement .....	61
American Finishing? Sunday Spectacles. By an American Architect (Illustrated) .....	2	North Porch, St. Paul's Cathedral .....	59	Non-Acceptance of Lowest Tender .....	64
Notes .....	6	Obituary .....	59	Ventilation .....	64
The Distinguished Amateur .....	6	Discovery of a Sculptured Figure at Chigiam .....	60	Tail Chimney Construction .....	64
Letter from Paris .....	7	The Iron Trade in 1885 .....	61	Church Building News .....	64
The New Hôtel de Ville at Neuilly .....	8	St. Peter and St. Paul's Tidings .....	61	The Student's Column: Foundations .....	65
Sculpture, General Post Office, Sydney .....	9	Projected Railway, Tinsbury, (see Water, Dock, Pier, and Harbour Works) .....	62	Variations .....	65
"Church and State" .....	9	Depression in the Building Trades .....	62	Recent Patents .....	66
Street Architecture, Berlin .....	10	Pressures and Parliament .....	62	Meetings .....	66
Design for Stained Glass "The Return of Alsace and Lorraine" .....	10	"The Royal Institute of British Architects" .....	63	Recent Sales of Property .....	66
The Fourth Bridge .....	10	What is a Bill of Quantities? .....	64	Royal Institute of British Architects .....	66
				Miscellaneous .....	66
				Prices Current of Materials .....	67

## Ancient Rome in 1885.\*



HERE has always been a tendency, almost from the commencement of book printing and engraving, to produce works descriptive of the ancient and other remains of Rome, which

have been welcomed by the public.

The number of such works is great, but not more than is needed by the engrossing interest of the old Roman city's marvels. These works range from the merest impressions of the passing traveller to the most formal class of guide-books; there are works with many illustrations, like Wey's "Rome," not long since published, but with no very reliable text for scientific purposes. There are not a few series of architectural plates, setting forth the remains, more or less carefully measured and drawn, from those by Palladio and Desgodets to the goodly volumes of Taylor and Cressy, the latter being a remarkable book, the best of the many works published by Englishmen. The former, while among the earliest series of published measured plates, is valuable also as showing the benefits to be derived by the student from the study of antique monuments, and it is sufficient to show the source of Palladio's purity of detail. Not a few other examples could be quoted of published monographs of buildings prepared by students in Rome, mostly French, in later years.

The succession of the dates when these works appeared shows the uniformity of interest taken, and of the ever-increasing

demand for more information, while the number that have been produced in this country is commendable to our habits of research.

The tendency being to welcome such works, it would be hard if similar good fortune did not attend upon the latest issue of them all. Under the title of the present notice, and, considering the vastness of the theme, in the small limits of a handy octavo of 512 pages, Mr. Middleton contrives to render a mass of information upon the ancient monuments of the Eternal City. He gives naturally more ample detail of the results of the excavations of recent years. In all he compresses his matter into the fewest words. The work is not a guide-book,—it is not a book of measured plates. There are fifty-seven small wood-cuts (would that there were more) that well illustrate the text so far as they go, for they are clear and concise. In addition, there is a useful little map of Ancient Rome and a map of Modern Rome showing the contemplated changes, and we can be but gratified, on inspecting the position of the new quarter of the city, to notice how well it is kept away from the ancient built-upon portions, where it can grow according to modern needs of population without doing much harm to the ancient monuments. Lastly, there is a plan measured by the author and drawn by him, of the Roman Forum, in which are shown the exact positions of that wonderful gathering together of Temple, Forum, Basilica, memorial column, triumphal arch, and the like. This plan shows the result of the excavations down to the most recent discoveries, and it has the advantage of indicating by tints the principal materials used in the various buildings.

The author's combined architectural and archaeological knowledge enables him to conduct his task with "attention to detail and modes of construction,—points which are

usually passed over too lightly by those antiquaries who are without any practical acquaintance with the actual processes and materials employed in building." Some interesting items of technical information will be referred to as we proceed.

After referring to the various sources of information, such as the references to the classical authors, inscriptions, coins, and Mediæval and modern works, a brief list of the latter being given, the author proceeds to his first chapter, on the materials used in the ancient buildings. But scant justice is perhaps done to Donaldson's "Architectura Numismatica," the plates of which are described as not remarkable for accuracy, and Parker's series of admirable photographs comes in for greater praise, as might be expected, than his confused and rambling books.

The wholesale destruction of ancient remains that took place in Mediæval and later times is referred to,\* and it must be a matter of regret for all time that such ruthless havoc was permitted by men who ought to have been the preservers of what had been spared by the hand of Goth and Vandal. Thus, the removal of the side arches of the Triumphal Arch of Gallienus, the stripping of the bronze from the dome of the Pantheon by Pope Urban VIII., and many others, are noted.

The site of Rome is described as a great plain of alluvial and marine deposit, with nine or ten hills of volcanic conglomerate, ashes, sand, and tufa, the traces of volcanic action being of such late date that in many places broken pottery and bronze implements have been found beneath the deposit. Facts such as these, as well as the recent discovery of an Etruscan cemetery, give considerable room for doubt as to the accuracy of the belief in

\* The splendid porphyry columns of the Temple of Venus and Roma were broken up to build the kilns in which the equally magnificent marble columns were burned into lime on the floor of the temple.

\* Ancient Rome in 1885. By J. Henry Middleton. Edinburgh: Adam & Charles Black. 8vo. 1885.



the foundation of the city by the Roman race.\*

Tufa being so abundant on the actual sites of most of the buildings, it is not surprising that it has been one of the principal building stones employed; but Alban stone, Peperino, Travertine, &c., were all employed. The use of the excellent cement concrete formed by pozzolana and sand has contributed in no small degree to the development of Roman construction, since so many forms capable of being built by its instrumentality would have been impossible had a less binding material been used. Thus the heavy mass of the vast dome of the Pantheon is formed of this everlasting concrete, as is the core of almost all the most massive walls and vaulting, sometimes cast between boards. Several of these concrete works are faced with brickwork neatly bonded in; arches are formed of carefully-constructed brickwork; and, indeed, the use of brickwork, *opus incertum* and *opus reticulatum*, &c., as a facing to masses of concrete may be studied with profit in these days when the use of concrete has again attracted public attention. The extent to which it was employed in ancient Rome may be, perhaps little known to many who are conversant with the old buildings, who may believe that the apparently solid brick constructions are, in fact, for the most part of concrete. The bricks used in Rome appear to have been stamped from the second century A.D., the stamps continuing to a late date, and these being for the most part readily deciphered, the date of construction can very frequently be determined. No examples of the stamps are given in the book before us, which is to be regretted, for their interest cannot be over-rated.

Precious marbles of all kinds, white statuary, Parian, Athenian, golden Numidian, green Cipollina, violet Pavonazetto, dull green Porta Santa, blood-red Rosso Antico, and a vast number of others were all pressed into the service of Roman architecture at varying dates, and used for all kinds of decorative purposes, particularly for wall linings. Their mere enumeration must afford an idea of how grandly aglow with colour must have been almost all the ancient buildings, the superb effect of the marble linings being enhanced with glittering mosaic floors and brilliant frescos or other paintings on dome and ceiling and roof. In presence of all that antiquarian research has ever taught of these old glories of colour, it must ever be a matter of surprise that, among ourselves, the seventeenth and later century revivals of classic forms witnessed but the bald, cold outline only, to the entire exclusion of all the old wealth of colour which had ever accompanied it in old times. This is the more remarkable since the first revival in Italy was marked by the development of arabesques in colour, inspired by the study of many ancient works then discovered.

Our author refers to the use of hard granites and porphyries, which could only have been worked by the help of emery or diamond dust. The perfect fitting nature of the blocks of stone forming the wall of pre-historic date, the so-called wall of Romulus, is referred to, and distinct marks of metal tools are to be found on them, sufficient to disprove the belief that the masses were simply split by wooden wedges. The use, however, of iron clamps run into lead, at a later date, and of wooden dovetailed clamps, is curious, as is the mode of fixing the marble facings with iron. "The wall stucco was applied in three or four coats, the whole being often more than two inches thick." The surface was prepared with great care to secure paintings, and was often polished to a surface like artificial marble, the first coat being held on not by a rough surface, but either by nails or small plugs of marble, which were driven into the surface of the wall to be plastered. It is not so stated, but, of course, this would be only for the best work. Interesting notes are given with respect to the course not only of the primitive wall, but of the probable direction of that of

Roma Quadrata, and of those of the Regal period\* and of later times, including the position of the gates and the great Agger of Servius. A good cut shows the construction of the massive brick-faced walls of Aurelian, with its bold square projecting towers and its lofty inner arches. Following a brief notice of the various sewers of the city, the construction of which it is suggested was derived from the partly Hellenised Etruscans, is a shorter one of the river embankments, credit being given to Mr. Parker for having first noticed a piece of Etruscan-like wall near the Cloaca Maxima. The Mamertine Prison, alluded to by Juvenal as being the only prison needed in the happy early days of Rome, is shown by plan and section.

Three whole chapters are devoted to the elucidation of the mass of buildings on the Palatine Hill, and these are shown to be of all ages, some being of remote antiquity, but since their discovery and uncovering, exposure to the weather has caused them to crumble rapidly. The foundations are revealed of a temple called that of Cybele, and of Jupiter Stator, and a wooden is given of the curious early altar to the Unknown God, while another renders the ground-plan of the so-called House of Livia, a well-preserved and complete specimen of a Roman house of the time of Augustus. The palace of that Emperor is described, and also those of Caligula, Domitian, Hadrian, and Severus, with the mass of accompanying temples and basilicæ, a passing reference being given to the supposed Church of St. Maria Antiqua. Doubt is expressed as to its Christian date, there being a marble-lined cistern in the apse where we should have looked for the site of the altar. Several technical points relative to these buildings, which, in some cases, determine their dates, are pointed out; thus, very thin bricks with wide joints are attributed to the end of the second century; some of the paintings are on walls lined with flanged tiles to prevent wet soaking through; and the flue-tiles from the heating furnaces are found to be held together by strong pieces of T-iron.

The Forum Magnum and its adjacent buildings occupy the whole of chapters v. and vi.,—a short history being prefixed showing the rise and progress of its buildings from the time when the site was but an intermediate valley filled at times with stagnant water, or, when dry, when it was the battle-ground of the Sabines dwelling on the hill of the Capitol and the Latins of Roma Quadrata. The construction of the cloaca, which runs across the site, was the first step towards converting the site into dry ground, but the ponds,—Lacus Curtius and Lacus Servilius,—remained until later. The world-famed buildings of the Forum had their beginnings in remote times, and were frequently rebuilt, as is very sufficiently shown by the excavations, which have revealed the foundations of early times built into those of later date, not in one spot only, but in every direction of the clearances.

A sketch is given of the Church of St. Adriano, which is probably the Curia rebuilt by Diocletian. It is a mass of ancient brickwork, relieved with stucco mouldings, and lined out in blocks. The sketch shows the ancient bronze gates now in the Church of St. John Laterano, the ancient level being about 20 ft. below the present modern surface, showing eloquently enough how great has been the accumulation of earth during the many centuries that have elapsed since Roman times.

The site of the Rostra of Julius Cæsar is now determined, and two interesting woodcuts show the plan and a section, while small detail sketches give the way in which the marble face-work was secured to the wall of tufa behind, the marble cornice and plinths being carefully dowelled, the position of the bronze gallery beaks being determined by the holes which remain in the tufa wall. The entire width is 78 ft., and there have been two colossal figures at the extremities. The remains which have been uncovered correspond with a bas-relief from the arch of Constantine,

which shows the upper portion of the Rostra as well as the adjacent buildings.

Behind the Rostra are the remains of a richly-decorated platform, curved on plan, which has been lined with Greek marbles, and the extremities of the curve are the probable sites of the *Umbilicus Romæ*, or central point of the city; and the golden milestone (gilt bronze) inscribed with the names and distances of the towns of Italy. To the right of the Rostra is the Arch of Severus, while to its left was most probably the site of the smaller Arch of Tiberius, the Temple of Saturn, with its portico of Ionic columns being behind the latter arch, and the Temples of Concord and of Vespasian behind and beyond the Rostra, while above these latter towered the rock of the Capitol. The plan already referred to shows with much clearness the course of the Sacred Way, and the site of the enormous Basilica Julia, with its white marble pavement and treble row of piers; of which, alas! little remains, owing to its being burned for lime in Medieval times. The plan indicates the position of all the buildings surrounding the open part of the Forum, in face of the Rostra, the Temple of Castor, the circular Temple of Vesta at some distance away, as well as the bases of the seven honorary columns parallel to the Basilica Julia. A separate cut is given of the basement plan of the Temple of Castor, showing the huge spurs on which the columns were built, and another which will be scanned with much interest shows the plan of the newly-discovered House of the Vestals, and its relation to the circular Temple of Vesta. Its two stories are shown by a section indicating its relation to the Palatine Hill, and the mode of construction of some of its floors on the necks of the huge Amphoræ.

Reference is naturally made to the remarkable discovery of the portrait statues of the Vestals, which are of heroic size, with inscribed pedestals, although unfortunately the latter cannot be identified with the statues. One of the best of the wood-cuts shows a portion of one of these statues to a sufficiently large scale to enable us to judge of the excellence of the workmanship.

Passing reference is made to the sites of the arches of Fabius, the earliest of the triumphal arches, and that of Augustus, and the chapters conclude by reference to the other most recent discoveries in the Forum.\* The plan already referred to indicates the singular want of symmetry of the buildings of the Forum, which appear to have been placed in a very haphazard manner, sufficient to show that there never was any preconceived plan for the whole, and that they grew out of the requirements of the times.

Chapter viii. is devoted to the description of the buildings, &c., on the Capitoline Hill, the early walls, and the ancient temple of the Capitol, there being in this section a digression upon the period of Augustus, illustrated by the inscriptions from the temple of Ancyra, which enumerate the works which this emperor erected in Rome.

The Imperial Fora form the theme of the eighth chapter, there being plans of the Fora of Julius Augustus, and Nerva, showing the positions of these buildings, which although of similar destination, yet are adjacent one to another. Another plan shows the Forum of Trajan, entered by the triumphal arch, and having his column at the side of the enormous Basilica Ulpia.

Chapter ix. is devoted to the theatres, &c., the Circus Maximus, the theatres of Pompey and of Marcellus and others, being described, the amphitheatres being reserved for the tenth chapter. In this the Colosseum naturally takes the first place. The baths are treated of in the eleventh chapter, and a plan is given showing the results of the recent excavations at the back of the Pantheon, on the site of the

\* It may not be amiss to indicate for the guidance of students who may possess the older works on the Roman antiquities, that the three graceful columns mostly described in these, as belonging to the Temple of Jupiter Stator, are now shown to have been a part of the Temple of Castor. In like manner, the three angular columns said to be part of the Temple of Jupiter Romæ, are now assigned to the Temple of Vespasian; while the Temple of Concord is called so no longer, but the Temple of Saturn.

\* Many discoveries made during recent years show that Rome was populous at a very remote and quite prehistoric period.

\* A small engraving shows various masons' marks on walls of the Regal period. Many of them are letters of early form.



Baths of Agrippa. The two buildings line out so exactly that it is difficult to follow our author's belief that they had no connexion. The connexion of plan is not unlike the relation of the Albert Hall to the Inventions Exhibition, and some sort of similar connexion and joint use appears hardly capable of doubt. The Golden House of Nero is described, and a plan is given, while others show the Baths of Titus and of Caracalla. The twelfth chapter describes various other existing remains of Rome; the thirteenth, the tombs and memorial columns. The fourteenth is occupied by the aqueducts and the water-supply, several curious details being given of the plumbers' work of more than eighteen centuries ago, where we may see that four-way pipes, soldered joints, and stop-cocks were in use, as well as soldered lead supply-pipes, which were general.

The book concludes with the fifteenth chapter, which describes the construction of the roads, the bridges, and the wall of the Emperor Aurelius.

The work is a very valuable addition to our knowledge of the ancient buildings of Rome. Its author may be congratulated for having brought to a focus, so to speak, a vast amount of information from various sources into small and readable compass. Of this information it is evident that a large proportion is the result of his own investigations.

and into it are branched the wastes from water-closets and basins, bath tubs, laundry tubs, kitchen sinks, &c. The plan of the house is so arranged that the apartments containing these come over each other in the different stories, and the fixtures are grouped about the soil-pipe, the horizontal branches being made as short as possible. In large houses there are sometimes two or more vertical soil-pipes, so as to avoid the necessity for running long horizontal pipes.

by the city authorities, so that the public sewer will not be impaired. From this connexion to the building salt-glazed terra-cotta pipe is used, commonly 5 in. inside diameter. In the best work these pipes are bedded on concrete, so the alignment will be and remain perfect. In cheaper work the earth is hollowed out under the hubs or bells, so that the length of the pipe will have a solid bearing on the earth. The joints are made with cement and sand in equal parts, and the inside swabbed out, so that

## AMERICAN PLUMBING: SANITARY SPECIALITIES.

BY AN AMERICAN ARCHITECT.

ENGLISH plumbing was undoubtedly the progenitor of American plumbing. The offspring is lusty, and differs materially from the original, both in the manner and material of which it is composed.

I do not propose to describe all the American specialities, but there are many things which I think would be interesting, if not instructive, to Englishmen interested in building.

But our plumbing is not, properly speaking, plumbing at all, as lead enters into it only to a very limited extent. In the United States, iron soil, waste, and supply pipes are used, to the exclusion (of course, there are a few excep-

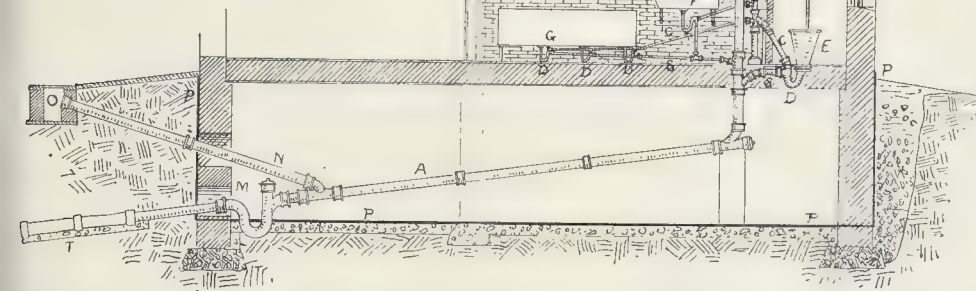


Fig. 1.

- A. Main soil-pipe.
- B. Vent-pipe, with branches entering from the traps of various fixtures.
- C. D-traps vented.
- D. Water-closets.
- E. Kitchen sink, with vented traps beneath.
- F. Laundry tubs.
- G. Bath-tubs.
- H. Wash-basin.
- I. Enlarged soil-pipe.
- J. Wire basket.
- K. Running trap.
- L. Fresh-air inlet.
- M. Grating in pavement, forming entrance to cold-air inlet.
- N. Asphalt coating over a concrete cellar bottom, extending through the wall as a damp-proof course and up the side of the wall as an impervious coating.
- O. Branch waste-pipes.
- P. Terra-cotta pipe laid on concrete.
- Q. Glazed tile facing on the walls of bath-room.
- R. Glazed brick in kitchen.
- S. Soil-pipes and their connections are manufactured in sizes varying from 2 in. to 15 in. in diameter. Pressure-pipe comes in 12 ft. sections. Well and spigot pipe, 5 ft. long. Durham, 20 ft. Sanitas, 3 ft.

tions) of lead pipes. Branch wastes, where bending is necessary, less than 2 in. (about 5 centimetres) in diameter, are sometimes made of lead.

### THE INSIDE SEWERAGE SYSTEM.

The term "drainage system," as this is sometimes called, should only be used to designate agricultural or hand tiles, which drain off pure water. As soil and waste pipes convey sewage, I designate them when in place, as the inside, or house sewerage system.

In America, one vertical soil-pipe is used,

In our cities the sewers are usually placed in the streets, while kitchens, bath-rooms, and water-closets are almost invariably situated at the back of the house. For the above reason the sewer must run beneath the building as the entire site is usually covered in width. The material, manner of trapping and ventilating plumbing is governed by "Plumbing Regulations" or laws in the large cities of the United States. The illustration (fig. 1) shows a house fitted up in accordance with "Regulations" as usually drawn up. The house system commences with the sewer connexion. Here a special fitting is required, usually put in

no hard projections can form on the inside to catch the sewage.

A 4 in. (about 1 decimeter inside diameter) iron pipe is connected with this terra-cotta one just outside of the building line. The iron pipe passes through the wall, an arched opening being left for the purpose. If the wall should settle the pipe will remain intact. Just inside the building is usually placed the *U* or *V* running trap (fig. 1). These traps have inspection holes. On the house side of the trap a branch is introduced, running out to the curbing for a fresh-air inlet. This is covered by a grating let into and even with the pave-



ment, if on the side walk, and by a hood if on a grass plat (see detail illustration, fig. 6, C).

The pipe then runs along the wall as shown in the illustration, either supported by hooks built in the wall, or by hangers screwed into the joists. When this sewer-pipe is run beneath the ground, and this is sometimes found necessary, it is usually buried with its simple earth covering. In the best work it is built into a solid mass of concrete, if it is impossible to keep it exposed for its whole length, as it is always best to do.

As shown in the cut, the pipe turns leaving a screw-plugged inspection-hole, and runs vertically until it passes through the roof. Proper fittings are inserted at each story for branch, waste, and vent pipes. Where the climate is as cold as in New York City, a 4-in. pipe where it runs through the roof becomes completely choked up in frost. For this reason the last length of soil-pipe is enlarged from 4 in. to 6 in., and covered with a copper-wire basket (fig. 6, A). Cows of various patterns, and return bends, that were commonly used at the top of a soil-pipe, have been universally discarded for the plain ending shown in cut.

#### DETAILS OF PIPING.

Cast-iron bell and spigot jointed pipe is the kind generally used in the United States. This pattern is moulded in three qualities or thicknesses, called pressure, extra heavy, and light cast-iron pipe (see fig. 2, C, E, H, I, K). Pressure pipe was originally manufactured for the conveyance of gas or water under pressure, hence its name; but now it is frequently used for the horizontal soil-pipe in the inside sewerage systems of the best houses. The bell is shaped so as to best fit it for caulking, being at least an inch thick on the outside. The cut (fig. 2, H) shows the groove in the inside of the bell into which the lead is driven when the pipe is caulked. This is the best, but it does not have the same number and variety of fittings as the other pipes have. Extra heavy pipe is the kind used where the work is supposed to be good. Light pipe is only used where or when economy is a necessity. Light pipe is often very imperfectly cast, with flaws or holes, thin on one side, thick on the (fig. 2, E) other. The latter defect is caused by casting the pipe in a horizontal position,—a method fast becoming obsolete. The bells or hubs are cracked by caulking; joints are made by inserting the spigot end of one pipe into the bell of another. The space between is packed with a hemp gasket or unravelled rope for the height of three-quarters of an inch, being driven down by a chisel made for the purpose. The bell is then filled with molten lead, and it is driven firmly home with a chisel. When properly made this kind of a joint is permanent and effective, gas and water proof, and slightly elastic.

The Sanitas pipe, with flanges cast on the ends of each piece, has been recently introduced into the market by a Boston (U.S.A.) manufacturing company. The flanges are drawn together by screw-bolts (see fig. 2, L and F). A lead washer of the section shown in cut is introduced between the flanges. Being star-shaped, when the bolts are screwed up tightly, the lead washer is flattened, and a good joint formed. A ratchet wrench is necessary where the pipe is put back in an indent or recess.

This method of jointing pipe has not been in the market long enough to have its merits or faults fully determined. While the cast-iron bell and spigot-pipe can be easily cut to suit any length, with the flange-pipe it is necessary to make the space between the fittings suit the pipe. To meet this want short pipes are supplied, only varying 1 in. from each other in their length. Wrought-iron pipe is being used with screw-joints, having been introduced by the Durham Drainage Company, of Chicago. Wrought-iron pipe is furnished in 20-ft. lengths, and  $\frac{1}{4}$  in. thickness of metal. A soil-pipe of this kind can extend from floor to floor, even when the pitch is high, without a joint, the pipes and fittings in this system of plumbing standing upon their own foundation, independent of movements in the walls

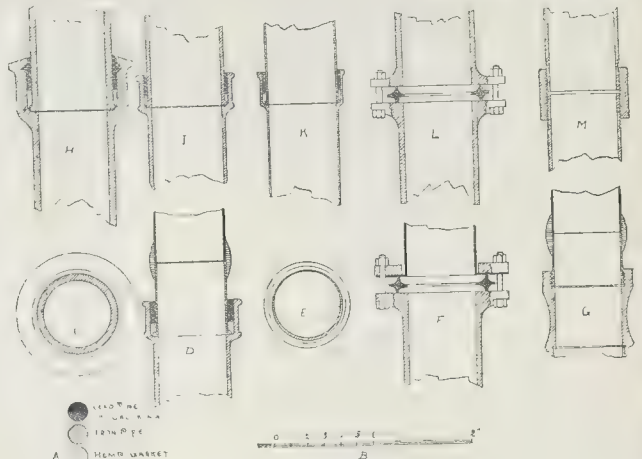


Fig. 2.

- A. Graphic explanation of metals shown in cut.
- B. Scale.
- C. Cross section of pressure-pipe.
- D. Vertical section of pressure-pipe.
- E. Extra heavy cast-iron pipe.
- F. Light cast-iron pipe.
- G. Sanitas pipe.
- H. Durham or screw joint-pipe.

H, I, K, and D have caulked joints.

E. Section of light pipe.

G and D. Method of connecting cast-iron hub-pipe with a lead pipe. A brass thimble caulked into the hub and connected with lead-pipe by a wiped solder joint.

F. Sanitas pipe connected with lead by a solid ring screwed down over its compressible lead washer.

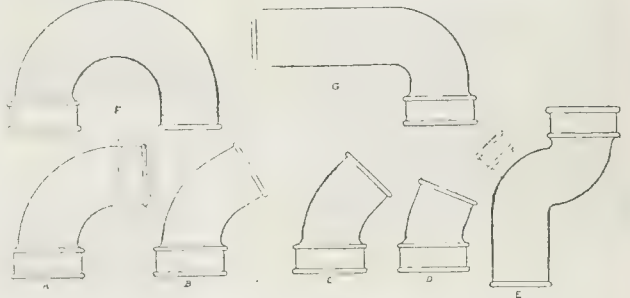


Fig. 3.

- A. Quarter bend. Dotted line shows one with a double bell.
- B. Sixth bend.
- C. Eighth bend.
- D. Sixteenth bend.

E. Off-set. Dotted line shows branch supplied on off-set when needed.

F. Return bend.

G. Quarter bend, with long outlet.

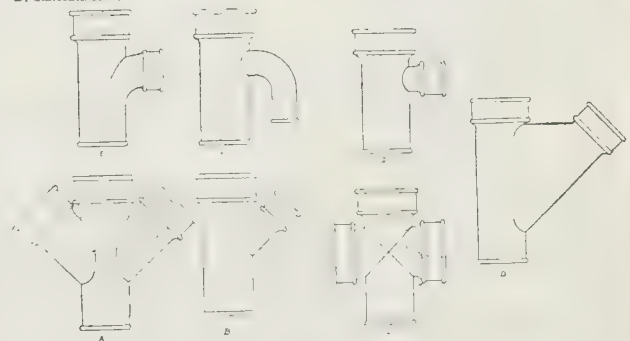


Fig. 4.

- A. Double Y-branch. The dotted line shows  $\frac{1}{4}$  in. and  $\frac{1}{2}$  in. combination Y.
- B. Y-branch.
- C. Double T. Dotted line shows a fitting with small T on one side.
- D. Anti-siphon Y-branch.

E. A T Y-branch.

F. Branch fitting, commonly used in connecting a soil and vent pipe placed above the connection with the highest fixture.

G. T-branch.

or floors. The screw-joint is one of the best forms, being the strongest, most elastic, and easily made water and gas tight (see fig. 2, G and M).

Connecting lead pipe with iron is performed

in the manner shown in fig. 2, D, G. A brass thimble is caulked into the bell of the common pipe, or screwed into a fitting of the Durham. The thimble is tinned, and the lead pipe connected with it by a wiped solder joint.

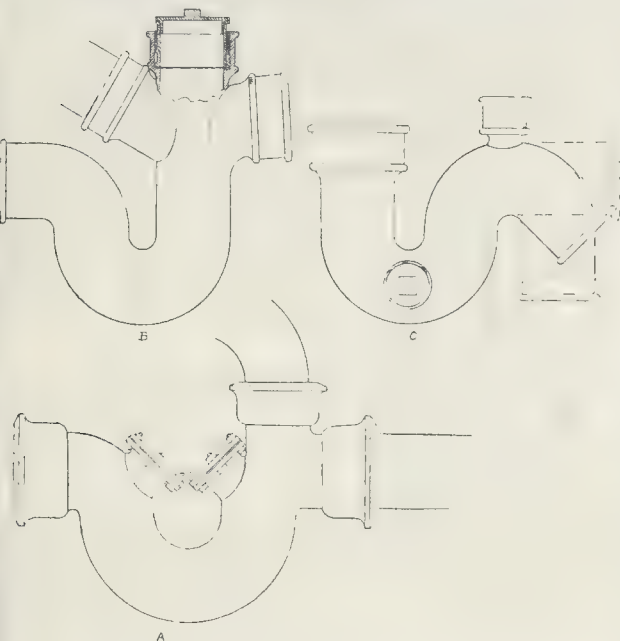


Fig. 5.

Pressure-pipe trap, with inspection holes and fresh air inlet.  
A. simple running trap, into which a Y-branch or quarter bend must be caulked to make the connexion with the soil-pipe.  
B. Shows a running trap with a T Y branch for soil-pipe, a Y-branch for fresh air inlet. The inspection hole has a brass screw plug caulked into it. This forms an excellent and convenient fitting for the purpose.

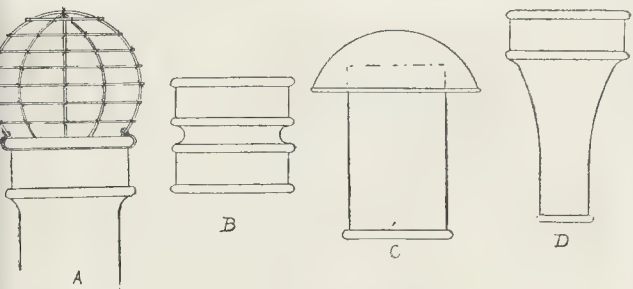


Fig. 6.

A. Outlet or top of soil-pipe with the wire basket.  
B. Double hub or shelf.  
C. Cap or hood for fresh-air inlet.  
D. Increaser or decreaser.



Fig. 7.

A. Outlet of closet, cast-iron pipe cast.  
B. Brass plate screwed to the iron pipe, soldered to the lead pipe.  
C. Cement.  
D. Solder.  
E. Lead pipe.  
F. Brass thimble, around which the lead pipe is lapped and driven into the bell of the iron pipe.  
G. Lead caulking.  
H. Screw bolts.

n connecting with a Sanitas pipe, the edge of the lead pipe is beaten out until it covers the lead washer. An iron ring is placed over it and the pipe screwed tightly down by bolts. Iron thimbles, with lead sleeve cast around them, have been recently introduced to caulk into iron pipe. A few years ago plain iron pipes were put in position without any coating to protect them from oxidation. Then it was the common custom to have the pipes painted

(dipped) inside and out with metallic paint. Now all the pipe in use is coated with asphalt. When well done it looks as if it were japanned. This is supposed to protect the pipes from oxidation and form a thoroughly durable coating. It has not been in use long enough for its durability to have been tested properly.  
Enamelled iron pipes are used to a limited extent. These pipes are coated on the inside with porcelain enamel, and have a pretty and cleanly appearance. The cost limits the use. I think it would be found that the hammering incident to caulking and cutting would break the enamel off.

PIPE FITTINGS.

The common, Durham, and Sanitas pipes have each fittings for the purpose of making bends, branches, connexions with traps, and fixtures. These fittings are for the same purpose, and are practically the same shape, in each case. The difference consists in the bell and spigot flange and screw ends to adapt them for joining with the pipe which they accompany. In the illustration I have only shown those with the common end.

Fig. 3 represents a number of bends in common use. They are found necessary where a line of piping deviates more or less from a straight line. The return bend was commonly put on the top of the soil-pipe after it passed through the roof. It is rarely used for that purpose now. Branch fittings are shown in the cut (fig. 4). They are made suitable for nearly every conceivable branch from one line of pipe to another. Y branches should always be used in soil-pipes. T-branches can be used in vent-pipes. The detailed view (fig. 4) in connexion with the small sectional view (fig. 1) will show the utility of these fittings. Running traps should always, I think, be placed between the sewerage system of the house and the city sewer. In a majority of cases they are so placed. A few men of standing are opposed to the use of this trap. They wish to ventilate the public sewers through the private houses. This article is not the place to discuss the merits of the case, but I will say that it might be a good idea to omit the trap if the plumbing and sewers were all models of excellence,—a state of things to be hoped for, but not expected. The common types of these traps are shown in fig. 5, with their inlets and inspection holes. One is for pressure-pipe with inspection covers bolted on (B), used by the Durham Company. Another (A) has a branch for the house sewer, an inspection-hole with a trap screw caulked into it, and a branch to receive the fresh air inlet. Inspection-covers are sometimes made in the form of plates with hooks intended to screw on to an inclined plane, a worthless cover. The other two mentioned are good. Deereaser, double hubs, hood, and end are shown in the next cut (fig. 6).

In the last few years small simple devices have been introduced for connecting water-closets with the house sewerage system (see fig. 7). The point to be attained is the same in each case. Not many years ago the stability and immobility of the floor was depended on to keep the joint of the closet perfect. As joists shrink and walls settle, the joints often come open. A piece of sheet lead and putty forms a very imperfect joint. The iron connexions consist of a plate cast on in one piece with an eight or quarter bend. On this plate the closet is bolted, cement being introduced between the flange on the outgo of the closet and the plate mentioned. The face of J. L. Mott's water-closet plate is finished with brass, and the end of the fitting is suitable for caulking into the bell of the common cast-iron pipe. The Durham plate is screwed into their fittings. The Meyer-Sniffen plate is for connexion with a lead pipe. A brass-plate through which a lead pipe is introduced, and to which it is soldered, is bolted to the bottom of the closet. This is clearly shown in the accompanying cut (fig. 7).

Iron pipe is supposed, in the United States, to be much better than lead for soil and waste pipes. Neither rats, mice, ants, nails, or umbrellas can make a hole in iron. There are recorded cases where lead pipes have been



destroyed by each of the above-mentioned causes. The concentration of carbonic dioxide or carbonic acid gas in sewer air seems to have a decidedly hurtful action on lead pipes when not properly ventilated. There are some interesting specimens in the Museum of Hygiene, U.S. Navy Department, Washington, D.C., full of holes, evidently caused by the carbonic dioxide of sewer air.\* Sewer air does not act upon iron in this destructive way. I have seen plain iron pipe (neither coated with asphalt nor paint) taken out without being materially damaged, after years of service. Lead pipe, where carried horizontally, is liable to sag and form traps in the pipe, thus cutting off the air and ventilation. Iron pipe can be carried long distances, forming a perfect alignment.†

GLENN BROWN.

#### NOTES.



FROM the Vestry of Chelsea we have received an interesting report (drawn up by Mr. Mossop, Chairman of the Electric Lighting Committee, and Mr. G. R. Strachan, Surveyor to the Vestry), for presentation to that Committee, on the Provisional Order for which the Chelsea Electricity Supply Company are making application to the Board of Trade, and which, if confirmed by Parliament, will authorise the Company to erect and maintain electric lines and works and to supply electricity within the parish. The maximum price to be charged by the Company is 10d. per unit. With regard to the conditions of purchase, the Committee had already come to the conclusion that a modification of the Electric Lighting Act, 1882, is necessary, if electric lighting is to be secured to the public at the present time. The section, it appears, is known as the "old iron" section, because it is said, by persons interested in these undertakings, to hand over to the local authority the whole of their plant at the value of old iron. The object of the section is, notwithstanding, as the reporters say, a legitimate and beneficial one, "but its terms are calculated to strangle any attempt to induce the public to invest money under it." "When it is remembered," they continue, "that the science of lighting by electricity has made substantial progress since 1882, that some of the then practical difficulties have been overcome, and that it is now possible to offer a better light at a cheaper rate, and yet, that it is almost impossible to raise capital for electric lighting purposes under section 27, it must be conceded that if the object of the section can be secured, and at the same time its terms widened so as to give reasonable scope to investors, a most desirable end will be attained." In this spirit the reporters have had conferences with the promoters, and as a result submit for the consideration of the Committee a clause satisfactory to them, and which they say should not be unsatisfactory to the public. The clause extends the time of compulsory surrendering of the undertaking to the local authorities from twenty-one to thirty-five years.

TO say that the necessity of the railway companies is the opportunity of the public, may, at the first glance, be called cynical. Yet it cannot be doubted that it is on the occasion of their seeking fresh Parliamentary powers, and on these alone, that the powerful, although not too prosperous, carrying companies that quarter the United Kingdom amongst them, show any marked disposition to listen to the complaints of passengers and of freighters. The prosperity of the railway companies is an essential part of the prosperity of the country. The dividends that they now earn are,—it is not for the first time that we express the opinion, disproportionately small. A comparison of the English and of the French systems of railway, and of the profits of the respective shareholders,

leaves but little room for doubt that it is to the impolicy of the English railway managers that the comparatively pitiful return that they make to their shareholders is entirely due. And thus, while it is in the interest of the public to oppose the granting of any fresh power to any great railway company without obtaining as the price of it an effectual guarantee, that demand is in the interest of the shareholders no less than of the public.

A SHORT announcement made very recently in the official *Gazette* of Rome appears to be worth attention in England, for it was to the effect that a concession had been given by the Italian Government to Messrs. Armstrong & Mitchell to erect ironworks at Puzzuoli. The reason for this determination was, of course, not stated; but we fear that it is not far to seek, and that it is only one of many unhappy outcomes of the industrial disputes which have gone so far to ruin England. All readers of the newspapers will remember the miserable strike that for so long paralysed work at the Elswick factory; and one can scarcely avoid coming to the conclusion that the proprietors, like others before them, have determined to transfer some of their operations to localities where the tyranny of the British workman is not felt. The industrial history of England can show many of these examples of late years, by which an enormous amount of capital has been taken away from this country to Spain, France, Belgium, Russia, and elsewhere. The worst of it is, that the conceit and wrong-headedness which produce these catastrophes show no signs of abatement, but rather the reverse. A few more years of this sort of thing and England will have no trade or manufactures remaining to play fast and loose with, as it is not to be supposed that capitalists will go on indefinitely losing money to please the Trades Unions and the self-complacent gentlemen who make their fortunes in connexion with them.

COMPETITION between railway companies, carried on as it has been in well-known cases, results in general loss and in ultimate damage to the public service. On the other hand, in the absence of competition, not only are the utmost legal fares and freights exacted and, indeed, exceeded, but facilities of travel, punctuality, civility, and decent carriage accommodation, all suffer. The contrast as to fares, punctuality, civility, and comfort, for example, which exists between the three northern lines, which now have found a *modus vivendi*, and the four or five eastern, southern, and western lines, which but little, if at all, compete with one another, is patent, lamentable, and, in some sort, disgraceful. But, if such be the case under existing circumstances, what will be the case if the London and Brighton and the London, Chatham, and Dover lines are allowed to get in the small end of the wedge of amalgamation, with the probability that the South-Eastern will be attracted to the union before long? Judging by present experience, the public will suffer. Trains will be taken off, fares will be screwed up to the very maximum. Stock that would be condemned at once on the northern lines will be allowed to run till it shakes itself to pieces. Nor do we think that the shareholders will be the better for the fresh start given for a war between the companies and their customers; that is to say, such we take to be the outcome of the Bills now sought if passed without very well-considered guarantees.

THE Pont Neuf at Paris, as mentioned elsewhere in our "letter from Paris," has stultified itself and belied the Parisian proverb, "Solide comme le Pont Neuf," by showing serious signs of giving way and threatening to disappear bodily into the Seine. Great as have been the transmutations of Paris, so integral a portion of the metropolitan history cannot be left to be replaced by a modern structure, and it is to be hoped that speedy means will be found for strengthening the defaulting piers. This bridge, however, is not the first of its race, the earliest one having been destroyed by fire and the second by a violent storm. The

present bridge, indeed, dates from Henry III. who, accompanied by Catherine di Medici, his mother, and Louise of Lorraine, his wife, laid the first stone in 1578, though the works were interrupted by civil war, and were not completed until Henry IV.'s reign in 1604. For a long time the Pont Neuf was encumbered with tents, occupied as shops and places of entertainment, so that the bridge became the fashionable resort of the Parisians. The statue of Henry IV., put up by his son Louis XIII., had rather a curious history. It was originally cast by Bologna, a pupil of Michelangelo, for the reigning Grand Duke of Florence; but, on his death, nobody seemed disposed to own it, and it was offered by his successors to Marie di Medici, to whom it was shipped off, meeting with shipwreck by the way on the coast of Sardinia. During the Revolution it was pulled down and the present one erected at the time of the Restoration.

THE cold weather which, even in a comparatively mild winter such as the present is experienced, directs attention to the manner in which railway waiting-rooms are warmed. Of all places in the world they require general warmth, and not a mere local glow. But the great majority of waiting-rooms at railway stations are warmed by means of ordinary fire-places. The consequence of this is that only a small portion of the room is warmed, and the fire is surrounded by some have a dozen passengers, whilst the remainder shiver at a distance. We have stated this generally of railway stations, but as particular instances we may mention Willesden Junction, Watford Junction, Crewe, and Chester. Other stations might be mentioned, but it would only cause us to chronicle an uninteresting list of names. It is sufficient to point out that, as opportunity offers, every station waiting-room should be heated with slow combustion stoves; they would add to the comfort of passengers and save the pockets of the shareholders.

WE print in another column a letter from "A Suburban Builder" in regard to a bill of quantities furnished to him, and which he regarded, and we think rightly, as giving very insufficient information in regard to some portions of the work to be estimated. Quantities should certainly give more detail about the work than is given in the portions quoted by our correspondent from the bill of quantities in question. But if "A Suburban Builder" means to set up the principle, as part of his letter rather seems to imply, that a bill of quantities should be so made out as to dispense with any inspection of the drawings and specification, he is going too far. It is impossible that a building of any elaboration of decorative treatment can really be analysed down into a priced quantity list. The drawings of a building exhibit the style of work as quantities can by no possibility exhibit it: the quantities form an authoritative statement and record of the amount of each portion of work. It is too much to expect that they should be so made out as to fill the whole place of drawings and specification in making an estimate; and we should distrust estimates made without reference to the drawings, on however accurate a bill of quantities they might be based.

THE proposed Italian tour of members of the Architectural Association appears to be in process of getting well and efficiently carried out, with the view of making the most of a necessarily brief expedition. The party are to start on April 17th, returning on May 6th, giving two days to Milan, four to Florence, six to Rome, and touching in swallow-flights on Piacenza, Sienna, Pistoia, and other towns. It will be a scramble, but a very happy one for those who go for the first time, and who have youth and enthusiasm as companions of their journey. By way of preparing to make the most of it the committee have organised a series of meetings at which each of the towns to be visited will be studied beforehand by the aid of books, maps, and photographs,—an excellent idea.

\* A very full description and illustrations of these specimens by the author appeared in the *Architect and Building News*, Nov. 7, 1885.  
† To be continued.



**M. EUGÈNE GUILLAUME**, member of the Institut of France, who was formerly Director-General of Fine Arts, has recommenced his Cours d'Esthétique at the Collège de France, and his recent lectures on the influence of the philosophic schools of Greece in the development of schools of art have contributed to maintain the high character of that too little known educational institution. Plato and Zeuxis, Aristotle and Lysippus and Apelles, Plotinus and the artists of the Alexandrine School, have in turn served the eminent Professor with subjects for very thoughtful studies, in which he seems to have established beyond question the parallelism which existed between the philosophic doctrines and the artistic conceptions of ancient Greece.

**THE** publication, in facsimile, of some of William Blake's extraordinary illustrated manuscript poems, edited by Mr. W. Muir, and published by Mr. Quaritch, of which some books have already appeared, is, we hear, in process of continuation, and the works to be brought out (it is hoped) during the present year are "Milton," "Europe," "The Song of Los," and "There is no Natural Religion." We mentioned the reproduction of the "Book of Thel" some time since. The new reproductions, like the previous ones, are to be confined to fifty copies for subscribers only.

**WE** are glad to learn, from a letter from Dr. Villiers Stanford in the *Times* of Wednesday, that a committee has been formed for erecting a monument in Cambridge to the great composer of the "early English" period of music, Orlando Gibbons, who was born at Cambridge in 1583. Gibbons was, in his way, one of the greatest masters of "tone-structure," and his memory well deserves the honour of such a commemoration in his native place. The proposed site for the monument is opposite King's Parade, and it is proposed that it should be in the form of a statue by Mr. Hamo Thornycroft. No fault can be found with the choice of a sculptor; but considering the unfavourable effect of the weather on open air statues in England, would it not be better to place the statue in the antechapel of King's (where Gibbons was a chorister), where it will be protected from the atmosphere, and where the composer may seem still to hear the voices winding through the vocal mazes of his own "Service in F" dear to all church musicians? The proposal to place on the pedestal a portrait in relief of Sterdale Bennett (another old King's chorister), which Dr. Stanford also makes, is unhappy, and has already been called in question. Bennett was too original a genius to be placed as an accessory on the pedestal even of Gibbons; and, besides, the art of the two men had little in common; Gibbons is Gothic, Bennett is Renaissance; for these types of art have their parallel in music, though not in the same chronological periods.

#### THE DISTINGUISHED AMATEUR.

"He was never suspected to love anybody, nor to have the least propensity to charity or compassion."

Clarendon.

**THE** amateur architect differs in kind from all other amateurs; for whereas they are content to sit at the feet of the great masters in the arts which they severally affect,—regarding with a becoming reverence achievements which they can never hope to rival,—he thinks lightly of the regular professors of art, holding them to be a stupid and infatuated race, and looking down upon them with a lofty scorn.

In assuming this attitude the amateur architect is distinctly original; for the ordinary amateur is confessedly an imitator. The Hamlet of the back drawing-room will copy even Mr. Irving's limp, and the tenor of private life embellishes with reminiscences of Mr. Sims Reeves his otherwise artless performances. But the amateur architect is above such weaknesses, and, be what he may, he is no plagiarist. It may be at once conceded that his works bear no resemblance to those of the architect by profession; that is, when the amateur is so ill-advised as to commit himself to practical work. As a rule, he is content with

the safer position of being the reputed cause of what is good in the works of others, giving out that their successes are due to his inspiration, and their failures the result of the rejection of his guidance. As a man of "words, not deeds," his position is secure, and foolish is the architect who allows himself to be drawn on to the attack. Education of a special kind and a particular experience give the amateur a clear advantage in such encounters over the student or man of business. Of the chivalrous conduct of a disputed question of art or taste he has no idea. He cannot see two sides to any question, and despises the mutual courtesies and concessions which take the edge from such contests. He gives no quarter, and, it is only fair to add, desires none. As was said of an equally distinguished predecessor, he has no "propensity" to charity, unless, indeed, it be to that spurious kind of charity which does think evil, and is very much puffed up.

He is generally rich, and a liberal cheque introduces him to committees charged with the restoration of public monuments. Once there matters quickly assume a warlike tone. He has views, which he expresses vigorously, and his views are, it appears, the only ones which sensible men can entertain. Unfortunately dissentients are dragged into the columns of the leading journal and presented with the alternative of being either rogues or fools. For such exciting word-combats he is excellently equipped, and few, indeed, can long endure the cutting east wind of his ridicule and invective. He convinces no one, it is true, but he silences all, talks the weak ones over and the strong ones down,—and comes out of every fray elate with victory and eager for fresh strife.

But "silly Samson was shorn," and the amateur architect has been known to be so imprudent as to risk his reputation on bricks and mortar. There is no example of a successful amateur architect, Lord Burlington notwithstanding; for no one can say positively whether Kent was not the real author of the works which are connected with the Earl's name. The amateur who builds is lost. All his dialectical skill avails not, nor can he persuade the world that the monstrosities of which he assumes the paternity are works of art. His strong points stand him in no stead, and the bitter tongue, the ranking innuendo, the scathing satire, are powerless against the evidence of stone walls. He shows himself as unwise in fighting architects on their own ground as they are in meeting him upon his. His discomfiture is complete, and yet it cannot be contemplated without a degree of regret, for he has redeeming qualities,—undaunted courage, and a frankness in his comities, the virtues of an open foe. How can abilities of such an order be directed in a useful channel, or be provided with a harmless escape? Their unregulated and unrestrained exercise is plainly harmful. The daubs of the amateur painter may be torn up; the poet's verses have their immemorial use. The tuneless song dies away upon the ear and is forgotten, and one recovers in time from the depressing efforts of the amateur comic reciter. But the works of the amateur architect endure at least for his lifetime and are a weariness to all but himself. So long as he merely wastes his means on a Fonthill or such like folly the result may be borne with a patient shrug; but there have been cases in which the amateur has disfigured the designs of real architects, or, worse still, laid sacrilegious hands on the works of old. In these cases a feeling stronger than that of regret will assert itself.

Could not some island,—Coventry Island, say, or Barataria,—be placed at his disposal? He might build there to his heart's content, and no one but himself be one penny the worse. The new buildings would be removed by the next generation, and there would be no ancient ones to "translate." Failing that, there are moderately unfrequented tracts in the Northern parts of the kingdom where his doings would dismay none but the red deer, and where his hobby could be ridden without public danger.

Upon what theory can one account for the aberrations of genius? Why do men who are great in the career for which they are fitted prefer to appear so very small in careers for which they have no aptitude? The amateur architect of the period is a combatant, and has no single attribute of the peaceful and peace-loving artist. He is an anachronism, and should have been a Border baron in the good old days, the

companion of "Stout Williemondswick" and "Hardriding Dick," and the rest of that pugnacious and impetuous band. In these tamer times his peculiar genius has but a limited scope, and expends itself in acrid words, digging deep into all mankind with a pen for want of a sword. Such abundant energy would be worse than wasted but for the fact that he keeps up a pother about art before a public who might otherwise not think about it at all. Although his antics have a serious side, he has added considerably to the world's amusement; and at this season of the year we extend him a reasonable measure of goodwill, although he has done all in his power to make "peace on earth" an impossibility, at least for architects.

#### LETTER FROM PARIS.

**THE** grand ball at the Tribunal de Commerce was the first of the fêtes intended to console the Parisian population in their numerous troubles. With the Christmas and New Year's rejoicings we have entered on a new phase of the programme, and the Palais d'Industrie finds itself transformed for twelve days into an immense *kermesse* of the gayest and most picturesque aspect. We pass over, as is most suitable, the concerts and theatrical performances and other attractions, to speak of the artistic decoration of the Palais. In order to cover the immense wall surface of the large nave, transformed into a winter garden, the committee asked for the loan from the State of the historic tapestries, and had the good fortune to be seconded by M. Williamson, the curator of the Mobilier National. Here was an incomparable collection of textiles of Gobelins, Beauvais, and la Savonnerie, absolutely unknown to the public, and which was in itself a sufficient attraction to the fêtes. This exhibition is an absolute revelation to the art-world, and a great source of instruction to our schools and of decorative art. The artistic genius of the seventeenth and eighteenth centuries appears here in all its splendour, and one could not but ask, in looking at these tapestries of such rich and yet pure style, these compositions of such power and originality and such warm and harmonious colouring, if modern civilisation, with its mechanical achievements, was not a decadence by the side of these vigorous conceptions of the master-workers of past generations.

While these fêtes are being organised for the profit of hands out of employ, the Municipal Council of Paris is engaging in needless discussions. It is not the part of a great municipality to settle questions of wages, to limit the hours of labour, and fix the price of a day's work,—to make itself, in fact, the promoter of a State Socialism. All one can ask of them is to promote, by their votes, the undertaking of great public works, which alone can bring prosperity to the mere workman, whom Utopian theories do not affect at all.

To the oldest among these the "Union des Chambres Syndicales du Bâtiment" decreed the other day their rewards. As before, at the "Société Centrale des Architectes," we have seen the veterans of the workshop come forward and receive the consecration of a long life of honourable labour. "Let us be united, my old comrades," said the President of the Chambres Syndicales, in a hearty extempore address, "the times of hate and discord are no more,"—an optimist affirmation which is, unhappily, only the illusion of a generous nature.

Let us mention, in connexion with this subject, the exhibition organised in the Salle des États at the Tuilleries by the syndicate of contractors for public works. In an epoch like our own, where the most gigantic works are undertaken without hesitation, and the impossible has almost disappeared, it is of the greatest interest to study the means employed, and the implements whereby the most difficult operations are realised.

The exhibition referred to does not include the implements themselves, it is true, but plans, drawings, photographs, and models, executed with the finish of jewellery, which permit the public to study in all their details the apparatus and their application. We may mention especially the retrospective exhibitions of implements of the last century,—a saw-mill, models of dredgers, of excavating machines, of draw-bridges, and especially a model of the suspension bridge at Cubryac (Dordogne), which is a curiosity of the South of France.



On coming out from this exhibition we have ocular evidence that the work on the monument to Gambetta is in full swing. The main part of the work is already completed, and the "ornamentists" are executing the decoration of the pyramid which is to complete the groups in bronze executed after the models of M. Aubé. The monument will be placed in the centre of the Place du Carrousel. As there is also the Monument of the Revolution of 1789 to be erected on the site adjoining the Tuileries, there will be there, with the Arc de Triomphe already existing, a complication of architectural lines which may produce rather an awkward effect, especially if the Administration establishes, as is proposed, a row of porticos along the street of the Tuileries, leading from the Pont Royal to the Rue de Rivoli.

But these are only projects; there is many a slip between the cup and the lip with them. It is the same with the decoration of the Pont de la Concorde, so many times attempted, and which has again come up for discussion. Sundry journals are demanding that there should be placed on the pedestals, which cut the parapet at regular intervals, statues of the great men of the French Revolution. This would only be a repetition of what previously existed. But the former statues on the bridge produced so bad an effect that they were removed to the Cour d'Honneur at Versailles. Since then, the Commission de Beaux-Arts has vainly tried many schemes of decoration, especially that of great pylons decorated with allegorical figures. They even put in position, in 1877, models designed by Duc, the celebrated architect of the Palais de Justice; but the idea was abandoned, and we may hope that the "Gloires de la Révolution Française" will not step on the pedestals to obstruct the view of the Seine and of the monuments which border the quays.

We doubted last month, in speaking of the fêtes projected on the Pont Neuf, that the slow but progressive decay of that ancient monument would interfere with a very interesting part of M. Alphand's programme. The city engineers, it is true, maintain that the circulation of traffic can soon be re-established without danger; but the work of consolidation is not making great progress, and the demolition continues while the probable causes of the accident are discussed. Is it the rupture of the pile work or the sinking of the ground which supports the piles? Whatever it is, it is much to be regretted, on both historical and architectural grounds; for the Pont Neuf, from its antiquity, and the recollections connected with it, is one of the most interesting monuments of Paris. Commenced in 1578 by Androuet Du Cerceau, it was completed in 1604, under the direction of Guillaume Marchant. Germain Pilon ornamented it with masks of remarkable workmanship; and two eminent engineers, MM. Michal and De la Galisnerie, restored it completely in 1848. To the Pont Neuf belongs also the recollection of the Samaritanie, that once celebrated fountain whose carillon rang joyously at all public ceremonies, and especially when the king passed by. Here is a whole world of associations which will disappear unless one can fetter the destructive hand of time.

As this unforeseen event will modify certain portions of the intended fêtes, an electric installation at the Hôtel de Ville has been hastily got up, in view of a grand charity ball.

The decision has been given, a few days since, in the matter of the competitive designs for a monument to Rousseau, of which we have formerly spoken, and the situation for which was not fixed upon beforehand. Voltaire has already his statue on the Quai Malpiais, on the left of the Institute; why not place Rousseau in the corresponding position on the right? In this way the homage would be conformable to historic traditions, and the two great men, who professed such a violent aversion to each other during life, would continue, after death, to turn their backs on one another.

M. Berthet, who missed the prize in the Étienne-Dolez competition, has obtained it in this case. His work is an honourable mediocrity. The expression is feeble, the modelling correct, cold, without any of those accentuations which give character to a work and raise it to the level of originality. The same commonplace character belongs to the model by M. Larche, who wins the second prize; and, in fact, it is the third premiated design which most attracts us. This is by M. Steiner, whose model is good and without pretension, excel-

lent in anatomy, the draperies broadly treated, and the general effect far more vigorous than the two which have, nevertheless, been preferred.

In speaking of sculpture, we may note in passing that the statue of Claude Bernard will shortly be placed on the top of the flight of steps leading from the Rue des Écoles to the Place du Collège de France.

There has been much talk lately about the six "Old Masters" offered by subscription to the Louvre, the authenticity and artistic value of which were very doubtful. The close examination to which the conservators of the museum have subjected them has justified this instinctive mistrust, and of this "magnificent donation" the State has retained only three which are "attributed to" Crivelli, Lucas Gassel, and Fra Angelico. The others are utterly apocryphal.

We can announce the speedy opening of the Musée de Luxembourg, which forms a symmetrical ensemble composed of the gallery (properly so-called), of the orangery, and the two other galleries detached from it at the two extremities and abutting on the railings of the Rue de Vaugirard. Between the three blocks of buildings a space is reserved of about 7,000 square metres, adorned with shrubs and lawns, on which are to be placed bronzes and marble statues. In this manner modern art will be "chez-lui" and will have no occasion to demand of the conscript fathers of the Senate a hospitality which they bestow with such a very bad grace.

One cannot address a similar reproach to the Municipal Council of Paris, which, in its rather ill-advised zeal as an inexperienced Mecenas, is again about to lend the Pavillon de la Ville (on the Champs Élysées) to independent artists. We are threatened with an exhibition there which in a way will be interesting, and which, if it coincides with the opening of the Salon, will be in reality and exhibition des refusés.

Another exhibition now open at the Galerie des Artistes Modernes, in the Rue de la Paix, is a collection of the pictures and studies of Berchère, the remarkable Oriental artist. The collection will remain on view till the 16th of January.

In continuation of its work of popular instruction, the Administration of Paris is about to place at different points in Paris commemorative tablets to recall the existence or the death of various celebrated persons. Thus, on the Hôtel des Postes, Rue Jean Jacques Rousseau, an inscription will record that here once stood the house of La Fontaine of the fables. Other tablets will mark the house where Admiral Coligny was assassinated (144, Rue de Rivoli), and the theatre where the king's comedians (Comédiens Ordinaires du Roi) played from 1689 to 1770 (Rue de l'Ancienne Comédie, No. 14). These commemorations of the past are excellent, and we approve equally the inscription which records, on the Quai de la Conférence, the monumental gateway constructed 1632 by the architect Pidoux, and which was destroyed in 1730. We do not say so much for the revolutionary souvenirs with which the Musée Carnavalet continues to enrich itself. We may accept the sword of honour, offered by the Directory to Masséna after the Italian campaign. It recalls some national glories and the worth of a general who was surnamed "L'enfant chéri de la Victoire." But, in all conscience, is it worth while to purchase, as is threatened, the bath in which Marat was stabbed by Charlotte Corday? Apart from the question of the authenticity of this wretched relic, what interest has it for the history of France? After the fall of the Empire, the first care of the Government was to scatter to the four corners of France the museums of the sovereigns which had been laboriously collected at the Louvre. There were among this collection remarkable works of art and very curious relics. The Republican press, Heaven knows, has been lavish enough of its sarcasms about the trappings of the monarchy, the perquisites of Louis XIV., the "Ébène" of Mary Antoinette, the little hat and legendary grey overcoat of Napoleon; and here are the same kind of vagaries beginning over again without even a shrug of the shoulder: only for the relics of monarchies it is found suitable to substitute a revolutionary frippery, which has not even the attraction of rarity or curiosity. So true it is that in France we keep turning always in the same circle, with the regular routine of a horse in a training yard.

We have again two deaths to register in an artistic obituary. M. Joseph Beaume, historical painter, who has died at the age of eighty-nine, was author of many military pictures at the Versailles Galleries. He was a pupil of Gros, and obtained a second medal in 1824 and first medal in 1827. One of his principal works was a picture exhibited in 1822, representing the death of Henri III. He was born in 1796. The architect Labrousse, who is dead at the age of eighty-six, as already mentioned in the *Builder*, was a pupil of Vandoyer and of Hyppolite Lebas. He gained the "Grand Prix d'Architecture" in 1827, and in his later years filled the situation of the Arsenal and of the Collège Ste. Barbe, of which his brother had been the director.

We have mentioned that M. Chaplain, the eminent engraver, had been commissioned by the Municipal Council to execute a model for a medal commemorative of the Hôtel de Ville. This medal, which is to be presented to the President of the Republic, the members of the Parisian Municipality, and the principal functionaries, bears on its front face a seated figure personifying the City of Paris, and pointing towards the imposing perspective of the new palace. On the reverse, an inscription surrounded with leaves of laurel, gives in relief the names of the two architects of the Hôtel de Ville, MM. Ballu and Deperthes. These two architects were equally winners of the first premium in the competition, and shared equally the premium, although for some more systematic carrying out of the building it was thought necessary to name one of them, M. Ballu, architect-in-chief. The inscription engraved by M. Chaplain on the reverse of the medal is, therefore, only the legitimate expression of the union of these two architects in a common work, which will remain one of the most remarkable of its age.

## Illustrations.

### THE NEW HÔTEL DE VILLE AT NEUILLY.

**I**N Paris, as in London, the current of population sets towards the west. While the southern and eastern quarters of the city remain stationary, the diametrically opposite *arrondissements* are spread up to the fortifications, and only await the inevitable abolition of those useless ramparts to extend still further towards the setting sun. This fact alone explains the enormous impulse given during the last ten years to the surveying and building in the 17th *arrondissement*, in consequence of which the present magnificent quarters which cover the plain of Monceaux have risen from the earth, and this is also the reason why Neuilly-sur-Seine, the most Parisian of all the suburban communes, grows more beautiful, more populous, and more extensive every day. The proximity of Paris and of the Bois de Boulogne, the multiplicity of the means of transport, the shady boulevards bordered by elegant villas, have made this pretty suburb into an aristocratic faubourg, and the chosen centre of a numerous foreign colony, in which the English element predominates.

Menced by the situation itself with future annexation, Neuilly, which by no means intends to be incorporated with Paris, has from its own resources, and as a kind of protest, raised a town-hall of an importance far exceeding that of other similar monuments in the suburban zone.

The well-proportioned façade of this town-hall is to be seen in the Avenue du Roule, in the very heart of the Commune. The edifice, which was opened in September last, was, in 1879, the subject of a public competition, in which more than sixty competitors took part. The winner, M. G. André, a pupil of M. Questel's, not being able, in consequence of other engagements, to leave Lyons, where he practises, to come to Neuilly to personally take charge of the work, was replaced by MM. Dutog and Simonet, who, while respecting the grand outlines and proportions of the façade of the premiated design, were happily inspired to increase its decorative value by various and skilfully-devised additions.

The principal façade, which is 40 metres (about 130 ft.) long, comprises a centre portion raised on a flight of ten steps and flanked by two great angle pavilions. Three semicircular



arches, filled with wrought-iron grills, give access to the interior and are separated by niches intended to receive statues.

The simplicity of the lines of the ground-floor give value in a happy way to the architectural richness of the upper part, which consists of a Corinthian order, between the columns of which are rectangular mullioned windows. This colonnade supports a frieze, magnificently carved by E. Barrias, the whimsical bas-reliefs of which, consisting of children playing among foliage, surround the angle pavilions for a length of 70 mètres. Above is a balustrade, and in the middle of it a clock, which M. Tony Noël has ornamented with two recumbent statues representing the rights and duties of man. On the right and left of the dial are two elegant figures carved by the same artist and symbolical of Day and Night. Of these sculptures we give a separate illustration on a larger scale. Owing to their elevated position it was impossible to get a photograph of the actual work as completed, and our engraving has been made from a photograph of the original model in clay. This was not entirely finished in all details, some of the lesser details being only roughly indicated, but the figures were complete as here shown. Rising above the centre of the roof behind the clock is a turret, 42 mètres high from the ground, and evidently inspired by that of the Hôtel de Ville at Paris.

Mansard roofs surmount the angle pavilions, which are decorated in three distinct ways: in the lower part allegorical bas-reliefs, by M. Charles Gautier, crown tablets intended for the posting of public notices. At the first-floor level composite pilasters flank a large mullioned window, the projecting balcony of which is carried by consoles; above the cornice rises a dormer, with a triangular pediment ornamented with little vases at the angles and on the apex.

The sides of the building are extremely simple. Three tiers of windows (round-headed on the ground-floor, rectangular and with projecting balconies on the first floor, and dormers in the roof) form the only decoration. On the rear façade appear again, with a sobriety that gives further value to the richness of the principal one, the arrangements which we have described, with a central portion facing a large court recessed between two wings which form the pavilions.

The interior of the building is equally well arranged for administrative purposes and for public ceremonies. After mounting the flight of steps at the entrance, one penetrates into a large vestibule decorated with Composite pilasters, and out of which rises a staircase of white stone, the straight, parallel steps of which lead to the reception rooms on the first floor. There one finds the staircase surrounded by a gallery, square on plan, the open balustrade of which is broken symmetrically on each face by the pedestals of a great semicircular arch. The piers of this arch, which is ornamented with deeply-cut carving, are pierced, each with a smaller opening flanked by pilasters supporting a cornice which receives the transverse arches of the vault. This arrangement is reproduced on the side walls, with blank arcades flanked by rusticated Ionic pilasters. Above is a frieze, decorated with escutcheons, fruit, and interlacing figures.

The gallery is paved with Venetian mosaics, executed by M. Facchina. It gives access at once to the offices of the *État Civil*, to the private room of the mayor, and to the *salons*, the largest of which occupies the whole of the first floor along the principal façade. It is entered by three doors, with moulded architraves, surmounted by pediments, each with a cartouche and a very rich frieze. This *salon* has two large chimney-pieces and high wainscoting, the panels of which are decorated with escutcheons, with a monogram composed of an N and two S's interlaced (Neuilly-sur-Seine), which occurs also on the escutcheons of the façade and on the door-handles.

The *Salle des Mariages*, situated in the pavilion on the left of the façade, is decorated with a marble bas-relief by M. Gaudé, symbolical of the family. Here the arrangements made by the architect show evidences of the influence of the feeling of the times; for this apartment is terminated at one end by a great arch draped with curtains, which give to the platform occupied by the mayor a false resemblance to a Jewish Tabernacle, and the effect of a "lay sanctuary" well calculated to rejoice the hearts of the apostles of free thought.

The other pavilion, reserved for the sittings

of the Municipal Council, plays at Parliament *au petit pied* with its semicircular ranges of tables and seats, its raised desk for the President, and even its public gallery, open to all the idlers of Neuilly. This *salon* contains another bas-relief by M. Gaudé, symbolising the Republic. Let us add that the architects have had the rare good fortune to fall in with a carver, M. Ledru, of the highest talent, who has devoted himself to the work and has decorated the architraves of doors and windows, the arches of the staircase, the cartouches of the façades, and even the chimney-stalks, with carving distinguished by an originality inspired by the best periods of the French Renaissance. One could not too highly praise the finish of all the details of this harmonious building, both within and without.

Thanks to the talent of the architects, to their experience, and the prudence with which they have realised the original project of M. André, the carrying out of the work has not been attended with any of those frequent miscalculations of which municipalities complain, and the total cost has not reached a million and a half of francs, or about 1,200 fr. per superficial metre.

In this figure, it is true, is not included the pictorial decoration of the *salons*. The reception-rooms, as well as the ceiling of the staircase, offer grand surfaces, well calculated to tempt the brushes of the best artists. Here is matter for important decorative work which the Conseil Général de la Seine will shortly be called upon to give commissions for, either after a public competition or without one. We do not hesitate to say we should prefer the latter mode of procedure.

R. B. FENWICK.

#### SCULPTURE, GENERAL POST OFFICE, SYDNEY.

This group of sculpture forms the decoration of the principal entrance to the new Post-office buildings at Sydney, New South Wales, of which Mr. Jas. Barnett, the Colonial Architect, is the architectural designer. The group here given, however, has been executed in London by Signor Giovanni Fontana. It represents a seated figure of Her Majesty in her robes as Queen and Empress, while beneath are allegorical figures representing Britannia and New South Wales clasping hands.

The group is engraved by Mr. J. D. Cooper, from a photograph.

#### "CHURCH AND STATE."

Those who have visited the ancient towns of the Low Countries and of Northern Germany must have been struck by the way in which the great ecclesiastical and secular buildings are grouped together. On one side of the great square, or principal street, we find the noble cathedral, or collegiate church, the home of piety and religion, on the other we see the great secular building of the town, the "Palais de Justice," the "Hôtel de Ville" or the "Rathaus," representing the dignity and authority of the secular power. There can be little doubt that it is by no mere accident that these two edifices are so closely associated, and that they were to a great extent intended as a comment on those words of Scripture, "Render unto Caesar the things that are Caesar's, and unto God the things that are God's."

In such times as the Middle Ages, when men were more deeply impressed by external objects than they are in our days,—when an appeal was made directly to the mind by the visible creations of art, by stately buildings, pictures, and sculpture, rather than by books, which few then possessed, or could have read if they had possessed them,—these kinds of association had an immense effect upon the imagination, and did much for the cause of religion and social order.

We are too much in the habit now of regarding such aids to sentiment as somewhat puerile and childish, and of looking upon our mediæval ancestors rather in the light of grown-up babies than as reasoning and sensible men, but it may be doubted whether we have not sacrificed to mere commercial interests those fascinations which noble and dignified art has at all times exercised over the imagination. This is very obvious when we visit any of our English manufacturing towns, for in them we find little that is poetical or attractive

to the imagination. We are, however, beginning to see that, after all, beauty and poetry are two necessities of the happiness of human beings, and that man does not exist merely for the purposes of money-making, that there are other things to be thought of besides the commercial prosperity of the community. No one, for instance, can read the description of a manufacturing town given by Charles Dickens in "Hard Times" without a feeling of pity for the human beings whose daily life is passed amongst such appalling hideousness, and a detestation for the men who grow rich upon the toil of the wretched inhabitants, and who, by indifference and selfishness, condemn them to an existence amidst such unlovely surroundings.

A prospect of better things seems to be in view, and the many handsome new town-halls, municipal buildings, museums, picture galleries, exchanges, &c., which are rapidly growing up in such towns as Liverpool, Birmingham, Leicester, Sheffield, and Preston, together with the proposal to erect a stately cathedral in Liverpool, show how much we are in advance of our fathers in this respect. Still more, however, will be required, and greater sacrifices be demanded if the future generations of Englishmen are to become contented, and are really to enjoy the wholesome pleasures of life. We must not only put up handsome buildings in our towns and cities, but those buildings must be erected upon important and noble sites, not hidden away in back streets; and this, no matter what the cost of obtaining such sites may be. The fact is that all our manufacturing towns require to be thoroughly remodelled; they ought to be, and must be, made dignified and magnificent. Why should our manufacturing towns, with fifty times the wealth ever possessed by Ghent, Bruges, Liege, and Louvain, be more remarkable for squalor and ugliness than for grandeur and magnificence?

Unfortunately, our old English cities, beautiful as they often are, do not offer us many examples of municipal or commercial architecture, and the English cathedrals are, in nearly all instances, cut off from the towns by their great "closets." Now, superb as this arrangement undoubtedly is, it is one that is impossible to copy at the present day. The ancient English municipal buildings are small, and too unimportant for our present purposes, consequently that proximity and grouping together of vast secular and ecclesiastical edifices, which forms so notable a feature in many Continental towns, is not to be met with in this country; and in order to see what can be done in this way we are obliged to study the Flemish and German cities of the Middle Ages.

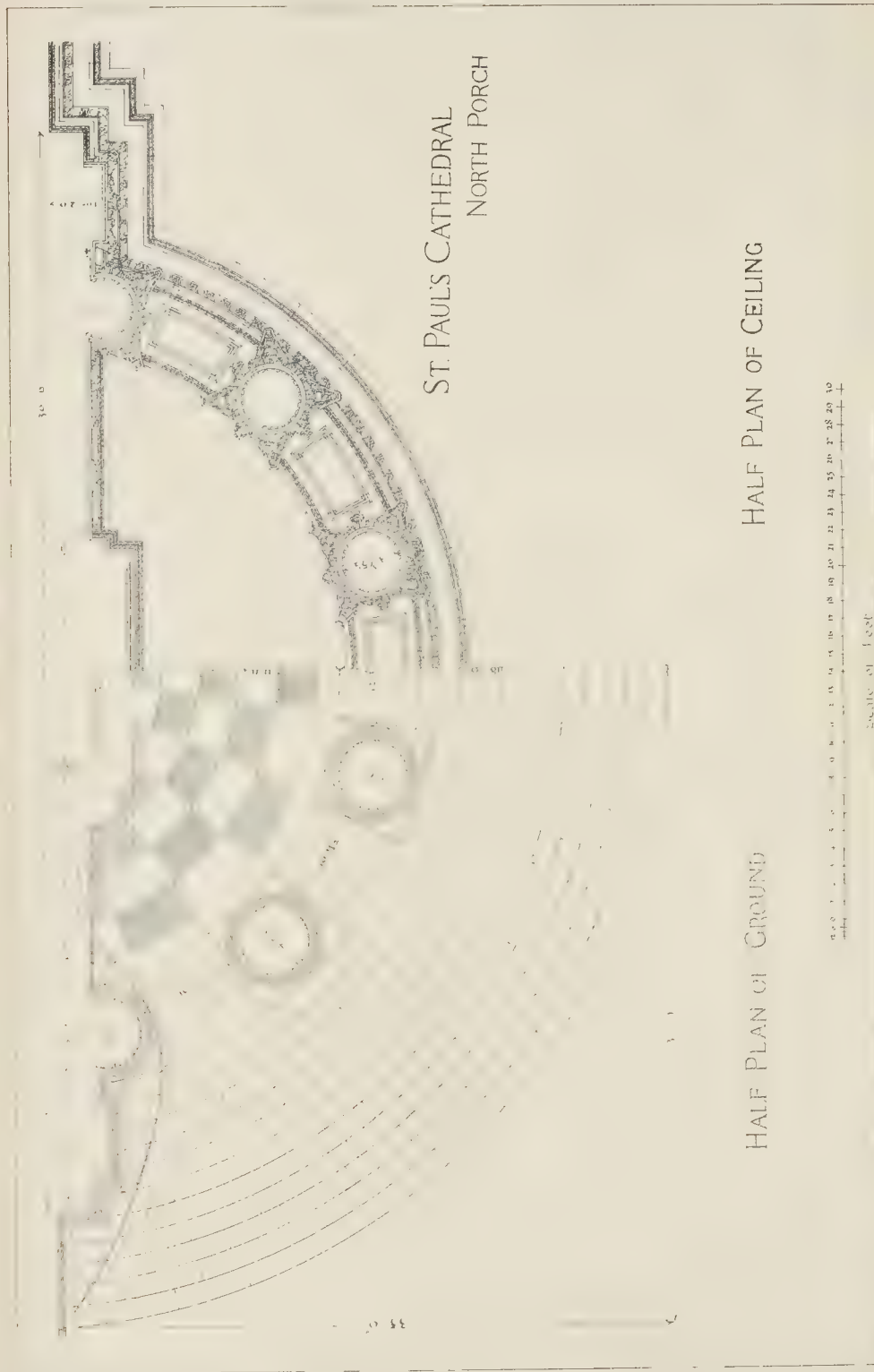
The Flemings were, like ourselves, a busy, thrifty, commercial people, not given in any way to highly poetical imaginings, or even to a love of art for its own sake; they were, moreover, an extremely practical people very fond of money, and strongly objecting to part with it: they were perhaps the very last people in Europe whom we should have expected to have made great sacrifices in the cause of art, or to have allowed their convenience to "play second fiddle" to picturesque or elegance; yet they saw the necessity of rendering their towns fair and pleasant homes of industry, and considered it more wise to make them attractive than disgusting and repulsive. It never entered into the mind of a Fleming that a human being could, by any possibility, exist in a place which was only remarkable for dinginess, dirt, and hideousness; and because a man's life was spent in toil and labour, they considered that the surroundings of that toil and labour should be as little repulsive as possible, and that he should enjoy as much of the social decencies of existence as was possible under the circumstances. The consequence was this, that with the most unpromising circumstances they produced such painters as Memling, Van Eyke, and such musicians as Roland Lassus (Orlando de Lasso), and Gaches de Wert, and all their numerous followers. They had their own school of architects, sculptors, and glass-painters, to say nothing of poetry and romance-writers, and thus, notwithstanding their somewhat boorish manners, unattractive external appearance, and habits of turbulence, they have left the world a legacy of poetry, music, and the fine arts second only to that of Italy. Does not this point out to us that, if we want our factory hands, and labourers, the British "proletariat," and even the British rough, to become valuable members

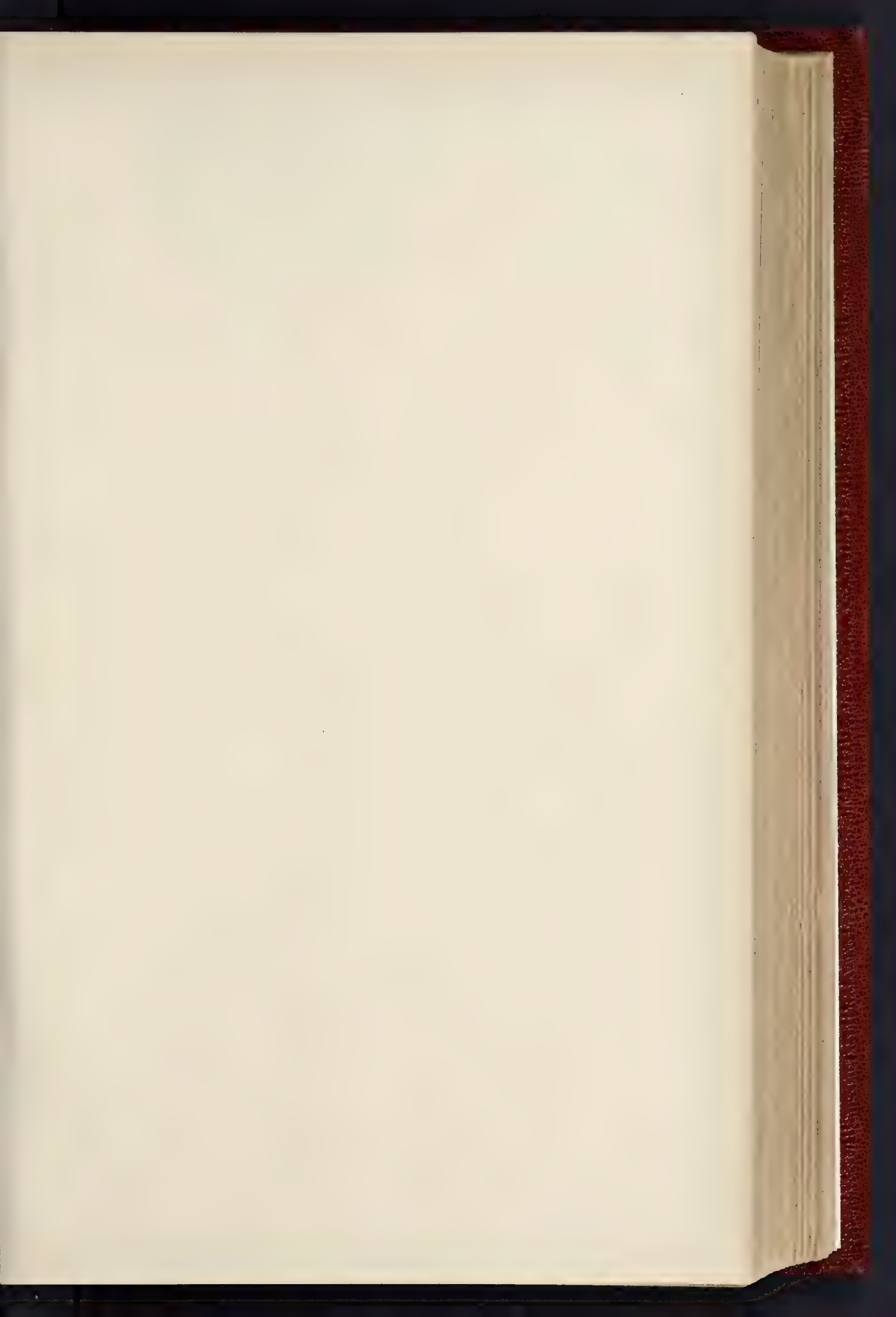






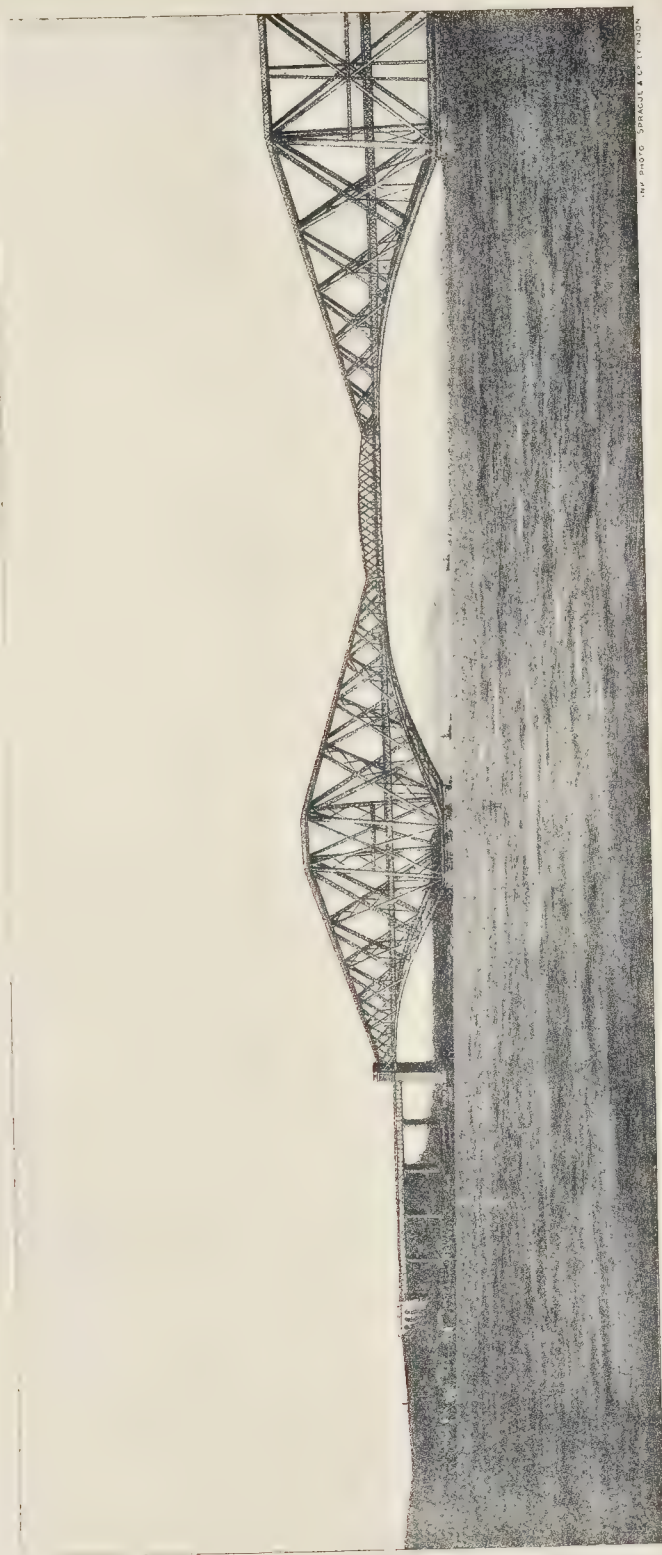








THE BUILDER JANUARY 2 1886.

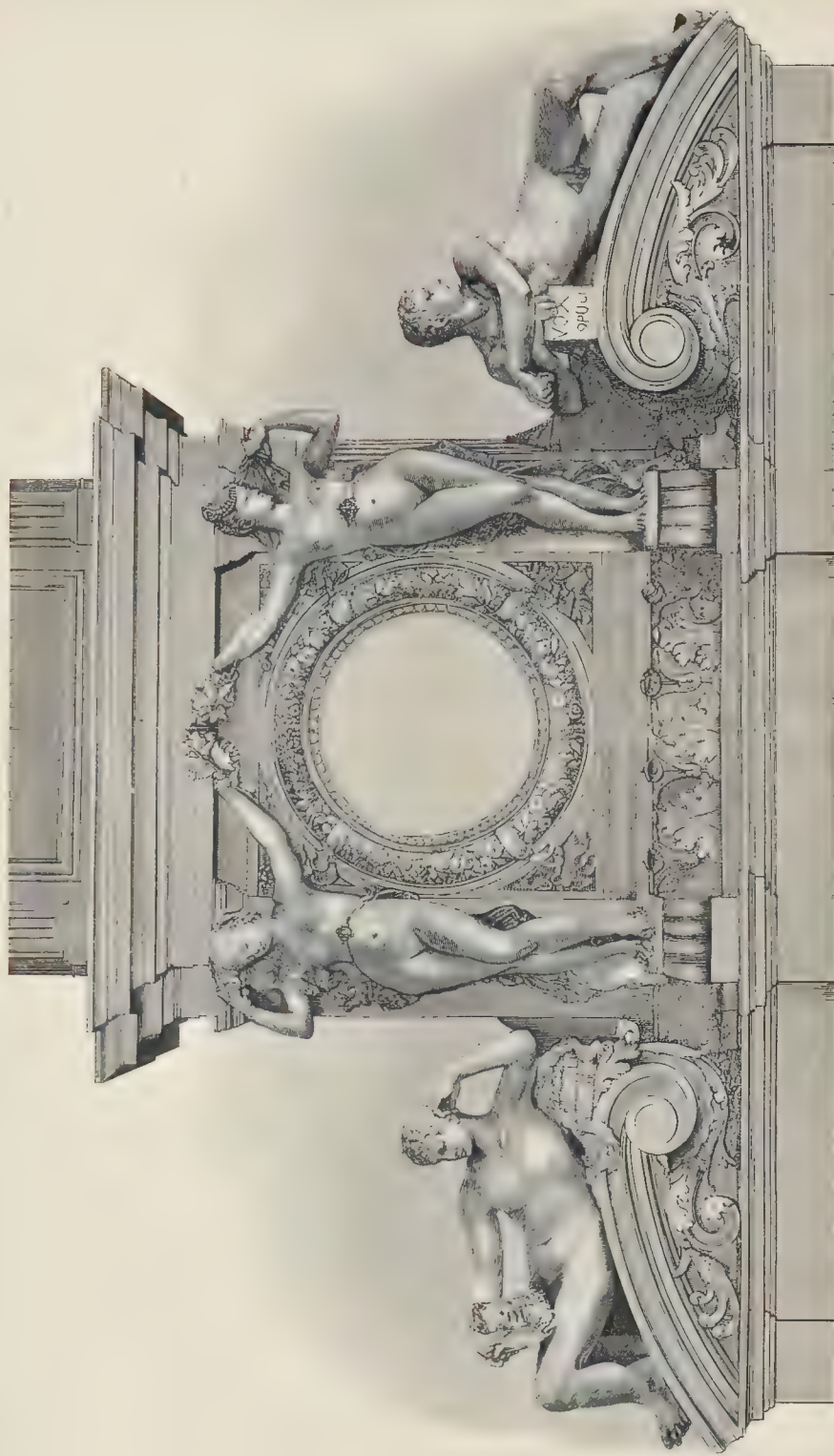


FORTH BRIDGE.  
PERSPECTIVE VIEW, SHEWING SCALE IN RELATION TO THE LANDSCAPE

W. & A. G. SPENCER & CO. LONDON.







SCULPTURE, NEW HÔTEL DE VILLE, NEUILLY, PARIS.—M. TONY NOËL, SCULPTOR.

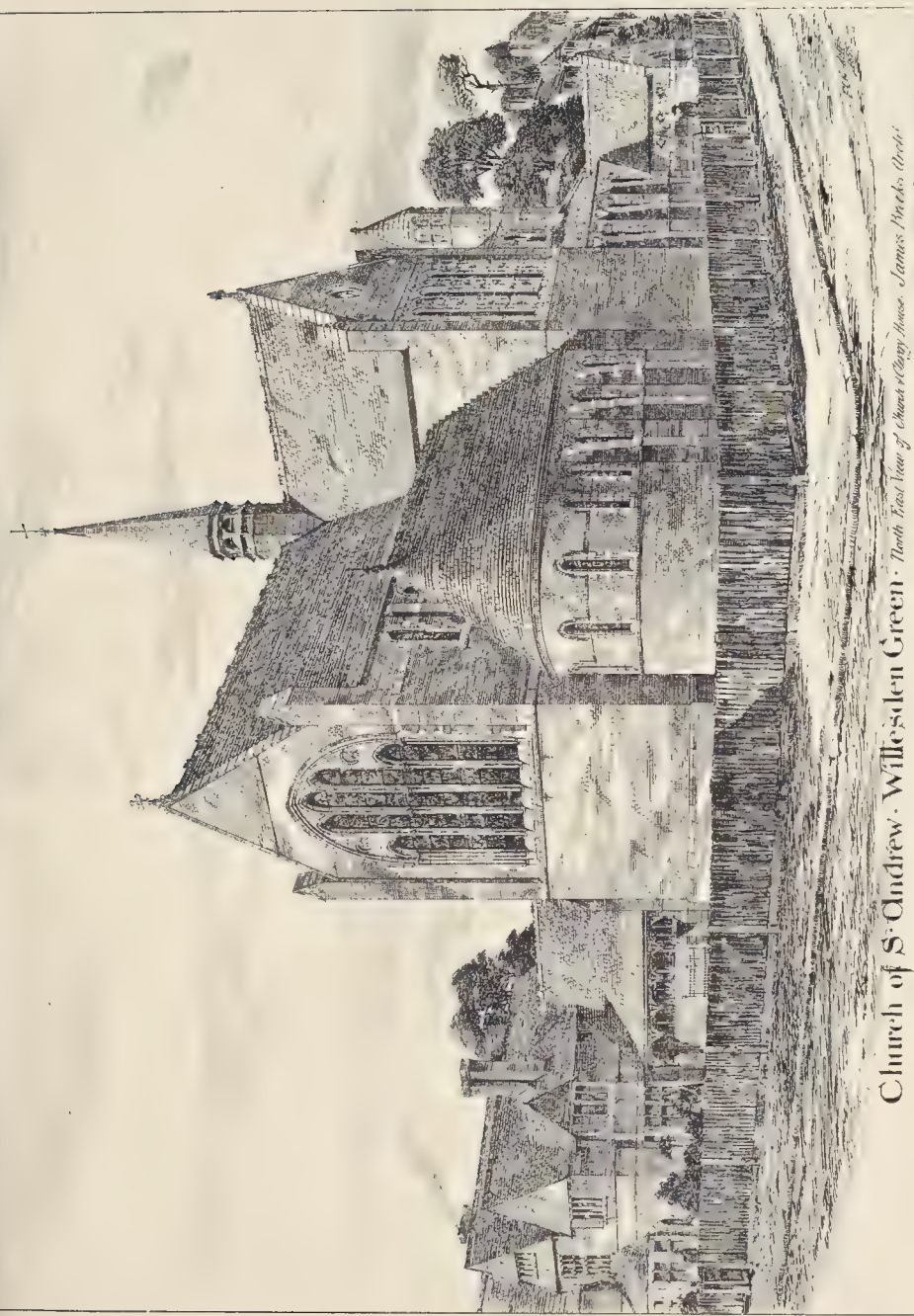
(Engraved from a Photograph by the C. G. Mallet, taken in the Sculptor's Studio.)



SCULPTURE OVER ENTRANCE OF GENERAL POST OFFICE, SYDNEY, N.S.W.—SIGNOR GIOVANNI FONTANA, SCULPTOR.







Church of St. Andrew, Willesden Green. North East View of Church & Organ House. James Packer (Engr.)

PHOTO. T. G. SPENCER & CO. LONDON











the centre of the bridge is 150 ft. above high-water, and the highest part of the bridge is 361 ft. above the same datum. Each of the three main piers consists of a group of four cylindrical masonry and concrete piers, 49 ft. in diameter at the top, and from 60 ft. to 70 ft. in diameter at the bottom. The deepest pier is about 70 ft. below low-water, and the rise of tide is 18 ft. at ordinary springs. In the piers there are about 120,000 cube yards of masonry, and in the superstructure about 45,000 tons of steel.

The caissons, which were built on shore, launched and floated into position, are 70 ft. in diameter at the cutting edge, and taper 1 in 46 to facilitate sinking. At 1 ft. above low water, which is the top of the permanent caisson and commencement of the granite-faced masonry, the diameter is 60 ft. A working chamber 7 ft. high is provided at the bottom of the caisson, the roof of which is supported by four strong lattice girders 18 ft. deep, and cross girders 3 ft. deep spaced 4 ft. apart. An internal skin 7 ft. distant from the external skin, and vertical diaphragms, form pockets which can be filled with concrete at any point where, owing to the slope of the ground and the varying hardness of the silt and clay, a heavier pressure is desired to force down the caisson. Three shafts, 3 ft. 6 in. in diameter, with air-locks at the top, pipes for admitting water and ejecting silt, and other of the usual appliances, are provided. The air-locks for passing out the clay and boulders as designed by Mr. Arrol and myself have, instead of the usual hinged doors, two sliding doors like horizontal sluice valves, across the 3 ft. 6 in. shafts, which are worked by little hydraulic rams, or by hand, and are interlocked like railway points and signals, so that one slide cannot be opened until the other is closed. Mounted on the side of the air-lock is a steam engine which, by means of a shaft passing through a stuffing-box in the side of the air-lock and a drum inside, winds up the excavated material in skips containing one cubic yard. The operation of hoisting, opening slides, and discharging is rapidly performed, so the two locks have a large working capacity. A third air-lock, with side doors, ladder, and hoist, is also provided for the men.

All of the pneumatic caissons are filled with concrete up to low-water mark, the mixture being 27 cubic feet of broken whinstone, 7 cubic feet of sand, and 5½ cubic feet of cement, which together make a full yard of concrete, having a crushing resistance of about 50 tons per square foot.

Above low water the cylindrical piers, which are 49 ft. in diameter at the top, 55 ft. at the bottom, and 36 ft. high, consist of the strongest masonry, the hearting being flat-bedded Ayrshire stone with both horizontal and vertical end, and the facing Aberdeen granite, the whole set in two to one cement mortar, and built in the dry within temporary wrought-iron caissons. In the shallow piers where the rock stepped the masonry is carried down to the rock itself, and wrought-iron hoops 36 in. in diameter bind the bases of the piers. At the top of all the piers 18 in. by 1½ in. hoops, and midway down 18 in. by 2 in. hoops, are also built in, and it is believed that these cylindrical caissons of masonry are as completely monolithic as can be attained or desired. In each cylindrical pier there are forty-eight steel bolts 2½ in. in diameter and 24 ft. long to hold down the bed-plates and super-structure of the main piers.

Over the piers the arched tubular lower member forms a connexion with the upper bed-plates, the vertical and diagonal tubes, and the lateral and vertical cross bracing, so that considerable thought had to be given to the details at this point. A full-sized model was prepared, and different modes of arranging the junctions were set out and modelled. Finally, it was decided to gradually change the tubular lower member into a box form with one rounded upper corner, where it meets the skewback or part over the pier, and by internal vertical and horizontal diaphragms, to make the latter a cellular structure of enormous strength and stiffness, offering facilities for attachments in any required direction. Several layers of plates form the bottom of this skewback, and constitute what may be termed the "upper bed-plate" of the bridge. The "lower bed-plate" consists of similar layers of plates riveted together and bolted to the pier; and the two bed-plates are made to slide on each other within certain limits

to be referred to more particularly hereafter. The layers of plates run longitudinally and transversely, to meet the different stresses; and, after the edges are planed, the plates are fitted together, clamped between girders, and drilled by special machines through their whole thickness. About 1,000 lineal feet of 1½ in. holes have to be drilled in each bed-plate, which in practice with the eight-drill machine takes about eighteen days, including stoppages. In the upper bed-plates holes about 11 in. square, with corners rounded to a 3-in. radius, are required, in some instances, to clear the nuts of the holding-down bolts, and these are cut readily by a simple tool devised by Mr. Arrol. In other cases, 12-ft. diameter recesses, 2 in. deep, have to be bored for what may be termed a huge key or dowel, which will connect the upper and lower bed-plates, but allow a slight rotation; and this also requires a special tool.

The tension members and cross bracing generally consist of box lattice girders, which are drilled by travelling machines of similar type to those already referred to in connexion with the tubular members. All of the rivets are of steel, having a tensile strength of about 27 tons, an elongation of about 30 per cent., and a shearing resistance of from 22 tons to 24 tons per square inch. It is hardly necessary to state that hydraulic riveting is used throughout. The nuts and washers of the holding-down bolts and some other parts are of cast steel, having a tensile strength of 30 tons per square inch, and an elongation of 8 to 10 per cent.

Owing to the enormous size of the structure elastic deformations which may be neglected in ordinary cases have to be provided for.

Obviously during the early stages of erection, before much weight comes on the bed-plates, the tube will be practically free to expand and contract. Ultimately, when the whole weight of the completed structure rests on the piers, the friction between the two surfaces of the upper and lower bed-plates will probably be sufficient to prevent movement except under extremes of temperature and heavy wind pressure of rare occurrence. The attachment of the superstructure to the piers partakes thus of the character of a safety friction clutch. Movement will not occur under ordinary circumstances, and, if an excessive shock from some unforeseen cause arise on the superstructure, it can only be transmitted to the masonry of the pier through the sliding surface of the upper and lower bed-plates.

Mr. Baker has kindly supplied us with the following notes as to the state of the works at the present moment:—

#### PIERS.

*South Queensferry Main Piers.*—Three of the four piers in this group are completed, and the last has been sunk to a depth of 60 ft. below low water.

*Inchgarvie and Fife Main Piers.*—Seven are finished, and the eighth is carried up above high water.

*The Viaduct Piers* are all carried up to the height at which the girders are first erected. On the five north spans the girders are built, and are being raised by hydraulic machinery. The operation of building the piers is carried on simultaneously. On the south side seven of the girders are built, but the raising has not been commenced.

#### SUPERSTRUCTURE.

About 16,000 tons of steel plates, angle-bars, and other forms of material for the 1,700 ft. spans, have been delivered at the shops at Queensferry. There the operations of fitting them together, planing, and drilling are being carried on; and about 10,000 tons are completed ready for erection. The work of erection has commenced at each of the three main piers. At South Queensferry, two of the "lower bed-plates" have been placed in position. At Inchgarvie also two bed-plates have been placed, and the massive horizontal tube between the piers is erected. At Fife, all the lower bed-plates are laid, the horizontal tubes between the piers, and the complicated mass called the "skewback," resting directly over the piers, is well in hand.

The most interesting events that have happened lately have been the rapid and successful founding and erection of the deep piers for the Inchgarvie group, and the recovery of the South Queensferry caisson, which was wrecked on the 1st of January, 1885.

#### CHURCH OF ST. ANDREW, WILLESDEN GREEN.

This is a good example of the qualities of picturesqueness combined with solidity and simplicity, for which the churches designed by its architect, Mr. Jas. Brooks, are notable. There is scarcely anything of what is usually called "ornament" in the church and the clergy-house with which it groups in so pleasing a manner; yet the effect of the whole is to produce an architectural picture of no ordinary charm.

#### NORTH PORCH, ST. PAUL'S CATHEDRAL.

The three sheets of lithographs, giving the elevation, section, plan, and decorative details of the North Porch of the Metropolitan Cathedral, are reproduced from the set of drawings which gained their author, Mr. F. W. Troup, the Royal Academy Silver Medal for measured drawings of architecture. At a time when the architecture of Wren is so much studied as now, careful drawings of this portion of his great building, of which we believe there is no published illustration on the same scale and of the same accuracy, will probably be valued by many of our readers. We do not, however, profess admiration for all the decorative details, in spite of Wren's name. Festoons and ribbons are not decorative design, in the true sense of the word.

#### OBITUARY.

*Dr. Samuel Birch, F.S.A.*—We record with much regret the death of Mr. Samuel Birch, D.C.L., LL.D., F.S.A., Keeper of the Egyptian and Oriental Antiquities in the British Museum, which took place after a short illness at noon last Sunday, at his residence, Caversham-road, N.W. According to the *Times*, Dr. Birch, who had just completed his seventy-second year, was the grandson of Samuel Birch, Alderman and Lord Mayor of London, and eldest son of the late Rev. Samuel Birch, D.D., rector of St. Mary Woolnoth, in the City of London, and vicar of Little Marlow, Buckinghamshire. In 1834, Dr. Birch entered the service of the Crown under the Commissioners of Public Records, where he was the contemporary of the late Sir Thomas Duffus Hardy. In January, 1836, he received an appointment under the Trustees of the British Museum, in whose service he has spent just fifty years. On the retirement of Mr. Barnewell, he became Assistant Keeper of the Department of Antiquities—a miscellaneous mass at that time, including the whole range of Greek, Roman, British, Oriental, and Egyptian archaeology, as well as ancient and Medieval numismatics and ethnology. In 1861, on the subdivision of this vast and valuable collection, Dr. Birch undertook the responsible position of Keeper of the Oriental, British, and Mediæval Sections. At a subsequent period of further division, his attention was confined solely to the Egyptian and Assyrian antiquities, with which his name will always be associated. We may add that he was one of the founders, and the President, of the Society of Biblical Archaeology. He was the author of a long list of works, and had been for many years an occasional contributor to the columns of the *Builder*.

*Mr. Thomas Goodchild, F.R.I.B.A.*—We record with regret the death of Mr. Thomas Goodchild, which took place a few days since, after a protracted illness. For some years he held the office of Surveyor to the Teddington Local Board. He was elected a Fellow of the Institute of Architects in 1880. His works include the Free Church of England, the Wesleyan Chapel, and the Vicarage (the latter illustrated in the *Builder* for July 3, 1880) at Teddington; and the Vicarage at Hampton. His design in the Bagshot Church competition was placed second, and was illustrated in the *Builder* for March 25, 1882.

**Tarnished Silver for Decorative Use.**—In reference to our "Note" on this subject (p. 815, ante), we may mention that a specimen panel of the decorative use of this material may be seen at the shop of Mr. Merrick, carver and gilder, 200, Brompton-road.



DISCOVERY OF SCULPTURED FIGURES  
AT CLAPHAM.

A VERY remarkable discovery has been made beneath the modern Church of St. Paul, Clapham. This building, a long, flat-roofed mass of brickwork, pierced with two ranges of windows, is conspicuous enough from the elevated position it occupies close to the Wandsworth-road.

It stands on the site of the old parish church of Clapham previously to the erection of what is now the actual parish church on Clapham Common. Mr. J. W. Grover, C.E., F.S.A., having recently delivered a lecture upon the various associations and buildings of old Clapham, was led to test the accuracy of a passing remark in Brayley's "History of Surrey," that certain remarkable monumental figures formerly in the old church had been deposited in one of the vaults. There was also a local tradition that some of the monuments had been stowed away when the church was demolished. Acting upon these data, and with the friendly help and assistance of the Local Burial Board, Mr. G. Aldridge, one of the members of the Board, and Mr. Grover set to work. An old wall was soon reached by their workmen, and, this being followed, a flight of steps was found, leading to a vault, apparently extending beneath the present church. All knowledge of this entrance had been lost, the burial-ground being closed. There was nothing to bar the entrance to the vault, and the workmen speedily called the explorers to enter. The vault appeared to be a subterranean museum of sculpture as the lights revealed the contents. In one place, facing them, was a magnificent marble figure of a knight in armour, opposite was the figure of a younger man. In the vault beyond was a sitting figure of a young lady in full evening costume with an elaborate arrangement of ringlets. In a small corner was the standing figure of a young child holding a skull. All these were found to be of pure white marble, still clean and but little covered with dust, so that, in some places, the polished surfaces remained. This discovery on becoming known has created a great deal of remark beyond the locality itself, and it may be of interest to render a few notes of the local history, which we now proceed to do. The monuments are described by several old writers who had seen them when they were in their original positions, and the frequency of these remarks attests the interest which they appear always to have obtained.

The parish church of Clapham appears to have passed through the long phases of history which are very much the same in the case of each of these venerable buildings scattered throughout our land in such great numbers. The manor is named at a very early period, since in King Alfred's time it was charged with an annual payment to the monks of Chertsey of 200 pence. Its owners are mentioned in the time of Hardicanute, since the drunken feast which caused the monarch's death was for the purpose of celebrating the marriage of the daughter of its then lord with a Danish nobleman. Domesday Book has its record of the district, but no mention is made of the church,—a circumstance not at all conclusive, as showing that it did not then exist. We know that it was standing in the twelfth century, since the advowson then passed to the monks of Merton Abbey, who appear to have held it until the Dissolution. A chantry was founded here by Thomas Romayne in the fifteenth year of Edward III. Then there are records of more recent additions as follows:—The form of the building, which was probably only a nave and chancel originally, was altered in 1500, when a chapel was added on the north side, close to the west end. A corresponding chapel was added on the south side, called Walter Frost's Chapel. These are stated to have been in the form of western transepts, and that on the north side, at any rate, had a north gable, with a ridge going north and south. It is probable, however, that this projection was not the Atkins Chapel, which was more probably at the east end of the north aisle. A north aisle was added about 1715, by Mr. Hewer E. Hewer, and a south aisle was erected at the same time at the expense of the parishioners. The building continued in this condition until 1774, when the growing population required still further accommodation, and by an Act of Parliament the new church on Clapham Common was then erected, and constituted the

parish church. The old building was then demolished, except the north aisle, which was retained for burial services, until the erection of the present St. Paul's Chapel on part of the site in 1814, when it was pulled down entirely. The old church was remarkable for a large number of monuments, which are spoken of as being of excellent workmanship. These are described by the old writers already referred to, and the inscriptions are given at length. These will be noted in part as we proceed. The principal monuments were those of Sir Richard Atkins, knight, and his lady, Rebecca, the wife of Sir Edward Wright, who were represented by recumbent figures of white marble on an altar tomb. They were buried in a vault in the churchyard. Close to them were figures of Henry, the eldest son, and Rebecca and Annabella, their first and second daughters, the monuments having been erected by their parents, there being verses beneath each of them.

As a specimen, that on Annabella, the eldest daughter, who died in 1670, in her nineteenth year, is subjoined. The verses were somewhat similar beneath each of the other two figures, but those now given may be taken as fair samples of the rest:—

"Could Tears have sav'd her precious Life, noe doubt;  
A gen'ral Deluge had been pour'd out;  
Or could the skill of all the learned have  
Prevailed, but to relieve her from the grave,  
Mankind had ne'er permitted soe much Worth  
(T' theye great Loss) to vanish from the Earth.  
She dyed young,—not that she really could  
Be Weary yet soe soon of doeing good;  
But fit for Heaven she without pretence  
Might justly scorn a meaner Residence."

Messrs. Brayley & Britton, in their "History of Surrey," state, in a footnote, that the above monument was entirely destroyed, and the effigies themselves consigned to sepulture in one of the vaults when the new chapel was built. "Although in a bad taste in regard to dress,—the son, who died at the age of twenty-four, in February, 1677, being represented in a Roman dress, with a flowing peruke, and the daughters in gowns with full sleeves and stiff bodies,—they were superiorly wrought and deserved preservation above ground."

We are indebted to Lysons's "Environs of London," 1792, for information as to the then position of the monuments in the old church. The building had been at that time pulled down except the north aisle (he says the south aisle by mistake). The tomb of Sir Richard and his wife was at the north-east corner, and it still possessed its curious iron railings and pinnacles, the armorial bearings being given by Lysons. Adjoining it, on the east wall, was the monument of their three children,—Henry, who died in 1677, aged twenty-four; Rebecca, who died in 1661, aged nine; and Annabella, already referred to. These stone monuments appear to have been grouped into one composition, for Lysons states that their effigies are as large as life, under an arch supported by columns of white marble of the Corinthian order. "The son is represented sitting, in a Roman dress, with a flowing peruke. The daughters are standing, dressed in gowns with full sleeves pucker'd, and plain stomachers."

Reference is also made to many other monuments by the old writers, a few of which may be noted. The tomb of Bartholomew Clerke was on the south wall, and represented himself, his wife, and son kneeling, the whole being in a recess, above being the arms of Clerke and Hasselrigge. Dr. Martin Lister's monument was also on the south wall, probably recently re-erected to shut in that side of the north aisle kept up. There were two old brasses on the south wall, that to the memory of W. Tableer having come from the old middle aisle. The monument of W. Hewer was on the north wall. Lysons gives the names of several other monuments which were destroyed when the building was pulled down; but he refers to the existence of one to the memory of Sir Lawrence Bromfelde, knight, who died in 1668, and which was then in the churchyard. This appears from Strype to have been a flat stone by the Communion rails.

There is an old view of the remains of Clapham Church, taken from the north-east, engraved in vol. 85, part 2, page 489, of the *Gentleman's Magazine*, drawn just before the demolition of this remaining portion to make way for the erection of St. Paul's Chapel. It shows an eastern portion standing like a small chancel attached to a western nave, the latter being, in fact, the north aisle. There is a transept-like

projection at the west end with a gabled roof, the whole of this part being built of brick, having moulded cornices broken around plaster buttresses, and round-headed windows are in the bays between them.

The eastern building is smaller and evidently of more ancient date, having a three-light window on the north side, with transom and Tudor arches in the heads, the whole being contained beneath a flat moulded label, returned at the angles.

A similar window is shown at the east end, but blocked. This was most probably the Atkins Chapel, for the monuments have been found as nearly as possible beneath it, as far as can be told by an examination of the site and the local surroundings. The view has been taken after the demolition of the nave and south aisle, and it therefore shows only the portion which remained from 1778 until 1814, and the demolition of this part itself took place before the view was published, the editor expressing the hope that the brasses and as many of the monuments as possible may be set up in the new chapel.

We have referred already to the inscriptions on the tombs, and have given a sample of the kind of verification of any of our readers, they others be required by any of our readers, they can be readily obtained, since they are given in full in the 1720 edition of Stowe's "London," edited by Strype. The Latin inscriptions on Sir Richard's tomb are also printed. These are given again for the most part in the descriptions of the church in the *Gentleman's Magazine*. Strype also gives the armorial bearings on the tomb, and from his further notice we are able to ascertain that the monument of the Dean of Arches was originally on the south wall of the north aisle, and the position described by Lysons, after the demolition of the body of the church, was, doubtless, its original one,—at least, since the erection of the north aisle itself.

Bartholomew Clerke, Dean of Arches, was lord of the manor prior to its purchase by the Atkins family. He died in March, 1583, aged fifty-two. His wife, Eleanor Hasselrigge, was represented with him, together with their son. A daughter had been apparently at one time also on the monument, but her parents were represented kneeling before desks the Dean being in a red robe.

Dr. Martin Lister, F.R.S., was commemorated with his wife, Hannah. He died February 2nd, 1711-12, having been for several years an inhabitant of Clapham, and bequeathed £1. for commemoration service for his wife. He was the author of the "Synopsis Conchyliorum," published in two folio volumes in 1685, and containing a very good series of accurate engravings of all the shells known in his time; the drawings having been made by his two daughters.

The Wm. Hewer whose monument has been referred to was the servant and friend of Samuel Pepys, at whose fine house on the Common Pepys died.

A few days since we paid a visit to the monuments, thanks to a private view, cards of which had been issued by Messrs. Aldridge & J. Collins, members of the Burial Board. We found a stream of people constantly ascending and descending into the vault, the entrance of which is on the north side of the present chapel. The greatest possible interest was being shown in the discovery, and during the two or three hours when the entrance was open over persons were computed to have inspected what had been found. It was, indeed, a remarkable sight to find, on descending, a number of exquisitely-wrought figures standing out so strong and vivid relief from the darkness of the vault. Not to repeat what has been already stated, the following notes may serve to describe what exists:—The figure of the standing knight is that of Sir Richard Atkins, who died August 19th, 1689. He is clad in the plate-armour of the period, a sash being gracefully arranged over it from his shoulders, looped around the armour; linen wristbands showing, and the head covered by a large ringlets flowing down upon the shoulders. It is a recumbent figure, as is attested by a mattress, but it is now set upright. A companion figure, Sir Richard's wife, is found in the adjacent vault, lying upon an ancient leaden coffin. She is clad in a new arranged gown, with a stiff-pointed stomacher; a tippet is elegantly arranged over the shoulder.



and the hair is covered with looped drapery. The oldest son, Henry, is in a sitting attitude, clad in Roman scale armour, closely fitting and flexible to the form, the arms and legs bare; he, too, has a large flowing wig. At the end of the vault the sitting figure is that of Annabella, whose epitaph has already been given. The head-dress is something very remarkable. It is carved with exquisite grace, adorned with pearls, while a string of pearls is around the lady's neck. The stomacher is very pointed and very low, the arms are bare from below the elbow joint, the upper part of the arm being covered with drapery. The costume is, in fact, evening dress, very beautiful, but rather remarkable for a funeral monument. A book is held in the left hand. The last figure to be noted is that of a little girl, the Rebecca of the inscriptions. It is a charming little figure, of pleasing expression, clad in a pretty child's dress, with an edging of lace elaborately carved. As the light fell upon the young little face, many of the visitors expressed their opinion that it was the best of the series. The expression of the face in no way prepares us for the skull which is held in the child's two hands. These figures are all life size, and carved in white marble of close grain. They are fine works of art, studied and grouped in an admirable manner; the countenances express such individuality that we have no doubt but that they are portraits to the life. The question naturally arises, Who was the sculptor? There is not a clue to this in any of the old writers consulted. This is, however, the fate of the sculptors of most of the monuments in the old churches around London, the works of art in these, of seventeenth-century date, being in fact, more numerous than ordinary observers may be ready to believe. Certain it is, that those at Clapham may be classed with the best. We observed, with no little interest, that some of the architectural members belonging to one or another of these tombs are piled up in various parts of the vault. There are two moulded ribs, apparently quadrants of a circle, which probably formed the semicircular arch of the three children's tomb, while in another place a white marble slab actually contains the three inscriptions, one of which, taken from Styrpe, and not from the work itself, we have already given. There are lengths of white marble cornice with flat modillions, lengths of black marble, one or two shields, two or three lengths of scrollwork in black or grey, the light did not show which, with white shields, and many corbels and such like, quite sufficient for a skilful hand to put the designs together again.

It is greatly to be hoped that these remarkable works will not be left to the darkness which has hung over them for more than eighty years. The interest taken seems to show very amply that this will not be the case.

The churchyard bears abundant evidence as to the great extent of the monuments so needlessly thrust out of the old church. One of the figures of the Dean of Arches' monument is, we are told, locked up in the heating apparatus; a large marble slab, apparently to the memory of Sir Richard Atkins's father, was recently found underground during some repairs. The tablet to Dr. Lister, and that of his wife, are on the external north wall. But a glance on leaving showed a rather remarkable monument of white marble, built into the north-west wall of the transept, of the large addition only recently made to the church. It is exposed to wind and weather. It is hardly to be credited when we state that this is the monument of William Hewer, the faithful friend of Samuel Pepys. We have already noted its position within old Clapham Church. It was thrust out at the demolition, built on to an external wall when St. Paul's was erected, taken down only recently, but again fixed externally.

A monument has been at last fixed in St. Olave's, Hart-street, to commemorate old Samuel Pepys; cannot something be done to save this of his friend from its most unworthy position?

**Cheltenham Grammar School Competition.**—The Governors have awarded the first premium of 100l. to the design under the motto and device, "Arms of Pembroke Coll., Oxon," and the second, of 50l., to "Supervision." The first was found by the chairman, on opening the sealed envelope, to be by Mr. Henry Hall, R.L.B.A., London; and the latter by Messrs. J. & E. Conder, London.

#### THE ENGLISH IRON TRADE IN 1885.

THE hopes,—faint, it is true,—which were raised at the beginning of 1885, of an improvement in the iron trade of this country, have been rudely dispelled by the experiences of the past year. Bad as was the preceding year, the year of which we have just seen the close was worse, and we do not know whether the present generation has passed through one in which the effects of bad trade were felt more keenly, both by employers and employed. In stating this, we have said the worst that can be said of the last twelve months, and it is a redeeming feature of the past year that the distress caused amongst the various branches of the iron trade and the related trades by want of employment has been borne with a fortitude that deserves all praise, whilst the philanthropic and practical efforts made to relieve the ensuing misery elicit commendation in an equal degree. Without inquiring too minutely into the various causes of the depression which has been characteristic of 1885, it may be broadly stated to be due to a diminishing demand on the part both of home and foreign consumers, as well as to a growing competition by foreign manufacturers, a competition unfortunately fostered by want of foresight of British producers. The International Railmakers' Association, for instance, which has been condemned by all independent journals in the trade, received the support of English manufacturers in the vain hope of enabling them to neutralise that competition. Warning voices were raised, but to no avail. It is a grim satisfaction to know that even those who countenanced the movement now see the folly of the manoeuvre, which has opened up markets to the foreigner which were formerly closed to him.

The unfailing barometer of British trade, the Board of Trade Returns, fully corroborates what has been stated respecting the state of the English iron trade during 1885. The exports of iron and steel during the first eleven months of last year represented a total value of 20,128,374l., as compared with 22,707,708l. in the corresponding period of 1884. As regards quantities, the exports were 2,910,347 tons last year, against 3,267,490 tons in the first eleven months of 1884. The great falling-off in shipbuilding during the past year has contributed in no small degree towards curtailing trade requirements, besides lowering the prices both of iron and steel. When it is considered that the total output of British shipyards in 1885 was reduced to 540,000 tons, as compared with 750,000 tons in 1884, and 1,250,000 tons in 1883, no surprise will be felt that this great decrease has affected the iron trade of this country most injuriously. The chief cause, however, of the prevailing depression in the English iron trade is still over-production. It need only be stated that the crude iron in stock at the present moment in Scotland and Cleveland alone is over 1,500,000 tons, against 1,221,000 tons at the beginning of 1885, and over two and a half million tons in the whole of the kingdom, and it will not need much eloquence to point a moral. The effect of such stupendous stocks upon the market is self-evident, and we can scarcely be surprised if the tendency throughout the past year has been for lower prices. It is true that Scotch pig-iron warrants have been remarkably uniform in value throughout the year, if we except a few trifling fluctuations, and that they are now quoted at nearly the same rate as at the opening of 1885, viz., 41s. 7d., against 42s. 2½d. But it is equally true that Scotch warrants are mostly in the hands of speculators, who, by keeping up the prices of the commodity they deal in, have contributed towards the comparative firmness of makers' iron without, however, benefiting Scotch ironmasters. For, owing to the dearness of Scotch iron, the floodgates of competition were opened to Cleveland makers, who have managed to place over 90,000 tons more of cheaper Middlesbrough iron in Scotland during the past year than in 1884. No. 3 Cleveland pig was worth, at the beginning of the year, 35s. 3d., prompt delivery, and it is now 31s. 9d.

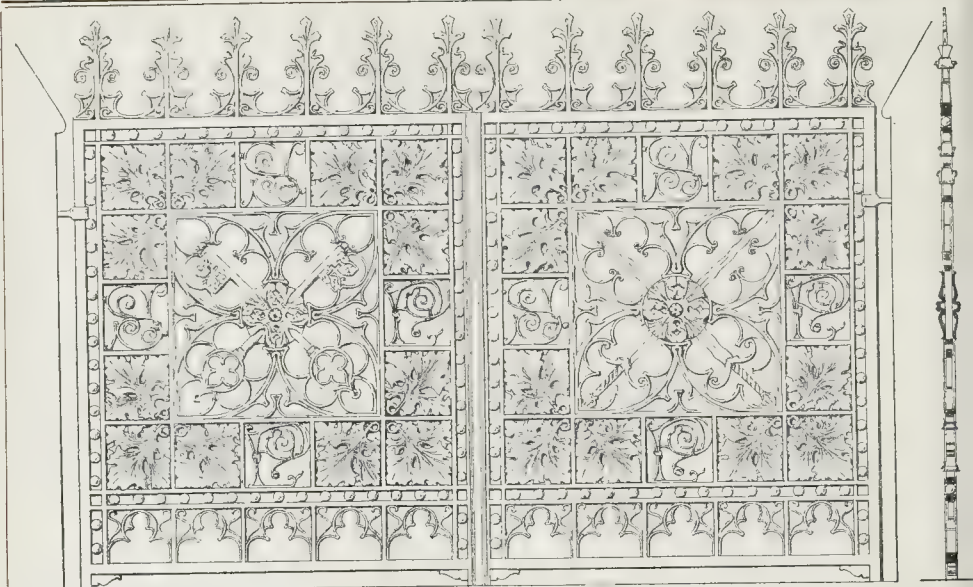
The rates for crude iron in other parts have been in sympathy with those of the two principal producing districts, and this is true also of the trade in hematite pig-iron. The latter trade, however, notwithstanding the prevailing quietness, has been remarkably steady, no change worthy of note having taken place in quotations from July, 1884, to the end of 1885. An im-

provement in hematites set in about November, owing to the increased consumption of steel for shipbuilding purposes, and the expectation of a better demand from the United States. Whilst touching on the question of the greater demand for steel for shipbuilding, it may be mentioned that, if it had not been for the increasing wants of shipbuilders, the production of steel during the past year would have fallen off much more than it has actually done. From the statistics published of the output of steel during the first half of 1885, we are enabled to estimate the falling-off in the production of Bessemer steel at about 200,000 tons for the whole year, of which nearly the whole will probably be found to be on account of steel rails. The fact that English steel makers have now been producing ship plates and ship angles for some time, and the still more satisfactory announcement that they are going in for the manufacture of steel sleepers, are signs that better things are in store for the British iron trade, and this is, so far, encouraging. It remains to be added with regard to steel that ship plates of that material are now selling at about 64. 10s., against 71. at the beginning of the year, whilst steel angles are fetching 61. 5s. compared with 61. 10s. Steel rails have been sold throughout the year at the almost uniform rate of 41. 15s. for average sections, and this steadiness is ascribed to the operation of the International Railmakers' Syndicate, at the sacrifice, however, as pointed out above, of admitting foreign manufacturers into markets hitherto our own.

Independently of the gradually proceeding substitution of steel for iron, which in the case of shipbuilding amounts to nearly 50 per cent. at the present time, the trade in finished iron has been much curtailed by a slackening demand, both home and foreign. In consequence, prices have suffered, but not to such an extent as might have been anticipated from decreasing inquiry. This, however, is solely due to the fact that prices were already so low at the beginning of the year that they could not decline much more, although manufacturers of finished iron were favoured by the cheapness of the crude material. Prices, however, tended downwards throughout the year, and at its end were about 7s. 6d. per ton lower than at the beginning. In the North of England, the average rate for iron rails, angles, plates, and bars at the beginning of the year was 41. 18s. 11d., or 5s. 4d. less per ton than that touched in 1879, when it was 51. 3s. 3d. At the last return presented in the year, in October, the net average price was 41. 17s. 2d. In Staffordshire the notable value of marked bars was 81. 2s. 6d. down to 71. 10s. in January. This has been the nominal quotation throughout the past year; but as a matter of fact most houses have taken shipping orders at from 10s. to 20s. below those rates, the depression in value being caused, as in the preceding year, by the competition of the cheaper North Country iron. In Lancashire the rates at which bars were quoted for delivery into the Manchester district were 51. 10s. to 51. 11s. 3d.; they are now 51. 2s. 6d. to 51. 5s.

Reference has already been made to the great decrease in shipbuilding; but as there is no cloud without its silver lining, we are justified in assuming,—and the assumption almost amounts to certainty,—that the reduced production of tonnage will tell in the end upon the freight market; for the loss of ships is constant, and shipbuilding, and through it the iron trade, must ultimately revive from this, if from no other cause. Although not nearly so severely as the other branches of the iron trade, the engineering trades have suffered considerably during the past year. Marine engineers would be the first to feel a falling-off in ship construction; but, if we except locomotive builders and electric light engineers, engineers have had just cause to complain during the past year, a period during which they for the first time really felt the pinch of bad trade. Summing up briefly, it may be said that, taking into account the better outlook in shipbuilding, the revival of trade in the United States, the fact that industrial undertakings have been remiss in replacing old material owing to bad trade, and that long delayed renewals cannot be shirked much longer, the future does not appear nearly so dark as the past year has led people to anticipate. It is a satisfactory sign that English manufacturers are beginning to have their eyes opened by such occurrences as the formation of an international rail syndicate,





*Brass Chancel Gates, Church of SS. Peter and Paul, Teddington.—Designed by Mr. Ernest C. Lee, F.R.I.B.A.*

the indirect consequences of which will be felt yet for years to come; or the more recent Belgian girder incident, which has taught them that they are for the moment surpassed by foreign enterprise. We trust that they will profit in the future by the severe lesson they have received in the past.

**ST. PETER AND ST. PAUL'S,  
TEDDINGTON:  
BRASS CHANCEL GATES.**

THE above church was erected under the direction of the late George Edmund Street, R.A. The gates have been designed to be as far as possible in character with his work. The emblems of the patron saints are introduced with their initials. The brasswork was executed by Messrs. Richardson, Slade, & Ellison, the model for leafage by Mr. Thomas Earp, all from full-size drawings by Mr. Ernest C. Lee, architect.

**PROJECTED RAILWAY, TRAMWAY, GAS,  
WATER, DOCK, PIER, AND HARBOUR  
WORKS.**

AN analysis of the 176 private Bills for the Parliamentary session of 1886 shows that of the railway Bills (fifty-six in number) eleven are promoted on behalf of companies proposed to be incorporated for the construction of entirely new lines in different parts of the country. These include a proposed line of railway from Bedford to Peterborough, commencing on the Midland line at Bromham, near Bedford, and terminating on the Northampton and Peterborough section of the London and North-Western line at Overton, in Huntingdonshire; a new line from the East Lincoln Railway, across the Lincolnshire marshes, to the main line of the Manchester, Sheffield, and Lincolnshire Company; a new line from the Eastbourne branch of the London, Brighton, and South Coast Railway to the Lewes and Seaford branch, with the view of effecting more direct railway communication between Brighton, Eastbourne, and Newhaven; a new line from Harrow to Great Stanmore; a new line from the Liverpool, Southport, and Preston line, now in course of construction, to Ormskirk; a new line in Lincolnshire, between Louth, Mablethorpe, and Willoughby; a new line from Woodstock, in Oxfordshire, to the Great Western main line; a new line in the county of Durham, called the West Durham and Tynemouth Railway; a new line, called the Nottingham Suburban

Railway, intersecting the various suburbs around Nottingham; the Felixstowe, Ipswich, and Midlands Railway, a new line to connect the Great Eastern with the Midland line; and a new line from Portsmouth to Hayling Island, which would cross over a portion of tidal water, and reduce the distance between Portsmouth and Hayling Island as compared with the present route via Havant. As regards existing lines, most of the leading companies have Bills seeking further powers for the construction of additional works, and amongst other new lines promoted by existing companies are those by the Rhymney Company for new lines in Glamorganshire and Monmouthshire; by the Mersey Railway Company for new lines in Liverpool and Birkenhead; by the London and Brighton Company for new lines at New Cross; by the Midland Company for a new line at Hendon; by the Taff Vale Company for new lines in the neighbourhood of Cardiff and Newport; by the Manchester, Sheffield, and Lincolnshire Company for new lines in Lancashire and Yorkshire; and by the Seacombe, Hoylake, and Deeside Company for several new lines in the Wirral district of Cheshire. The London, Tilbury, and Southend Company promote a Bill for powers to construct new wharves, warehouses, and landing-stages at Trobery, near Tilbury; also containing powers to build on land near Tilbury Fort. The London and South-Western Company's Bill contains powers providing for the transfer to the company of the Wimbledon and West Metropolitan Company, and for an extension of time for the construction of the line. The Bill also seeks for powers to the company to construct the unabandoned portion of the Kingston and London line; and also powers to purchase houses and lands in the Parish of St. Mary, Lambeth, for widening the line and constructing a new station at Vauxhall. In connexion with the London and South-Western Company's Bill it should be stated that the Wimbledon and West Metropolitan Company likewise promote a Bill to compel the London and South-Western Company to construct so much of the railway authorised by the Kingston and London Railway Act as is situated between the Kingston line and Putney Bridge. It may be stated that the authorised Wimbledon and West Metropolitan line commences at Putney Bridge, by a junction with the Metropolitan District Railway at their Putney Bridge station. It then crosses the Thames by a bridge immediately eastward of the new Putney Bridge, now in course of construction by the Metropolitan Board of Works, and, continuing in a south-westerly direction, it enters Wimbledon Park, which is now being laid out for build-

ing purposes. At this point will be the Southfields Station, whilst some distance further south-west there will be another station called the Wimbledon Park Station, a short distance from the Merton-road, leading to Wandsworth. Continuing from this station the line finally forms a junction with the main line of the London and South-Western Company near Wimbledon Station. On the completion and opening of this line railway communication between the metropolis and Wimbledon will no longer be confined to the London and South-Western Company.

The tramway projects, promoted by B. and also by provisional orders, are twenty-three in number, of which seven are undertaken connected with the metropolis. These include two Bills promoted by the North Metropolitan Tramway Company, one of which seeks powers for the construction of new lines in Clarendon-road, Theobald's-road, Vernon-place, Gravel-road, Commercial-street, and Lewenstein-Whit-chapel; and the other for extension Drayton Park, Gillespie-road, and Blackstock-road, and for the doubling of the line in Goswell-road. The South Metropolitan Company powers to lay down tramways from Clapton to Balham, Tooting, and Merton; by and Bill it is proposed to lay down tramways from Cricklewood to Kilburn, and Harrow-road, whilst the North London, the Southwark, Deptford, and the London, Highgate, Finchley companies all apply for powers to extend their several systems. Amongst these Bills is one seeking powers to lay down several steam tramways in the districts around Manchester, Bury, Rochdale, and Bolton.

Gas and water undertakings are represented by twenty-five Bills and twenty-four applications for provisional orders. Of the entire number of this class of undertakings fourteen present Bills empowering the incorporation of companies for the construction of new works, the remaining portion being applications in connexion with the extension of area of existing works. In the Southwark, Vauxhall Water Company's Bill powers are sought for the construction of new reservoirs at Lewisham and West Moulsey, and for building of bridges at Hampton. The London Company's Bill contains clauses empowering the company to sink a well and pumping works at Waltham; also powers to construct an aqueduct, commencing at the main road from Waltham Abbey to West Cross. The Lambeth Water Company seeks for powers to raise further capital.



The dock, harbour, and pier works projected re-represented by twenty Bills and Board of Trade applications for provisional orders. The Southampton Corporation apply for powers to construct a new dock, embankment, and river-wall, and also for powers to divert, deepen, and dredge the waters of the Solent and the rivers Itchen and Test. The East and West India Dock Company promote a Bill applying for further capital to complete the Tilbury Docks, and for powers to erect and maintain hotels at Tilbury. The Preston Corporation apply for powers for a deviation of the authorised diversion of the river Ribble in connexion with the dock works now in course of construction at Preston. Powers are also sought for the construction of new docks and a railway at Gravesend and Northfleet. The proposal is to construct three new docks, including a main dock 380 yards in length, and 200 yards in width, with two branch docks, each 626 yards in length, and 100 yards in width, together with wharves and warehouses surrounding them. The project, if carried out, would embrace a portion of Rosherville Gardens. The entrance from the Thames to the docks would be near the Gardens. The area of the proposed main dock is nearly 24 acres in extent, and the two branch docks 13 acres each, the docks, wharves, and warehouses occupying an area of upwards of 80 acres. The Bill also seeks for powers to connect the docks with the South-Eastern Railway and the Gravesend branch of the London, Chatham, and Dover Railway, by a junction railway with those lines. The Southampton Local Board promote a Bill with powers to purchase a portion of the foreshore of the river Thames for the purpose of constructing an embankment; also powers to construct new pier works, seaward, in continuation of the existing pier, together with the erection of refreshment and concert rooms at the end of it. Powers are also sought in the Bill to dredge and deepen the bed of the river. The Swansea Harbour Commissioners apply for powers to construct various new works, including a canal and additional locks. Powers are likewise sought to construct a sea wall and piers in connexion with the Bute docks at Cardiff, whilst the Cardiff, Avonmouth, and Burnham Railway and Steamer Company promote a Bill empowering them to construct new dock works near Avonmouth and Burnham. There is a Bill promoted by the Bristol Corporation for further dock works; also a Bill for the construction of a new bridge over the river Avon at Totterdown, near Bristol; and a Bill promoted by the Felixstow Dock and Railway Company for powers to charter steam-vessels. A Bill is likewise promoted having for its object the improvement of the river Tyne. There are also applications for powers to construct new piers at Dovercourt, Tynemouth, Newlyn, Shanklin, Brading, and Sandown. Powers to make Channel Tunnel experiments are again sought by the South-Eastern Railway authorities. It may be added as having some connexion with harbour and sea-coast interests that the authorities at Lloyd's promote a Bill empowering them to erect, maintain, and work signal stations; also further powers as regards the collection, publication, and diffusion of intelligence.

There are twelve Bills relating to town improvements,—new streets, widening of existing streets, and increased sanitary powers, being the main features in the several Bills. The Liverpool Bill, in addition to the improvement powers thus sought, contains clauses relating to hospital enlargements, with powers to contribute 16,000*l.* towards the rebuilding of the Royal Infirmary. The Blackpool Corporation, in their Bill, have clauses enabling them to purchase the Blackpool Sea-water Company, and to widen the promenade or carriage-drive in front of the sea.

Amongst the Bills of a miscellaneous character is one promoted by the Lancashire County Justices for powers to construct a railway to the Whittingham Lunatic Asylum. Several Bills of this class have reference to projects affecting the metropolis. The Metropolitan Board of Works promote no fewer than six Bills, all of which may be classified under this head. Their General or Varied Purposes Bill empowers the Board to make several street and other improvements, and also enables the Board to make a staircase to form an access for foot passengers to the footway along the north-eastern side of the South-Eastern Railway bridge at Charing Cross. Authority is also sought in the Bill for further

powers to the Board with regard to the use of subways under streets and other places in the metropolis. Another Bill promoted by the Board seeks powers for the enlargement of Hampstead Heath. The Board likewise promote a Bill empowering them to make further regulations in regard to theatres and music-halls. These two last-named Bills have already been referred to in the *Builder*. Of the three other Bills promoted by the Board, one has reference to the keeping and storage of firewood in the metropolis; another Bill provides for further powers to the Board in reference to Parliament by the Water Companies; whilst the other Bill provides for an alteration in the contributions by the insurance companies towards fire brigade expenses. The Corporation are the promoters of two Bills, one of which empowers them to alter and enlarge existing markets, whilst the other Bill they apply for powers to purchase lands in Highgate, Hornsey, and Kilburn for forming open spaces. A Bill relating to the Muswell Hill Estate empowers a new company, proposed to be incorporated, to purchase the estate and the Alexandra Park Railway. One of the most important Bills promoted has reference to the purification of the river Lea. The Bill contains powers to compel the Tottenham Local Board to disinfect and purify the sewage matter passing into their works; prohibits effluent water and sewage from their works passing into the river and its tributaries; provides for the diversion of effluent water from such works into the sewers of the Hackney Local Board and the Metropolitan Board of Works; and also further provides for the construction of a sewer to connect the works of the Tottenham Board with the sewers of the Hackney Board. The Kensington Vestry seek powers to construct a depot on land in that part of the parish known as the "Potteries," and to erect "destructors" and other machinery for the destruction and treatment of mud, dust, refuse of streets, and other waste materials of houses. The lands proposed to be purchased for the purpose contain an area of about four acres. The Horse Guards Avenue project for powers to form a new approach to the Thames Embankment, and the Bill promoted by the Charterhouse authorities, authorising the sale of a portion of the property, have both already been noticed in the *Builder*. A company proposed to be incorporated seeks powers for the construction of subways from Cromwell-road, South Kensington, to a point in the Brompton-road, near Knightsbridge-green, and thence to Oxford-street, near the Marble Arch. It is also proposed by the Bill to construct a new street from the north side of the Brompton-road to a point near the Cavalry Barracks, and to widen the Knightsbridge-road, on the south side. The Chelsea Electric Lighting Company promote a Bill empowering them to construct works and to lay down wires and other apparatus in various parts of Chelsea. The Greenwich and Millwall Subway Company promote a Bill for more capital, and for the transfer of the undertaking to the Metropolitan Board of Works. A Bill is likewise promoted with reference to the lighting of the new streets at Hyde Park Corner.

#### DEPRESSION IN THE BUILDING TRADES.

THE following is a statement sent in by the Institute of Builders, in reply to the questions propounded by the Royal Commission on Depression of Trade:—

The following statement relates to the building and general contracting trades chiefly carried on at home. Compared with the periods 1865-70, 1870-75, and 1875-80, these trades have been affected as follows:—During the last five years the imports have increased in volume in proportion, and manufactured goods have increased both in variety and volume. Profit has been reduced from good to vanishing point, the amount of capital invested being larger than in almost any other trade, and of late years vastly increased on account of the costly and varied machinery introduced. The labour employed is also larger than in any other single trade, but the number of men out of work since 1880 has been increasing, and it is at the present time larger than ever. Trade may be considered to have been at its normal level from 1875-80, above that level from 1870-75, and below it from 1880-85, and at

the present time may certainly be described as depressed. The depression began in 1880, and has not reached the lowest point yet. Want of confidence and want of enterprise are its most prominent symptoms. Its progress has hitherto been uniform, but it is impossible to see the future, which, however, looks very bad. The special circumstances to which the existing condition can be attributed, are, too much outlay in speculative building, the existing system of ground-rents and building leases, the recent decisions by which the money lent by trustees on mortgages is limited, and want of confidence. The demand for capital is below the average of the last twenty years, the supply above, and the return on it is below that average. The rate of wages for skilled and unskilled labour is above the average of the last twenty years, both in relation to quality and quantity, and the mechanics have become more specialists, though the average is not so good. No special legislation for the benefit of the trade, apart from the welfare of the community, can be suggested. The present condition of the trade has not been affected by any changes in the relation between capital and labour, but to a very great extent in the hours of labour; it has not, however, been affected by changes in the relations between the producer, the distributor, and the consumer, fall in prices or appreciation of the standard of value, the state of the currency or the banking laws, the restriction or inflation of credit, over production or foreign competition. It has been affected by the highway laws and taxation of improvements, but not by communication with other markets.

#### PLUMBERS AND PARLIAMENT.

SIR,—I observed in a recent number of your journal a notice of a dinner given by the Plumbers' Company, where the Worshipful Master stated that the Company were desirous of reforming the trade and were seeking Parliamentary powers.

I do not know what these powers may be, but rumours are rife, and I would suggest that the Company should try to amend some of the difficulties and anomalies which now exist, rather than hedge the trade round with further restrictions or make it a stronger trade's union than it is.

Speaking from a builder's point of view the plumbers are the most troublesome, and cause more loss and anxiety than all the other trades employed by us.

They begin work at a later hour than other trades.

In the winter they take one hour to dinner, whilst all the other trades are satisfied with half an hour.

They leave off work half an hour later, thus entailing the necessity of foreman or watchman remaining too.

They do less work and receive more wages than other equally intelligent mechanics.

If the two or three master plumbers who represent the trade on the Court of the Plumbers' Guild will address themselves to practical questions like the above, they will do some good for, and earn the gratitude of, the whole country.

I hear that our Builders' Association wrote to the clerk of the Company last August, asking that it might be represented at any conference, but up to now no answer has been vouchsafed.

Perhaps this is wise, as doubtless the gentlemen, who remind one somewhat of the three mighty men from Tooley-street, anticipated opposition; but if they will only go in for wise and practical proposals, they may depend on the cordial support of the builders, who, by the way, employ by far the largest number of hands.

C. A. M. B.

**Leeds and Yorkshire Architectural Society.**—The following is a list of recently-elected honorary members of this society, viz.:—The Marquis of Ripon; Mr. B. Priestley, M.P.; Mr. S. W. Duncan, Horsforth Hall; Mr. Alderman John Baynes, Mayor of Ripon; Rev. John Gott, D.D.; Mr. John Barran; Professor Bodington, M.A. (Principal, Yorkshire College, Leeds); Mr. J. S. Mathers; Mr. Ernest H. Jacob, M.D.; Mr. H. B. Hewetson, M.R.C.S. Eng.; Mr. W. Irwin (all of Leeds); and Mr. J. M. Barwick, M.A., Yeadon.



# "THE ROYAL INSTITUTE OF BRITISH ARCHITECTS."

Sir,—In the discussions now going on for the improvement of the Royal Institute, I have not seen any suggestions for the improvement of the name. Although the name is a secondary matter, it need not be left out of consideration, as I doubt if there exists a clumsier title among any of the other royal societies. The coupling of the words "Institute" and "British" are difficult enough of pronunciation even for a sober man, however they might sound in a blarney song; and the initial letters which the title obliges a man to use after his name are nothing if not comical. Did ever a man write F.R.I.B.A. after his name with a serious face on? The substitution of the simple word "Guild" for "Institute of British," making the title "The Royal Guild of Architects," would, in my opinion, adequately express the purpose and aim of the Society, and the initials F.R.G.A. would not, I think, conflict with any other royal society. Guilds are associated with trades of which the architect is the master workman in the building trade, and according to Spenser they are "an association of men belonging to the same class, or engaged in kindred pursuits, formed for mutual aid and protection; a business fraternity; and were originally licensed by the Government, and endowed with special privileges and authority." This definition practically expresses the reason *d'être* of the Institute.

J. M. MACLAREN.

## WHAT IS A BILL OF QUANTITIES?

Sir,—In response to an advertisement in your paper of Dec. 15th, stating that tenders were required for the erection of an institute at Slough, near Windsor, I duly applied for particulars, and received in due course a bill of quantities (at least, so-called); these were, I presume, prepared by the architect, as no surveyor's name is attached thereto.

The proposed building is of a highly decorative style, both inside and outside, and the quantities do not, to my mind, at all represent the work required to be executed to enable a builder to realise what is required to prepare an estimate. I will instance a few items:—"600 yards super. extra to best red pressed brick facing and weather pointing, with neat black joint, face and soffit measured." This has (on reference to the plan) to include small gable, pediment, octagon cut turrets, and a lot more ornamental work.

In "Mason" we have "4,000 ft. cube Bath stone from the Box quarries for external and internal work, except steps, paving, &c., which are to be in York stone as per specification; the whole to be worked to drawings in the best manner, fixed, and cleaned down at completion." Here we have all the stone mixed up in one item; this is all the information given as to mason's work.

In "Carpenter," we have "2,200 ft. cube Baltic red fir in sleepers, lintels, joists, principals, strutting, grounds, &c." This has to include work to curved principals, hammer-beams, and all the difficult construction of a 35 ft. span roof, full of gables, and a high and heavy turret.

In "Joiner," we have "370 ft. run 1½ in. moulded and panelled dado, with diamond raised panels, 3 ft. 3 in. high over all, having 4 in. by 3 in. moulded capping, 5 in. by 1½ in. frieze and 9 in. by 1½ in. skirting, to include all grounds." Not a word about mitres, of which there are about sixty in this item.

There is no bill for "Painter." This is to be priced in the wood and iron work inclusive, and the wood work is to be decorated.

This is somewhat the nature of the bill of quantities, and for this the builder is to add 2½ per cent. for quantities. I should much like to know who would be responsible to the builder in the event of his getting the work on such an unrepresentative bill of quantities, because when the contract was carried out the work would be much in excess of what a builder could be fairly expected to estimate for by this bill. My idea of a bill of quantities is that it should fully express the work without reference to the plan and specification.

I enclose the bill of quantities for your inspection.

A SUBURBAN BUILDER.

December 30th, 1885.

## TIMBER MEASUREMENT.

Sir,—I have a trunk of an oak tree which measures 15 ft. long and 9 ft. girth round the middle.

Now, considering this a cylinder, the cubical content is 96 ft. Supposing it squared and the outside neglected, the content is 61½ ft.

If it be considered as slightly tapering, in mathematical language, a truncated cone,—the two contents will each be slightly greater than those found.

Now, why do the sliding-rule and the tables used by timber merchants make it to be 75 ft.?

I cannot make it this either by taking twenty-five per cent. from the gross measure for waste, or any other way.

Can any of your readers help me?

J. WARDALE.

## NON-ACCEPTANCE OF LOWEST TENDER.

Sir,—Referring to Mr. J. Greenwood's letter in your issue of the 26th ult. [p. 914], I beg to say that the Central Association of Master Builders of London has for some time past had under consideration the subject of the non-acceptance of the lowest tender.

E. S. HENSHAW.

Secretary of the Central Association of Master Builders of London.

31, Bedford-street, Strand, Dec. 30.

Sir,—In your paper for December 12 [p. 842] there is a letter from Mr. Higgin, justly complaining of the rejection of a tender of his (the lowest by 1½) for some work at a bank, in favour of the next highest one, and we have to ask you to allow us space to bring to the notice of your readers a similar case in which we are the victim.

In November last, we were invited by Mr. C. J. Dawson, architect, of Barking (and Surveyor to the Local Board there), to submit a tender for a malt-store, to be erected alongside the creek in that town, for Messrs. Randall, Howells, & Co., of 25, Mark Lane, City. Having accepted the invitation, and in due time received a copy of the quantity, we, on the 18th of December, sent in a tender, and on the 23rd received a letter from Mr. Dawson thanking us "for the trouble you have had in tendering for the work, a list of tenders for which I append." These were as follows:—

Mowlem & Co.	£4,189	Cuniffe	£3,913
Clarke & Bracey	3,999	Nightingale	3,876
Morton	3,493	Smith (accepted)	3,388
Brass & Son	3,383	Rider & Son	3,778

We at once wrote to both the employers and the architect, and the former replied that "they believed they had acted quite within their rights," and the latter informed us that "as Mr. Smith had already commenced the building in question by erecting the most difficult portion of it, viz., the wall next the river" (completed some time since), and that, taking into consideration such work had been unremunerative to him, they thought, as the difference (90¢) was so slight, they could not do otherwise than accept Mr. Smith's tender."

Although the usual clause about non-acceptance of the lowest or any tender was conspicuously absent in both the invitation and also in the quantities, we suppose we have no legal remedy; but it certainly seems monstrously unfair that we should have to waste time and money in making calculations simply for the purpose of checking the estimate of a more favoured competitor. We have communicated with the other builders who tendered to ascertain their views on the subject, and desire, by the medium of your columns, to make known to the trade another instance of a too-frequently recurring custom. We also intend to bring the matter before the Council of the Builders' Institute and the Central Association of London Builders, asking them to consider if any steps can be taken to prevent such treatment in a business already harassed by an exaggerated competition and exposed to enormous risks, difficulties, and annoyances.

THOMAS RIDER & SON.

181, Union-street, Southwark.

December 30th.

## VENTILATION.

Sir,—My communication on this matter to *Nature*, referred to in your last issue, was a simple statement that I had tried in practice a system of ventilation strongly recommended by a writer in that paper; and I stated that the system as described was a total failure. I cannot see that either the statement or the result was "curious"; and in reply to your query as to whether I have any fresh-air inlet proportionate to the combined areas of the flue and ventilating shaft, I am happy to say I have not. As these shafts are about 9 in. square each, I should require, for the fourteen rooms the house contains, a fresh-air inlet large enough to run an ordinary hand-cart through, and there would probably be a calmer atmosphere outside the house than inside. To put a sufficient air-inlet in part of the rooms would be useless, as the pull of each flue in the house acts more or less in each and every room. The fresh-air inlet to each room consists of a channel to the outside wall, with ten 1 in. holes opening at the fireplace; this is, of course, in addition to door and window leakages, which are usually the only fresh-air inlets provided.

As flues have to be built with room for accumulation of soot and for sweeping, they are of necessity large; and, if a supply of air, equivalent to the possible demands of a tall 9 by 9 vertical flue, is to be admitted to a room, say 15 ft. by 20 ft., the air in the room would probably not be warmer than outside, and the atmosphere would be about as free from draught as a shady corner in the garden. It is the fact that a sufficient air supply for both flues cannot in practice be admitted to the room, which makes the system as recommended a failure. As I had tried it, and I am pretty certain the writer has not done so, I simply recorded the fact of its failure in practice. The reason of the failure was, I thought, evident; and, if flues from the ceiling are to be adopted, they

must apparently be accompanied by an apparatus which will deliver into the house an enormous volume of warmed air, as the admission of cold air in sufficient quantities is simply out of the question.

Warrington.

THOS. FLETCHER.

## TALL CHIMNEY CONSTRUCTION.

Sir,—Will you allow me to make two or three practical inquiries respecting the construction of chimney shafts, viz.:

What advantage shall I reap by using a portion of Portland cement in mortar, and what proportion of cement to lime and sand is best?

Will hydraulic lime give better results than ordinary stone lime?

Which would be best to use in constructing flues to carry hot gases to chimneys,—brickwork in cement or brickwork in mortar?

I notice in Messrs. Bancroft's work on "Tall Chimney Construction," advertised in the *Builder*, that some builders use ordinary stone lime, some hydraulic lime, and others chalk lime with a little Portland cement added; my object in writing is to ascertain which is best.

T. SUMMERS.

## CHURCH-BUILDING NEWS.

**Althorne.**—The Church of St. Andrew, s. Althorne, Essex, has lately undergone some extensive repairs, and, with the exception of the tower, is now in a permanently safe and substantial condition. The principal works have been the rebuilding of parts of the north and south walls of the nave, the insertion of new windows, and a new roof. A monumental brass in the nave floor records that the walls of the church were rebuilt by William Hykott, who died in 1508. They are of rubble and flint about 2 ft. 6 in. thick, but, owing to insufficient foundations and the fact that the subsoil is clay, they had settled in rather a remarkable way, viz., east and west (not out of the perpendicular), causing large vertical fractures through which the rain and weather entered freely. Indeed, so dilapidated and apparently hopelessly was the condition of the fabric that it had been condemned as being beyond restoration and demolition had even been advised. By means, however, of designs prepared by the architect, the most necessary works have been carried out, at a cost of about £800. The tower, imposing structure of the fifteenth century, still in a most dilapidated and crumbling condition. Funds are urgently needed for restoration of this, estimated to cost about £300. The architect was Mr. H. Hardwicke Langston, of London, and the contractor Mr. Charles Read, of Burnham. The chancel, which was a brick and lath-and-plaster construction, has likewise been substantially repaired and improved; the old brickwork which was raised has been retained, the walls have been raised and handsome stone tracery windows have been inserted in the east and north and south walls; also a new open timbered roof, the floor raised and tiled, and the interior fitted with choir seating. This work has been carried out at the sole cost of the Governors of St. Bartholomew's Hospital, Mr. Edward L'Amor and Mr. Langston having been joint architects for this portion of the work. There was a formal re-opening. The works were completed in December.

**East Dereham (Norfolk).**—The parish church of St. Nicholas, East Dereham, in which was buried the poet Cowper, has been re-opened, after complete restoration of the nave and aisles. The works to the East English nave roof comprised removal of the eighteenth-century plaster ceiling and repair of the existing oak roof, and an improvement of pitch-pine boarding and intersecting ribs, and 108 carved bosses of oak. The lead was taken off and entirely re-cast. The plaster has been removed from the north (Decorated) and south (Early English) roofs, and the spandrels of the former have been filled in with new tracery. At the foot of each brace new shields are to be fixed carrying emblems of the saints associated with the Eastern Counties. The old galleries which blocked up the north and south aisles and west end of the church have been removed, the celebrated Perpendicular font, which previously in the north transept, has been replaced in its original position near the west door. All the windows in this part of the church, including the great west window, have been thoroughly repaired in stonework, and glazed in tinted quarry glass. In this pro-



some beautiful tracery in the windows of the north aisles have been opened out. All the walls have been re-stuccoed, and the south porch—an excellent piece of work illustrated by Cotman,—has been repaired. The clerestory windows were formerly very plain and cold in appearance, but the old plaster mouldings have been removed, and new quoins and inner arches of stone have been inserted, and the windows reglazed. The church has been laid with hot-water pipes throughout on the low pressure system. These have been supplied by Messrs. Jones & Co., London. The former gas-standards have been removed, and ornate (by Messrs. Bradley & Co., of East Dereham) fixed on the top of the columns. The constructive work has been performed by Messrs. Gurnish & Gaymer, of North Walsham, and the whole of the works have been completed from the designs and under the superintendence of Mr. Edward Preston Willins, architect, of Norwich.

## The Student's Column.

### FOUNDATIONS.—I.

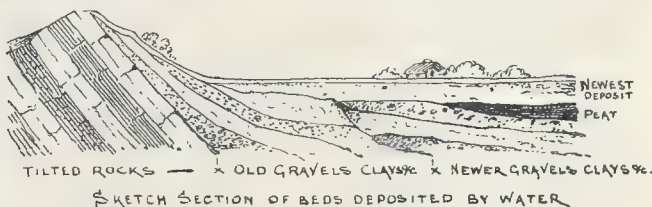
THE term "Foundations" has received a legal definition. By the Metropolitan Management and Building Acts Amendment Act, 1873, it is interpreted as meaning "the space immediately beneath the footings of a wall." This definition is made for the special purpose of fixing the circumstances under which the use of concrete shall be compulsory within the Metropolitan district, and the smallest quantity of it that will satisfy the requirements of the by-laws made under the Act. We shall see, in due course, how this matter is dealt with on this strictly legal basis. But the subject of foundations cannot, in practice, be so strictly limited. It includes everything that relates to the ground upon which the walls and piers of a building have to stand, and all kinds of preparation that may be required in order to make a bad or indifferent site sufficiently sound and firm for the purpose of being built upon. It is a subject that, beyond most others, requires careful personal observation and experience in order to the formation of a sound judgment in any particular case. Indeed, the student should understand that no written instructions can be of material use to him unless he seizes every opportunity of inspecting excavations and modes of dealing with unsuitable soils in the practical operations of the builder. A good knowledge of geology will be found of great utility, but the following details of the chief kinds of soil in which foundations have to be made may be sufficient as an introduction to the study of the subject.

#### THE VIRGIN SOIL.

In the open country, the surface soil, to a depth of from 9 in. to 18 in., has been more or less disturbed by plough or spade, and consists of the soil that may be common in the locality, mixed to a very large extent with vegetable matter resulting from the crops that have grown upon it, and with various kinds of manure. Below this depth we find the virgin soil, otherwise called the maiden earth, consisting of matter that has never been disturbed in human history. Whatever may be the nature of this subsoil, its ingredients have almost certainly been brought, at very remote periods, to their present position, by the action of water. They have been deposited either gently as a sediment in a quiet sea or lake, or heaped together more or less violently by the strong currents of rivers or the breakers of a sea-shore. Sand may have been drifted by the wind just as it is now being drifted on certain of our coasts. Rocks, except a very limited number that have been melted by heat, have been deposited in the condition of soft ooze or of sand, bed upon bed; some interruption in the process, or some thin layer of a different material having caused these horizontal divisions. These beds have gradually become hard, and have usually been tilted up at various angles, broken, and often buckled and twisted into forms and positions of great irregularity. While these movements (caused by subterranean forces acting slowly through long periods) were going on, other beds of gravel, sand, clay, or mud, or of such materials mixed together, have been deposited upon the hardened rocks, and have partaken of the continuing movements of these rocks. Portions of these soft beds have been washed away, and new deposits made over

the disturbed surfaces. Layers of vegetable matter have been formed in shallow water, and have decayed into peat, to be covered up with fresh beds of clay or mud. All these beds are likely to be thick in one place, and gradually to become thin and disappear, or to be cut off suddenly, so that within a small area the subsoil will vary considerably, and soft or spongy layers will be found under others that are comparatively hard and might seem perfectly reliable.

These phenomena can be easily seen and should be carefully studied in ordinary excavations, in railway cuttings, and in sea cliffs, but a very good idea of them may be formed by observing the deposit of debris brought down the channels of a muddy road after a heavy shower. There we may see beds of mud, sand, and gravel sorted according to the size and weight of their particles, and imitating on a small scale by the work of an hour the processes and results that have taken thousands of years to accomplish on the larger scale that we have now in view.



We may now consider these different kinds of subsoil in detail.

**Rock** as a foundation has a security that is proverbial. If its surface is not level it must be levelled or cut into steps to receive the footings or base of a wall. It is necessary to ascertain that the rock does not consist of a kind of shale that turns to mud when exposed to air and moisture. It is also necessary to see that the whole building stands upon the same kind of foundation, for if some part of it is on a soft and yielding foundation there will be a fracture over the place where the change in the nature of the foundation takes place.

**Gravel** is upon the whole the most satisfactory of natural foundations. It varies considerably in the size of the stones, their shape, and the proportion of large to small stones. The spaces between the stones are usually filled in with smaller pebbles and sand; a small proportion of clay helps to bind the whole into a solid mass. The rough flint gravels of the London district are of this class, and are very suitable for foundations.

**Sand** forms a good firm foundation so long as it can be kept in its position. A very slight proportion of clay with the sand makes it stand well in excavations. Sand that is clean and loosely held together may easily be made to slip away from under a foundation if a trench is dug too near to it. Fine sand that lies below the level of the water in the soil will behave very much like a fluid when an excavation is made in it. It is known as "running" sand. If a well is dug in such a stratum near to the foundation of a building the sand may escape into the well so as to undermine the walls.

**Clay**, when it exists in a thick bed, is very hard, firm, and comparatively dry, so that it can only be dug with difficulty. In that condition it is capable of bearing very considerable weight, but within 4 ft. or 6 ft. of the surface it is so much affected by changes in the degree of moisture as to render it a very treacherous foundation. It swells considerably when wet and shrinks when dry, so as to be intersected by wide and deep cracks. In places where water settles it is pasty, and yields to pressure, and the pruer it is the more it is subject to these objections.

**Silt** is a soft deposit from muddy water, and when it is below the level of the subsoil water is without cohesion or firmness, so that a wall would sink bodily into it. It is found where rivers that carry down large quantities of earthy matter broaden out into a lake or estuary, where the still water can deposit its impurities over a large area. The process is still going on near the mouths of all large muddy rivers, and some of the most important engineering undertakings have been necessary in order to provide foundations in such a subsoil.

**Peat** is often found lying in strata below the soil in marshy districts. When a heavy load is placed upon it, the water is squeezed out of it, and it becomes compressed so that an artificial foundation must be formed for any building of importance on such a site.

We must remember the conditions under which these beds have been deposited. They are sometimes tolerably level, of uniform composition, and of very great thickness, but frequently they are not only of irregular thickness and inclination, but of different materials mixed together. Thus clay is mixed with sand, making loam, which is more reliable as a foundation than clay alone. The addition of clay makes loamy sand, and loamy gravel, and lime added to clay forms marl—a compound that is often very hard, but changeable when exposed to air and moisture. To sum up this part of our subject, we may say that, as the result of natural operations, the details of which cannot be precisely known, the soil in which a foundation has to be obtained must always be to some extent uncertain until the excavation is made. Yet a

knowledge of such conditions as are possible, combined with a fair amount of experience, will enable one to judge beforehand of what is probable, and so to be prepared for dealing with the conditions that are found actually to exist.

### VARIORUM.

"THE Bernese Oberland: Twelve Scenes among its Peaks and Lakes," by Elijah Walton, F.G.S., with descriptive text by T. G. Bonney, M.A., F.S.A., &c. (London: Published by W. M. Thompson), is a handsome volume, containing twelve plates from the drawings of Mr. Walton, executed in chromolithography by Messrs. Wyman & Sons, giving some of the most striking scenes in the district which it illustrates. The colouring of some of the scenes strikes us as rather "high"; whether this is due to the original drawings, or the reproduction in chromolithography, we cannot say. Some are very successful. The text is better written and of more interest than is usual in works of this class.—"Ye Earle English Almanack: 1886" (published by Pettitt & Co.), is a very pretty little "sham-antique," with old-fashioned woodcuts and page ornaments, some curious odds and ends of reading. As an antiquarian jest, it is well done, and a good sixpennyworth.—Messrs. Lettis, Son, & Co., Limited, of King William-street, have sent us a parcel containing a varied assortment of their excellent diaries, date-tablets, and housekeeping books. The quarto "Office Diary," No. 1, which is provided with an index, will be found very serviceable; Nos. 8, 9, and 11 are good specimens of the octavo series of the same diary. Nos. 24, 26, and 27 are cheap varieties for the pocket. Lettis's "Rough Diary or Scribbling Journal" is, in spite of its name, a very well-finished diary, the printing, paper, and general get-up being excellent. This diary is folio size, and in one form it is interleaved with blotting-paper. Nos. 35 and 36 are specimens of the same diary in octavo size. No. 37, the "Universal Diary," interleaved with blotting-paper, is a very good and cheap scribbling diary, selling for a shilling. Lettis's "Clerical Diary" and the "Clerical Tablet Diary" are sure to find favour with the clergy, while the "Housekeeper's Books" seem to meet all possible requirements.—Walford's "Antiquarian for January" commences a new volume. The first article, on "Brightelm-stone," is by the editor, Mr. Edward Walford, M.A., and contains an interesting account of the curious land divisions and subdivisions which formerly obtained, and to some extent still survive, in Brighton. The other contents go to make up a very good number.



## RECENT PATENTS.

## ABSTRACTS OF SPECIFICATIONS.

7,075, Water Cistern. R. Pringle.

The inlet pipe is turned up at the end, and provided with a spreader to prevent the disturbance of the deposit. The outlet pipe is fixed with its mouth a little above the level of the inlet. The bottom of the cistern slopes to prevent deposit.

12,888, Bricks and Building Blocks. W. B. Smith.

The bricks are formed so that when laid they cross each other obliquely, each brick bonding with a larger number of others than is usual: in addition to which they may be bound together by tie-rods, or by joggles. They are of about the proportions of an ordinary brick, the difference being that, instead of being rectangular they are oblique-angled, and have a hole near each end. Special bricks are made for ends of walls or for the junction of walls meeting at right angles. The bricks are likewise suitable for building straight arches. The invention is applicable not only to bricks, but to other descriptions of building blocks.

13,459, Gully and other Traps. S. Phillips and J. Millier.

The ordinary fixed dip of gully and other traps is replaced by a separate one, which slides in vertical grooves. The grooves are filled with tallow to make them gas and water tight.

14,362, Parquet Flooring, Floors, and Ceilings. F. Guerin.

The strips or boards are formed with grooves in the sides which fit over feathers, through which screws are passed into the joists. The feathers may take the form of T or double T bars, or they may be of wood. A modification is to employ strips or boards having a groove only on one side and pins or dowels on the other fitting into the grooves in the adjacent piece. Where the parquetry comes next to walls or partitions, the pieces may be let into a strip of wood, the top of which is flush with the surface of the floor. The parquetry blocks may be of sufficient thickness, and may be so connected between rolled joists by dowels and pins as to form, at the same time, both a parquet floor and a parquet ceiling. In that case the blocks may be shaped so as to envelope and hide the flanges of the joist.

## NEW APPLICATIONS FOR PATENTS.

Dec. 18.—15,545, J. McConachy, Improvements in Ventilators or Air Valves.—15,553, W. Atkins, Improved Door Bolt.—15,554, A. Harris, Ventilation of Sewers.—15,559, H. Townsend, Electric Bell Pumps, Pumps, &c.—15,560, J. Arnot, Manufacture of Sunk Slide Flush and Knob Bolts for Doors, &c.—15,577, R. Brown, Improved Batten Nail.—15,587, F. Howcroft, Sash Holder.—15,608, D. & E. Glaister, Improvements in Movable Partitions, Doors, Window Sashes, &c.—15,609, D. & E. Glaister, Apparatus for Sealing Doors so that the Fastenings are Automatically Relieved.

Dec. 19.—15,613, T. Gray, Improvements in Door Locks.—15,650, G. Ayers, Improved Locking Device.—15,677, R. Barker, Revolving Coupling Joint for Water, Gas, and other Pipes.

Dec. 21.—15,684, G. Sowerby, Improvements in Lead Glazing.—15,689, H. Stockman, Improvements in Concrete-mixing Machines.—15,725, G. Tegg, Improved Air and Water Tight Seam or Joint for Constructional Wood and other Work.

Dec. 22.—15,751, W. Joy, Improvements in the Method of Charring Cement Kilns.—15,752, P. Lawson, New Anti-fouling and Anti-corrosive Enamel Paint.

Dec. 23.—15,811, W. Dohring, Apparatus for Cleaning Chimneys, Flues, &c.—15,820, E. Pitcher, Door Shields or Finger-plates.

## PROVISIONAL SPECIFICATIONS ACCEPTED.

9,090, D. Thomas, Improvements in Screws and Screw Drivers.—10,717, S. Heeshaw, Improved Fastening for Doors and Windows.—13,497, R. Hunter, Self-acting Stop Lift for Window Sashes.—13,692, C. Parsons, Combined Wood Sawing and Slicing Machines.—13,748, E. Horsley, Improvements in Window Fasteners.—13,899, T. Goldsmith, Improved Screw.—14,023, T. Paxton, Attaching Door Knobs to Spindles.—14,118, J. Housman, Improvements in Ventilators.—14,294, J. Keith, Improved System for Heating and Ventilating Cellular Buildings.—14,236, W. MacVitie, Adjusting Door Knobs and Handles to Spindles.—14,550, H. Joel, Utilisation of Gas Fittings for the Electric Light.—14,775, R. Legg, Improvements in Stall Boards for Sheep.—14,793, W. Scott, Apparatus for Embossing Canvas for Decorating Walls, &c.—14,907, C. Hodges, Improved Lamp-post.—15,134, A. MacLean and R. Smith, Preparation of Coloured Varnishes.—15,135, A. MacLean and R. Smith, Manufacture of Pigments.—13,328, T. Smith, Manufacture of Cement, &c.—14,695, C. Carson, Electrical Apparatus for Releasing Door and Similar Fastenings.—14,816, C. Gumpel, Friction Clutch for Holding Window Sashes and other Sliding Frames in any desired position.—14,951, J. Davis, Supporting Vertically-sliding Window Sashes and Shutters in their Frames.

## COMPLETE SPECIFICATIONS ACCEPTED.

## Open to opposition for two months.

16,817, R. Adams, Improvements in the Method of Opening and Closing Fanlights, Skylights, Ventilators, &c.—2,306, H. Hunt, Improvements in Kitchens, &c.—2,364, F. Haunay, Improvements in Water-closets Seats or Covers, &c.—418, W. Hayhurst, Improvements in Cramps for Carpenters and Joiners.—2,353, L. Bickley and J. Winn, Improved Paint Brush.—3,512, E. Summerfield, Adjusting and Fixing Door Knobs to Spindles.—9,422, W. Boulton, Improvements in Decorating Glass.—12,610, R. Mason, Improvements in Windows.—13,638, T. Norway, Door and Window Fasteners.—1,983, H. Gresham, Security Stops or Catches for Windows, &c.—12,191, A. Clark, Window-sash Holders.

## MEETINGS.

## FRIDAY, JANUARY 1.

Architectural Association.—Mr. E. C. Robins on "Various Theories Concerning the Form and Style of the Temple of Solomon." 7.30 p.m.

## SATURDAY, JANUARY 2.

Association of Public Sanitary Inspectors.—Mr. James Bateman, C.E., on "The Pollution of Rural Water Supplies." 8 p.m.

## MONDAY, JANUARY 4.

Royal Academy of Arts.—Mr. J. E. Hodgson, R.A., on "Dutch Painters of the Seventeenth Century." 8 p.m.

London Institution.—Mr. Edwin Freshfield, F.R.S., on "Christian Constantinople." 6 p.m.

Victoria Institute.—Mr. W. St. Chad Bosworth on "Newly Discovered Inscriptions with reference to the Migration of Abraham." 8 p.m.

Clerks of Works' Association.—Mr. E. A. Bernays, M.Inst.E.C., on "Portland Cement and some of its Uses." 8 p.m.

## TUESDAY, JANUARY 5.

Manchester Architectural Association.—Mr. J. S. Hodgson on "Architectural Ethnography." 7.30 p.m.

## WEDNESDAY, JANUARY 6.

British Archaeological Association.—(1) Mr. J. Romilly Allen on "The Sculpture of the Norman Door at Abbe, Yorkshire." (2) Mr. J. W. Grover on "The Discovery of the Monuments of the Atkins Family at Clapham." 8 p.m.

Bakers' Farmers and Clerks of Works' Institution.—Ordinary meeting. 8.30 p.m.

## THURSDAY, JANUARY 7.

Royal Academy of Arts.—Mr. J. E. Hodgson, R.A., on "Painters of the French School." 8 p.m.

Edinburgh Architectural Association.—Short papers on Current Topics. 8.30 p.m.

## Miscellaneous.

## Royal Institution of Great Britain.

Among the "probable arrangements" for the Friday evening meetings before Easter, 1886, are the following:—Friday, Feb. 5th, Mr. T. Prigden Teale, M.A., F.R.C.S., on "The Principles of Domestic Fire-place Construction." Friday, March 12th, Mr. Reginald Stuart Poole, LL.D., on "The Discovery of the Bible in the Cities of Egypt." Friday, March 19th, Mr. W. H. M. Christie, M.A., F.R.S., Astronomer Royal, on "Universal Time." Friday, April 9th, Mr. William Anderson, M. Inst. C.E., on "New Applications of the Mechanical Properties of Cork to the Arts." The other lecture arrangements include the following:—Mr. Reginald Stuart Poole, LL.D., of the British Museum. Three lectures on Naucratis: (1) Relations of the Greeks with Egypt from the Heroic Age to Ptolemaic times; (2) The Emporium of Naucratis; (3) The Egyptian Sources of Greek Art. On Tuesdays, Jan. 26, Feb. 2, 9. Prof. Charles T. Newton, C.B., LL.D., M.A. Three lectures on the Unexhibited Portion of the Greek and Roman Sculptures in the British Museum (illustrated by drawings and casts). On Tuesdays, Feb. 16, 23, March 2. The Rev. C. Taylor, D.D., Master of St. John's College, Cambridge. Two lectures on the History of Geometry: the Greeks and the Moderns. On Saturdays, Feb. 27, March 6. Professor Oliver Lodge, D.Sc. Two lectures on Fuel and Smoke. On Saturdays, April 10 and 17.

## On Christmas at Exeter.

Mr. Councilor Hems (better known, perhaps, as Mr. Harry Hems) invited a large number of poor old men and women to his customary Christmas dinner, which was served in his wood-workers' shop, on Christmas Day. Mr. Hems seems to have been characteristically energetic in administering to the enjoyment of his guests.

## Royal School of Mines.

Prof. Warington Smyth, F.R.S., in continuing his lectures in the theatre of the Geological Museum, Jernyn-street, dwelt at length upon the various means adopted for the discovery of displaced lodges. The simplest mode of determining where the continuation of the lodge lies is to assume the generalisation that the lost part of the lodge is lower on the side of the hanging wall of the dislocator, and this is practically the same rule which applies to stratified deposits referred to

in a previous lecture. To this rule, however, as in the case of beds, there are exceptions; but, after paying great attention to these exceptional cases, he found that forty-nine cases out of fifty held good. The exceptions occur where the underlie is very flat, as illustrated in the district of St. Agnes, in Cornwall, where a great number of dislocations occur, and almost invariably have the effect of heaving the lode; and there are instances where one lode has been brought to the surface two or three times; but complications of this kind may be quite unknown in another district. Heaviness and displacement may, and frequently do, result from contact with cross-courses, which form a plane down which the lode may slip, in which case it is important to know which way to work in order to fall in with the displaced lode again. Miners call these cross-courses guides, because, by following them, veins coming in contact with them may be met. Mr. Henwood, in some reliable observations, concludes that of a very large number of lodges which he examined, 22.7 per cent. were intersected by cross-courses and not heaved; the proportion heaved to the right hand 51.1 per cent., and to the left hand 26.2. Those heaved to the side of the greater angle were 63.5 per cent.; to the side of the smaller, 12.9; and the mean distance of the throw was 16.4 ft. This statement fully establishes the fact that the relation of right hand and left hand, of smaller angle and greater angle, cannot be adhered to invariably, and thus they are applicable only to a particular mine or particular district.

**Cautions to Builders.**—On Wednesday last at Stratford Petty Sessions, Mr. Joseph Elliott, builder, of 5, Haverward-road, High-street, Woodford, was summoned at the instance of the Woodford Local Board for unlawfully laying certain building materials, mortar and other things, upon the footpath in Chelmsford-road, Woodford, and allowing them to remain a longer time than necessary. Mr. Martin, the clerk to the Local Board, appeared for the prosecution. Mr. Holloway, the road surveyor to the Woodford Local Board, was sworn, and said that in consequence of receiving complaint from persons who said that they had run into mortar in Chelmsford-road he went to the road where the defendant was engaged in erecting certain houses. There he found the path completely blocked up with mortar, sand, and brick. He requested the person in charge of the operations to remove them, but the obstruction was there after that time. Mr. J. D. Hooper, the surveyor to the Local Board, said he had cautioned defendant as to obstructions of this kind, and they had remained some time after such caution; but it was all removed. Defendant admitted that he had carted sand across the path, but said it was removed as soon as possible, and never caused an obstruction for more than a couple of hours. A little mortar might have been made on the path. The Bench said this was practically plea of guilty. They should impose a fine of 40s., and 1l. 18s. 6d. costs.—*Daily Chronicle*.

**Virginia Water.**—The description of an insanitary condition of the lake of Virginia Water in our issue of December 12th, by resident on the spot, surpasses anything that should have thought possible within the Royal Park at Windsor under the immediate supervision of the Ranger and Deputy Ranger. Royal and Crown property are not subject to the local authority, as specially appointed officials are presumed to render further supervision unnecessary. But if the condition of the lake of Virginia Water is a fair example of the way these duties are discharged, the time may come for an alteration in the existing order of things. It is not to be expected that his Royal Highness Prince Christian, who holds the position of Ranger of the Forest, should inspect sewers or sewer-impregnated lakes. His duties are not expected of Princes, for like Caesar's wife, are above suspicion.

The office is a sinecure for the maintenance of princely dignity. But there are deputies who are responsible for the discharge of these duties for the protection of the health of Her Majesty and the rest of the Royal Family, as well as of the general public, who, by the sanction of the Crown, use the lake at Virginia Water as summer recreation. Royal water parties place also there, to the risk of health and life, the account given by our correspondent, only half as bad as he represents it to be. *Lancet*.



**Heating and Ventilating.**—Some of the most recent applications of the *Æolus* Water spray Company's system of heating, cooling, and ventilating, are at the following buildings: School of Science and Art, Lincoln; the convent of St. Lawrence's Sisterhood, Belper; age-green and West-green Board Schools, Tottenham; St. Barnabas Church, New Hummerstone, Leicester; Priory Chapel, College Walk, Maidstone; New Docks Offices, Bristol; town-hall, Stratford, E.; New Liberal Club, Birmingham; and the Staffordshire Bank, non-street, Birmingham.

**Rugby.**—The east window of the south aisle in Hillmorton Church, Rugby, has been filled with stained glass representing figures of our Lord as the Good Shepherd and St. Peter and John, with canopies and other ornamental detail, designed and executed by Messrs. F. Holt & Co., Warwick.

**Medieval Bricks.**—The introduction in Germany of facing bricks so marked and constructed as to be readily divided into halves and quarters has induced Herr W. Narden of Cassel to point out in the *Deutsche Bauzeitung* that the idea had already been perfected during the Middle Ages. The observations made by Herr Narden during the restoration of old brick edifices have led him to this conclusion. The economy of this method is urged by him in support of its more general adoption.

**Foreign Building Hints.**—In a recent number of *Science pour Tous*, a recipe is given for the artificial colouring of white marble or alabaster. A good blue is obtained by a solution of borax, in which indigo and azotate of soda, any red colouring matter, and nitric acid, are dissolved; red, by borate of soda, any red colouring matter, and nitric acid; black, by gutta. If marble thus treated becomes tarnished, it may easily be put to rights by drying it in a stove for one or two days.

A new varnish for iron and steel is described in *Industria e Invenções*, as being obtained by dissolving sulphur in a warm essence of turpentine, and laying it on the article to be treated with a brush. When the essence is evaporated, there remains upon the surface a light film of sulphur, which becomes permanently fixed after being exposed for some time to the flame of a spirit-lamp. The varnish is of a deep black, and very durable.—The French Consul at Baku reports the discovery of a new and valuable wood in the forests of the Caucasus. Its qualities are, great beauty of colour, and property of hardening in the air, and never decaying, while it weighs three times heavier than oak, and is very easy to work. It will probably be in great request with cabinet-makers, turners, and coachbuilders, and its price is 15 francs the quintal, or about 12s. the hundredweight.

**Reforms Needed at Kew.**—It is not unlikely that in the course of the next few years we will be considerably modified by the governing powers. There can be no objection to the distinctions that are maintained by certain palaces, and whether a tract of ground called "garden," or "park," or "arborescence," of little consequence, provided the public have access thereto at reasonable times and seasons, and good keeping makes good work for the student and good entertainment for the pleasure-seeker. As to what shall be understood by "reasonable times," there will be differences of opinion. It may safely be predicted that the day is not far distant when the gardens will be opened at an earlier hour than at present, and that some gates now kept locked will be thrown open. But the new Director, and the Government to whom he is responsible, will have to maintain a firm stand against the petition of the residents of the district and the local papers in which their special interests are protected,—the doctrine that, by reason of the presence of the residents, the gardens are the property of the public at large. An occasional outbreak of clamour, backed by the abuse of the local press, has to be endured by the Director of the gardens, and Sir J. D. Hooker has shown how unreasonable demands should be resisted, and the claims of science made to harmonize with the growing desire of the public for the free enjoyment of park and garden scenery. It is, we think, doubtful if the plant-houses could be opened at an earlier hour than at present because of the peculiarities of the daily work; but there can be no great difficulty in opening the gates at ten instead of twelve on week-days, and an outlet to the Old Deer Park would be a boon of great value in times of general holiday.—*Gardeners' Magazine*.

PRICES CURRENT OF MATERIALS.

TIMBER.		£.	s.	d.	£.	s.	d.
Greenheart, B.G.	ton	6	10	0	7	10	0
Teak, E.I.	load	12	10	0	15	10	0
Sequoia, U.S.	R. cube	0	2	6	0	2	6
Ash, Canada	load	3	0	0	5	0	0
Birch	load	3	0	0	4	10	0
Elm	load	3	10	0	5	0	0
Fr. Dantais, &c.	load	1	10	0	4	10	0
Oak	load	3	0	0	5	0	0
Canada	load	8	0	0	7	0	0
Pine, Canada red	load	3	0	0	4	0	0
yellow	load	3	15	0	5	0	0
Lath, Dantais	fathom	4	10	0	6	0	0
St. Petersburg	load	5	0	0	7	0	0
Waincoat, Kips	log	2	15	0	4	10	0
Odessa	load	3	12	6	3	15	0
Deals, Finland, 2nd and 1st.	std. 100	7	10	0	8	10	0
4th and 3rd	std.	6	0	0	7	10	0
Riga	load	6	0	0	8	0	0
St. Petersburg, 1st yel.	load	9	15	0	10	0	0
2nd	load	7	0	0	8	15	0
white	load	8	0	0	10	15	0
Sweden	load	6	0	0	8	15	0
White Sea	load	8	0	0	15	0	0
Canada, Pine 1st	load	17	0	0	31	10	0
2nd	load	13	0	0	17	10	0
3rd, &c.	load	7	0	0	10	0	0
Spruce 1st	load	9	0	0	12	0	0
3rd and 2nd	load	8	0	0	8	0	0
New Brunswick, &c.	load	5	0	0	7	0	0
Baltics, all kinds	load	4	0	0	12	0	0
Flooring Boards, sq. 1 in.—Free	load	0	9	0	0	13	0
pared, first	load	0	7	8	0	8	6
Second	load	0	5	0	0	7	4
Other qualities	load	0	0	3	0	4	0
Cedar, Cuba	foot	0	0	3	0	4	0
Honduras, &c.	load	0	0	3	0	4	0
Australia	load	0	0	3	0	3	4
Mahogany, Cuba	load	0	0	5	0	4	0
St. Domingo cargo av.	load	0	0	5	0	7	4
Mexican	load	0	0	4	0	5	6
Tobacco cargo av.	load	0	0	4	0	5	6
Honduras cargo av.	load	0	0	4	0	5	6
Maple, Bird's eye	load	0	0	3	0	6	6
Rose, Rio	load	7	0	0	18	0	0
Bahia	load	5	0	0	14	0	0
Box, Turin	load	0	0	18	0	0	0
Satin, St. Domingo	ft.	0	0	0	0	0	0
Porto Rico	load	0	0	0	0	0	0
Walnut, Italian	load	0	0	4	0	5	6

METALS.		£.	s.	d.	£.	s.	d.
Lead—Pig in Scotland	ton	2	2	6	0	0	0
Bar, Welsh, in London	ton	4	15	0	5	0	0
" in Wales	ton	4	7	6	4	10	0
" Staffordshire, London	ton	6	15	0	7	0	0
Sheets, single, in London	ton	7	10	0	0	0	0
Hoops	ton	6	5	0	7	5	0
Nail-roads	ton	5	15	0	7	0	0
Copper	ton	43	10	0	44	10	0
British, cke. and ingt.	ton	43	10	0	44	10	0
Best selected	ton	45	0	0	46	0	0
Sheets, strong	ton	52	0	0	0	0	0
" India	ton	48	0	0	48	0	0
Australian, fine cash.	ton	0	0	0	0	0	0
Chili, bars	ton	41	0	0	41	5	0
Yellow Metal	lb.	0	0	4	0	0	4

METALS (continued).		£.	s.	d.	£.	s.	d.
Lead—Pig, Spanish	ton	12	3	6	12	5	0
English, com. brands	ton	12	10	0	12	12	6
Swedish	ton	15	2	6	15	5	0
Silesian, special	ton	14	7	6	15	0	0
Ordinary brands	ton	14	7	6	15	0	0
Try	ton	96	0	0	0	0	0
Banca	ton	94	0	0	0	0	0
Billiton	ton	93	2	6	93	12	6
Straits	ton	93	5	0	93	15	0
Australian	ton	97	0	0	0	0	0
English ingots	ton	0	0	0	0	0	0
Zinc	ton	0	0	0	0	0	0
English sheet	ton	20	0	0	20	5	0

OILS.		£.	s.	d.	£.	s.	d.
Linseed	ton	30	0	0	30	0	0
Cocunut, Cochian	ton	26	0	0	26	0	0
Ceylon	ton	0	0	0	0	0	0
Copra	ton	29	10	0	29	10	0
Palm, Lagos	ton	25	0	0	25	0	0
Palm-nut Kernel	ton	23	10	0	23	10	0
Rapeseed, English pale	ton	21	10	0	21	10	0
" brown	ton	17	0	0	17	0	0
Cottonseed, refined	ton	25	0	0	25	0	0
Lubricating, U.S.	ton	4	0	0	4	0	0
Refined	ton	1	8	9	1	7	0
TURPENTINE	ton	0	12	0	0	12	0
American, in cks.	cwt.	1	8	9	1	7	0
Tar—Stockholm	brl.	0	19	0	0	19	0
Archangel	brl.	0	12	0	0	12	0

TENDERS.

BRISTOL.—For alterations and additions to premises, St. Augustine's-place, Bristol, for Messrs. J. Smith & Son. Mr. Henry Williams, Clare-street, architect. Quantities supplied by Mr. A. Barratt, Somerset-street, Corn-street.		£.	s.	d.
Ridewood & Wright	21,429	0	0	0
H. A. Forse	1,400	0	0	0
Walters & Son	1,390	0	0	0
J. Perkins	1,380	0	0	0
Eastbrook & Sons	1,350	0	0	0
G. Humphreys	1,331	0	0	0
T. Brown	1,320	0	0	0
J. Baxton	1,295	0	0	0
Charley & Son	1,254	0	0	0
A. J. Beaven	1,250	0	0	0
T. Thomas	1,247	10	0	0
T. R. Lewis	1,235	0	0	0
J. Clark	1,227	0	0	0
W. Church	1,147	0	0	0
R. Wilkins & Son	1,146	0	0	0
J. James	1,198	0	0	0
S. Turner	1,043	0	0	0
J. Wilkins (accepted)	1,414	0	0	0
[All of Bristol.]				

BRONDESBURY.—For dwelling house, in Salisbury-road, Brondesbury, for Mr. W. H. Coles. Quantities supplied:—		£.	s.	d.
Keyes, Head, & Co.	23,349	0	0	0
J. Blyth	2,829	0	0	0
T. Boyce	2,983	0	0	0
Higgs & Hill	2,894	0	0	0
G. H. & A. Bywaters	2,883	0	0	0
A. Bush	2,832	0	0	0
H. & E. Lea (accepted)	2,793	0	0	0

COMPETITIONS, CONTRACTS, & PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

COMPETITIONS.

Nature of Work.	By whom required.	Premium.	Designs to be delivered.	Page.
New Work to Buildings	East London Hospital	Not stated	March 1st	i.

CONTRACTS.

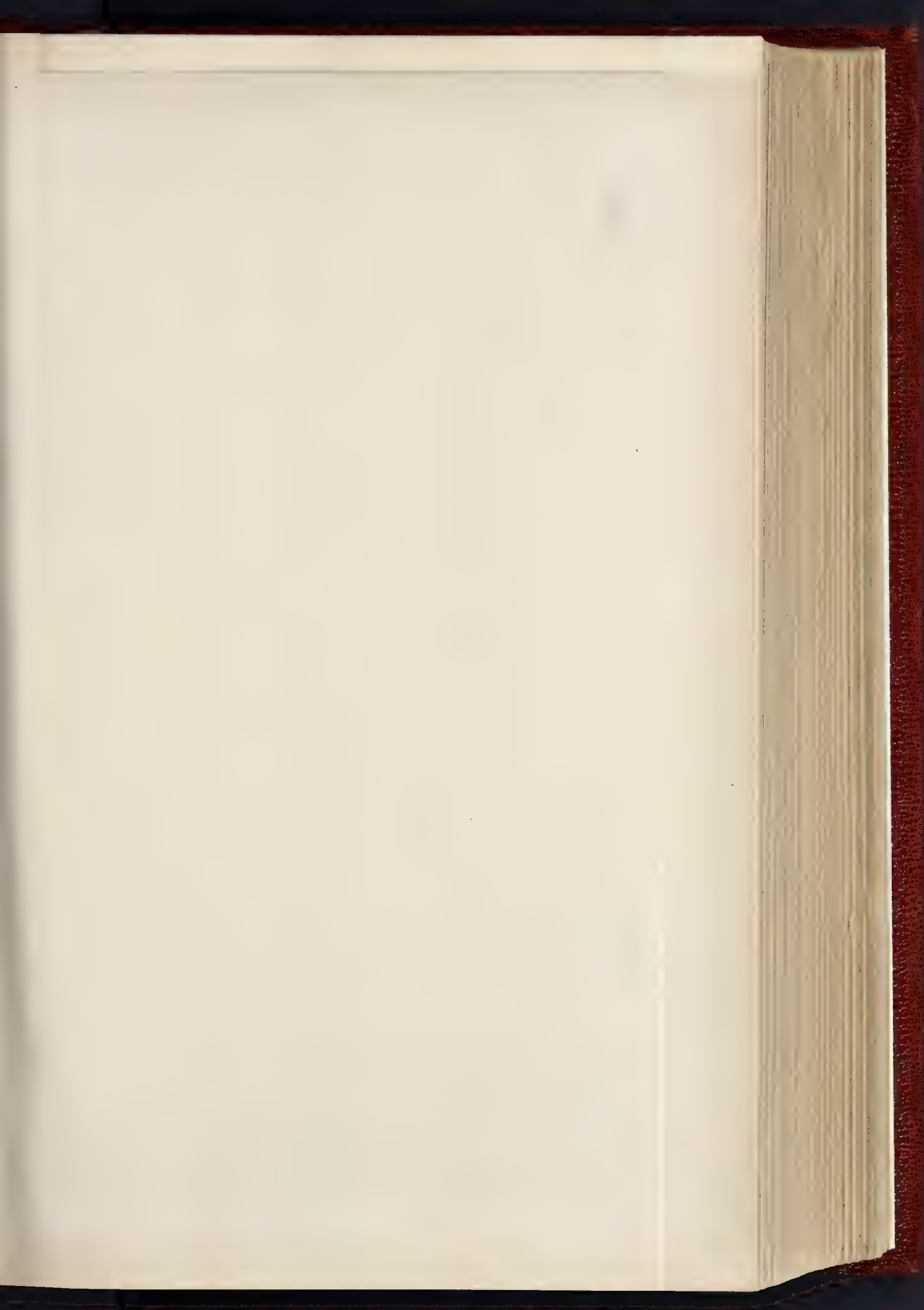
Nature of Work, or Materials.	By whom required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Alterations, &c., King's Hotel, Margate	The Proprietors	A. Drew	Jan. 6th	xxiii.
Granite Spalls	Fulham Board of Wks.	Official	do.	ii.
Completing Four Large Shops, Harlesden	Fulham Union	T. F. Shaw	Jan. 7th	xxiii.
Roadmaking, Excavating, &c.	Met. Asylums Board	Pennington & Bridgen	Jan. 8th	ii.
Stores and Materials	Folkstone Corporation	A. W. Conquest	Jan. 9th	xxiii.
New Street Works	Liverpool Corporation	Official	do.	xxiii.
Brick Sewer	St. Giles, Camberwell	do.	Jan. 11th	xxiii.
Water Supply Works	Shepton Mallet R.S.A.	do.	do.	xxiii.
Kerbing, Tar-paving, &c.	Tottenham Local Board	De Pape	Jan. 12th	ii.
Removal of Dust, Dirt, &c.	Lewisham Board of Wks.	Official	do.	xxiii.
Alterations, Additions, and Repairs	Crown Estate Com.	do.	Jan. 13th	xxiii.
Play-room and Repairs to School	Lambeth Guardians	T. W. Aldwinckle	do.	xxiii.
Erection of Urinals	Guardians of St. Mary, Islington	do.	do.	xxiii.
Wood Paving	Fulham Board of Wks.	W. Smith	Jan. 14th	xxiii.
Main Drainage Works	do.	Official	do.	ii.
Sewage Works	Finchley Local Board	G. W. Brumell	Jan. 15th	xxiii.
Erection of New National Schools at Felpham	Dorking Local Board	Smith & Austin	Jan. 15th	ii.
Schools	Gordon M. Hills	do.	do.	xxiii.
Works and Materials	Northfleet School Bd.	Official	do.	xxiii.
Wharf, New Dock Wall and Sewage Works	Vandsworth Bd. of Wks.	G. D. Bellamy	Jan. 19th	xxiii.
Painting Station at York	Plymouth U.S.A.	H. Copperthwaite	Jan. 23rd	xxiii.
Extension of School, &c.	North Eastern Railway	A. & C. Harston	Jan. 27th	ii.
New Lunatic Asylum	Met. Asylums Board	B. S. Jacobs	Jan. 29th	ii.
Boundary Walls, Abutments, &c., for Bridge	Derby Corporation	H. Bancroft	Jan. 30th	xxiii.
Ironwork for Bridge	Colne and Marsden L. B.	do.	Feb. 2nd	ii.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page.
Assistant Surveyors	Civil Service Com.	Not stated	Jan. 5th	xviii.
Building Inspector	Willesden Local Board	2l. 10s. per week	do.	xviii.



11. BILLITER SQUARE, LONDON, E.C.







# The Builder.

Vol. L. No. 2260.

SATURDAY, JANUARY 9, 1892.

## ILLUSTRATIONS.

Liverpool Cathedral Competition: View of West Front.—Design by Mr. James Brooks, Architect .....	80-85
Liverpool Cathedral Competition: Interior View looking West.—Design by Messrs. Bodley & Garner, Architects.....	85-89
Liverpool Cathedral Competition: View from the North-East.—Design by Mr. Wm. Emerson, Architect .....	92-93
New English Church, Berlin: View from South-East; West Elevation.—Herr J. C. Raschdorff, Architect .....	96, 97
Restorations of Solomon's Temple.—Illustrating Paper read at Architectural Association Meeting by Mr. E. C. Robins, Architect .....	100, 101

## CONTENTS.

The Liverpool Cathedral Scheme.....	69	New English Church, Berlin .....	78	Non-acceptance of Lowest Tender .....	107
American Plumbing: Sanitary Specialities. By an American Architect (Illustrated) .....	70	"Restorations of Solomon's Temple".....	78	The London Pavilion Music-hall .....	107
Protection from Lightning .....	73	The Charterhouse .....	78	Timber Measurements .....	107
Two Drowned London Churches: St. Thomas in the Walls and Holy Trinity, Minorities .....	73	The Royal Academy: Admissions to the Architectural School ..	78	Church Building News .....	108
Notes .....	74	The Temple of Solomon .....	103	The Student's Column: Foundations.—II. ....	108
The Two Loan Exhibitions .....	75	The Pollution of Water Supplies.....	105	Books: Bishop's Architecture, especially in Relation to our Parish Churches; Holden's Easements and Rights of Light; Winters' Queen Eleanor Memorial; Richter's Über Antike Stenometrischen .....	109
The Right to an Extraordinary Amount of Light.....	77	The Albert Dock .....	105	Recent Patents .....	109
Antiquities of Malvera .....	77	London Drainage: Medical Officers and Engineers .....	106	Meetings .....	110
Competitions .....	77	Two Egyptian Chairs .....	107	Miscellaneous .....	110
Designs for the Liverpool Cathedral .....	78	The Firth Bridge .....	107		
		Quantities .....	107		
		Ownership of Drawings and Specifications .....	107		

### The Liverpool Cathedral Scheme.



THE collection of drawings which is now on view in Liverpool will, we think, satisfy the most previously sceptical persons that there are great possibilities in the site which has been selected, and which

we have always said was the best, taking architectural and practical considerations together, among such of the possible sites as have been suggested and discussed. Two sites have been suggested which would have been superior in an architectural point of view. One was that of a river site on the quays; an idea which architecturally was calculated to excite the wildest enthusiasm, for a building of the highest class would have produced an effect, in such a position, almost unrivalled. Practically, it would have been rather out of centre; and it appears that the space was not to be had, being wanted for other purposes. The other suggestion we refer to was that of Mr. Seddon, which was strongly supported by some gentlemen in Liverpool who took a warm interest in the subject, that the new cathedral should be placed with its western façade on the line of street called Commutation-row, rather above and facing St. George's Hall. This idea was illustrated in our pages about a year ago, by a drawing specially made by Mr. Brewer (*Builder*, Feb. 14, 1885), showing the façade of Notre Dame at Paris, with spires added, as it would appear in that position. That this site would be architecturally superior to the one selected there is no doubt. The cathedral would have been less cramped, and would not have interfered with the view of St. George's Hall from any point. It is all built over, however, and we presume that the cost of acquiring the property and paying compensation would be very considerable. The idea, however, may still be worth keeping in mind.

The site selected (or at present to be regarded as selected), west of St. George's Hall, and now occupied by a church of little architectural interest, and its church-yard, is somewhat cramped, and in shape and proportion it is not very well suited to the usual Mediæval type of cathedral plan. But it is what may be called a rather suggestive site. Its very shape, rather wide than long, appears to suggest a departure from precedent in planning, or, at least, from the precedent usually accepted in modern English churches, that of the long and narrow Mediæval nave. Such a departure we should

regard, if fitly carried out, as a distinct gain. We have no wish to see a nineteenth-century cathedral built as a mere reproduction of the main features of a thirteenth or fourteenth century one. The temptation to take this course, considering how the Mediæval cathedral is endeared to us by association, is no doubt very great; but modern church worship, unless from the point of view of a small section of Churchmen who are as archaeological in their religion as in everything else, is essentially different from Mediæval church worship; and it should be the business of a modern cathedral architect to produce a fine building which may at the same time express the feeling and the requirements of modern worship. The site selected for the Liverpool Cathedral gives him a natural lead in this direction, since it is too short for the Mediæval type in its full proportions. The great fall of the ground towards the west is another of the suggestive incidents in the site; it creates a difficulty in some respects, but it almost compels a bold and effective treatment of the western façade. The principal drawback is the too close proximity into which the east end of the cathedral will necessarily be brought to St. George's Hall, and the stopping out, to a great extent, of the view of the west flank of that building. If we remember right, the opinion was advanced by some one, in the multitude of discussions which have taken place on the subject, that the obscuring of the said west flank would be no loss; but that shows a very inadequate appreciation of Elmes's building. St. George's Hall is, of course, a building most unsuitably designed and planned for its purpose; its value now is mainly as a modern treatment of Greek materials; but in this respect the western colonnade, with its square columns and its screen,—Greek in detail, Egyptian in arrangement,—is one of the most original and effective portions of the design. It will not be entirely shut out by any of the cathedral designs submitted; but its continuity and perspective will be much abbreviated.

Considering all these conditions: the squareness of the site, the proximity of a great modern Greek building, the Classic tendencies of the principal surrounding buildings, our own idea, as we have before indicated, would have been a design based on the suggestions of Wren's first design for St. Paul's, with a great dome and a wide central area, approached by a *pro-naos* rather than nave; the dome space itself forming the *naos*, or the chief part of it. The opportunity of realising Wren's fine conception, never (to his grief) carried out, with finer and purer treatment in detail than Wren's pseudo-classicism can be accounted, struck us as what might be regarded as a

godsend to inspired architects, anxious for a new path to fame. *Dis aliter visum*; the selected competitors think otherwise. Messrs. Bodley & Garner give, as a distinct reason against a Classic treatment, the consideration that a Classic cathedral would not detach itself sufficiently from its surroundings. "There is great danger," they say, "that a group of buildings, arranged as they must be very closely, and designed in the same style, should be confused together. The cathedral must, of course, be the most important in every way, but it would not occupy the place of honour, which is already taken by St. George's Hall; and we think that it would be difficult, if not impossible, to prevent the latter appearing a part of the former. Of course the group would, architecturally, be very fine." Surely the admission in the last sentence is important enough to outweigh the previous considerations; but the argument is altogether a curious instance of the difference between architecture now and architecture when the Mediæval cathedrals were built. Then, the cathedral was naturally in the same style as any buildings adjoining it, and there was no fear about their being "confused together." It must be admitted, however, that in the present state of ecclesiastical feeling it is probable that cathedral architecture founded on Classic models would have little chance of acceptance, and one cannot expect competitors to overlook that factor in the case.

The three designs by the architects invited to compete, Messrs. Bodley & Garner, Mr. Brooks, and Mr. Emerson, have each distinct individuality in the way in which the building is treated. Mr. Brooks selects the style of the latter portion of the fourteenth century, as illustrated in such buildings as Beverley, Fountains, Lincoln, &c., both as free from the more elaborate detail which might be injuriously affected by the atmosphere of a city like Liverpool, and also because the more severe detail of this comparatively Early Gothic style harmonises better with the lines of the Classic architecture adjoining: which is perfectly true. The plan is the Mediæval plan pure and simple, with the square crossing at the intersection of nave and transepts, only that the choir is shorter than the typical Mediæval choir (which is, of course, quite in keeping with the purposes of a modern cathedral), and the nave is short for its height and the scale of the building; but this is inevitable from the conditions of the site. The principal external effect is concentrated on the west end, where are two lofty towers with spires, set out north and south beyond the line of the aisles, and having between them a great flight of steps leading into three deeply-recessed and cavernous porches, Continental rather than



English in character. This is a grand and monumental piece of architectural composition, the whole width of the towers flanking the steps and forming an *appui* for the triple porch: one bay of the nave arcade is sacrificed for it, but the effect is worth the sacrifice, and the alternative design showing a side access by flights of steps entered through the towers, and giving an additional length to the nave within, is far inferior in effect, and not to be thought of in comparison with the other treatment. The nave piers are very lofty; the main line of the piers runs right through the ground-floor arcade to the springing of the triforium arcade, which thus becomes in reality the main arcade, giving a great look of height to the nave; at the same time the piers are gripped and steadied in the centre of their height by the lower tiers of arches and the floor of the triforium, which is not a mere arcaded passage, but a great gallery as large and lofty as the ground-floor aisles. The centre external feature is a lantern only, an octagon with turrets at the angles, and entirely subordinate to the western towers. The eastern termination is a semicircular apse, which, as Mr. Brooks says, "gets over the difficulty which might arise from the awkward line which might be produced by a square-ended building in close proximity, but not at right angles with it"; and we may add that, the northern termination of St. George's Hall being semicircular, we get here the interesting incident of the juxtaposition of the Gothic and the Classic apse. The general style of the design is such as we are all familiar with already in Mr. Brooks's work; broad masses of masonry in the walls and buttresses; simple and severe treatment in the windows and other details; an entire absence of anything like trickery or mere prettiness; these are the qualities we all know in Mr. Brooks's churches, and they are equally manifest in this, the largest design he has ever made.

These characteristics will be apparent in the perspective view of the exterior, which we publish this week; but we are not professing now to do more than give a general idea of the characteristics of the three designs, reserving more detailed comments for future numbers, when we shall give further illustrations of each design. Messrs. Bodley & Garner adopt a rather later Gothic style, that of the Early Decorated period, with geometrical tracery. Their design is pure English Gothic, and remarkable for grace and elegance externally. In the plan they have adopted the fine expedient which distinguishes Ely Cathedral, of the expanded octagonal space at the crossing; but, in place of being content with a mere lantern over it, they have raised the centre feature into a great octagonal tower in two stages, crowned by a spire, the whole rising to a height of about 450 ft. The west end has two towers with spires, about 270 ft. in height, the idea being to repeat on a larger scale the composition still existing at Lichfield, and which was intended and perhaps originally carried out in other English cathedrals. The internal arcades are of great mass and solidity, as will be evident from the view of the interior which we give in this number; the authors observing in their report that in a modern cathedral the question of the convenience of seeing and hearing in the side aisles need not be taken into account, as the centre aisle alone is likely to be used for actual worshippers, the side aisles being for passage and for the reception of monuments. They "think it desirable to insist on the absolute necessity of a very large space for this purpose, as the number of memorials becomes so very greatly increased in the course of ages that, unless there is very considerable room left, the church becomes greatly encumbered and disfigured." The authors consider that the building approaches too closely to St. George's Hall, and wish that the site should be somewhat extended westward; or they suggest that more space may be gained by reducing the scale of the building, without alteration of the design. To our thinking, this might be done even with improvement to the design; for the fact is the scale of the parts is rather over-large, and the

design, in the geometrical elevations, does not convey the idea of its actual size. With the exception of the very original and bold treatment of the central feature, this design is an orthodox English Gothic one of very pure type, and if this be the object it could not be more completely carried out. Mr. Bodley has in former times designed churches, like that at Tuebrook, near Liverpool, of which it might be said that when the hand of time has passed over them, it might become very difficult to say whether they were genuine Mediaeval work or modern reproductions, so completely has the spirit of Gothic been mastered in them.

Mr. Emerson's elaborate and masterly report is a complete essay on the architectural function of the cathedral, illustrated by a number of small views of various cathedrals, and of cities with their cathedrals, showing how the great building takes its place in relation to the whole aggregation. To this we shall hope to do full justice at greater leisure. Here we can only mention generally that Mr. Emerson considers that the spirit of modern worship demands an area as unbroken as possible, and every facility for congregational worship. He adopts a plan based on the Mediaeval division into centre and side aisles, nave and choir, but employs a rather short nave and a very large octagonal centre space at the crossing, covered by a large dome. In regard to the dome, Mr. Emerson remarks that the cathedral of a great city requires something more massive than a tower and spire to assert itself in the general view, and illustrates his point by views of the domes of St. Peter's and St. Paul's with a portion of the city adjoining, and a general view of Florence showing the mass of the dome as the central and conspicuous object. The argument may be pressed too far, but there is certainly something in it, and as to the suitability of a dome as the central feature for this special site, we have already expressed ourselves to the same effect. In regard to style, Mr. Emerson adopts, as he says, an early phase of Gothic, bordering on Romanesque; but, as will be seen from the view we give, it is Gothic "with a difference." There are reminiscences of India about it, with which country the author of the design has been much connected architecturally. The treatment of the west entrance, however, is derived from Peterborough, and certainly no finer model could be taken. The great porches are flanked by western towers, which Mr. Emerson, like Mr. Brooks, sets out beyond the line of the aisles, to give greater breadth to the front. In spite of the Gothic or quasi-Gothic detail, the main lines of the design, except the towers, are rather Classic than Gothic, and partly suggest a regret that the whole building was not frankly Classic. This, however, is only a passing impression, which may be modified on the more careful consideration which the boldness and originality of the design certainly call for.

We have confined ourselves purposely, as we have implied already, to giving a general idea of the *motif* of each design, with a typical illustration of each; reserving more detailed consideration of them. Their authors will not quarrel with us for thinking that their labour of months is not to be fairly dissected, criticised, and disposed of in a few hours.

**The Proposed 'School of Forestry in Edinburgh.**—The Report of the Select Committee on Forestry states that it was found impossible to conclude investigations during the past session, and recommends that a committee on the subject should be appointed in the next session of the proposed Forest School, Colonel Pearson, in examination before the committee, expressed himself in favour of a Chair of Forestry at the Edinburgh University, but he further stated that he had no actual faith in lectures in the school unless illustrated by practical instruction. Regarding the extent or scope of the school, Mr. Thielton Dyer, in reply to Sir Edmund Lechmere, said he would make the school applicable to India and the colonies as well as to our own country.

## AMERICAN PLUMBING: SANITARY SPECIALITIES.\*

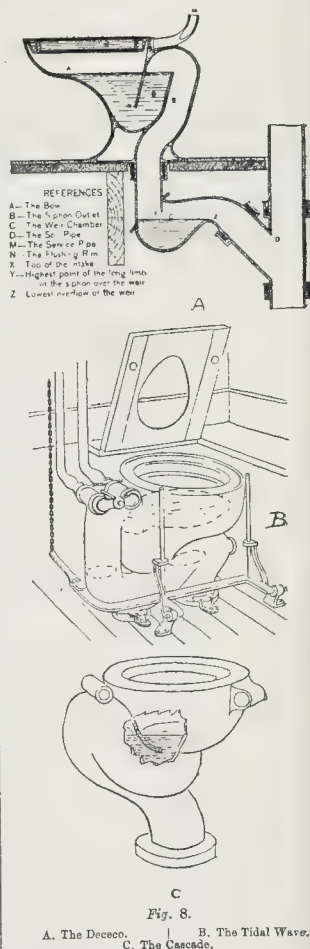
BY AN AMERICAN ARCHITECT.

### Plumbing Fixtures.

**SINKS**, bath-tubs, water-closets, wash-basins, &c., are called with us plumbing fixtures.

Water-closets are generally a copy or at least of the same class as closets in the old country (England). The Bramah, the Jennings, the Brighton, and hopper closets have their counterpart in this country, varying only in slight and unimportant details. Closets in which the discharge is caused by syphon action are novelties which the United States have produced.

The Dececo was invented by Geo. E. Waring, jun. The Tidal Wave and Cascade



A. The Dececo. B. The Tidal Wave. C. The Cascade.

were invented by J. E. Boyle. They are emptied by syphon-action. The Dececo (fig. 8, A) has a very sharp water seal at the bottom of the bowl. The closet is set over a weir placed beneath the floor. The first discharge fills the weir to the partition, when the outlet forms the long arm of a syphon. In this way the contents of the bowl are syphoned every time the bowl is used. From its shape it is necessary that this closet should be filled to within a short distance of the top of the bowl before the necessary syphon-action empties the closet can take place.

The weir-chamber below the floor is vented

\* Continued from p. 6.

much like the objectionable English D-trap in form. There is no opportunity for a vent-pipe in the trap of the Dececo, as it would prevent the syphon-action. This closet is, however, neat and cleanly, and is manufactured in one piece of earthenware.

The Tidal Wave has a double trap. An air-pipe runs from the space between the traps, up and through the tanks that supplies the closet with water. This air-pipe is governed by a valve which opens only when acted on by a pressure from below. In this way the vent-pipe does not interfere with the formation of the vacuum necessary before the closet could be operated by syphon-action. When two-thirds of the service-box has run off, the vacuum is broken, and the remaining third of the water fills the bowl, and leaves it in proper form to be again discharged by the syphon. The bowl (see fig. 8, B) and its double traps are formed

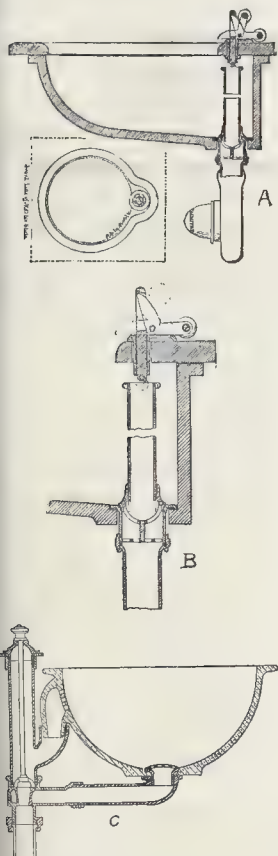


Fig. 9.

A. and B. The Sanitas.  
C. J. L. Mott's waste and overflow.

in one piece of earthenware. The lower trap is ventilated, or has a place for connexion with a vent-pipe at the usual place. The closet must be supplied from one of Boyle's patent tanks or cisterns.

The Cascade Closet (fig. 8, C) is a modified form of the tidal-wave closet. The outlet is directly beneath the centre of the bowl. The closet does not require as much space, and can be set so as to face in any direction.

In practice, it is found to be an excellent form of closet. This closet requires a trap beneath the floor, and the joint between it and the closet must be absolutely tight, or the closet will not operate.

It is fast becoming a common practice in this country to dispense with all wooden paneling, boxing, and casing around water-closets, bath-tubs, and wash-basins.

The water-closet seat rests on brass, nickel plated, or iron legs, leaving the closet visible, and allowing no concealed or dirty places to exist. In the best work the floors and sides of the bath-rooms are cased with glazed tile; and the room is kept warm by the furnace, hot-water, or steam heating apparatus. Bath tubs are put on legs when made of iron or porcelain, and make a sanitary tub.

Bath tubs in the United States vary little from bath tubs in England.

The market is supplied with tubs made in sheet copper tinned, iron (plain, painted, zinc coated, and enamelled), and in solid porcelain. The copper tubs, being the cheapest, are the most generally used.

They come tacked into a wooden form or box. This kind of closet requires a wooden casing to make it presentable.

The overflow runs into the waste-pipe on the tub side of the trap. As a sediment collects in this concealed overflow, a standing overflow is now used sometimes, similar to the overflow shown in the "Sanitas" wash-basin (fig. 9, A and B). Baths are invariably supplied with hot and cold water.

Wash-basins are simple bowls, the overflow connecting with the waste-pipe just above or between the bowl and the trap. There are numerous patent overflow and waste pipes, but

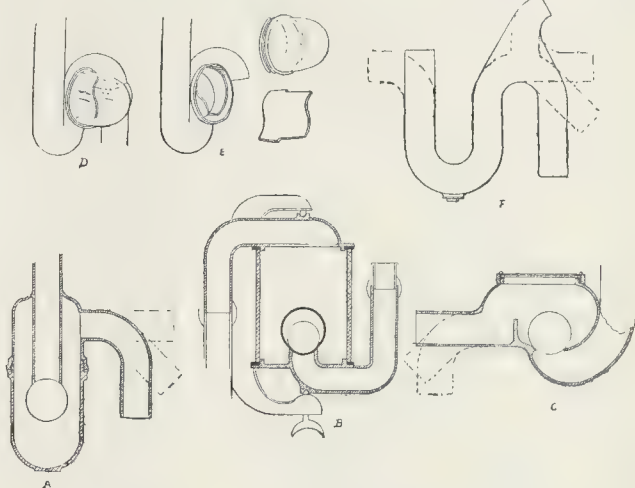


Fig. 10.

A. Bower's trap.  
B. Benner's trap.  
C. Cadell's trap.  
D. Sanitas trap.

E. Sanitas, with cup and separator detached.  
F. The common O-trap, with vent attached. The dotted lines show the different forms in which it may be obtained.

they have been but little used in practice. I illustrate two of the most simple and best patented devices which are finding their way into use (see fig. 9).

The Sanitas basin (fig. 9, A and B) has a standing overflow which forms the plug for the waste-pipe of the basin. By this contrivance the concealed overflow, as well as the common plug with its dirty chain, are removed. The plug or overflow can be easily removed and cleaned. It is raised or lowered by the small lever shown in the detail cut. The J. L. Mott basin illustrated (fig. 9, C) also has its overflow through the plug, but in getting rid of the chain, a part of the waste-pipe and the overflow are left to collect sediment. There is little opportunity of cleaning them as they are concealed.

The same firm manufacture an oval basin designed to allow greater freedom in the use of the arms in washing the face and neck.

Kitchen Sinks are used of iron (plain, painted, galvanized, and enamelled), steel, and porcelain. Zinc-coated, or galvanized iron as it is called, is the kind most commonly used in this country. They vary in size from 12½ in. by 16½ in. to 20 in. by 48 in. Solid porcelain sinks are used in the fine houses, but are too costly for houses of moderate price.

Hotels and large residences have or use grease-traps beneath the kitchen sink. These traps are put in beneath the sink to catch the grease from the kitchen utensils and dishes and prevent it from passing into the sewerage system. It is liable, on reaching the cold pipes, to congeal and give considerable trouble. The majority of them are merely large catch-basins, but Tucker's grease-trap is surrounded by a cold compartment, so the fatty matter will be quickly cooled and deposited. When full, the compartment can be lifted out and the grease removed. Commonly the simple O-trap is used.

Pantry Sinks are commonly made of planished copper, but in fine work solid porcelain is sometimes used. From the danger of breakage it is questionable if the copper sink is not the best for the purpose, although the porcelain ones are the most easily cleaned and the most pleasing to the eyes.

Urinals vary little from those used in England. Lipped urinals are the most common as well as the most desirable form. The most desirable method of flushing them is from a tilting tank, which empties its contents every time it fills. The length of time it takes to fill is governed by the supply-cock. It can be made to empty once every hour or once every day. Urinals are rarely used in private houses.

Closets, protected by porcelain safes, or so arranged that all the wood-work can be lifted from the bowl, are used in dwellings in the place of urinals. Urinals proper can only be found (with a few exceptions) in hotels and railway stations. In them a constant stream of water is kept running.

Tanks or Cisterns.—The plumbing regulations in a majority of the American cities require the use of separate tanks to supply water to flush the closet. This is a sanitary regulation to prevent the direct connexion between the water-supply main and the closet. Water has been known to have been drawn from the closet at a faucet opened below. There are tilting and syphon tanks, lever, plug, and service-box tanks, waste-preventing plugs, and service-boxes; in fact, hundreds of tanks differing slightly from each other, about the same kind and style as in England. They are manufactured of iron, lead (sheet and cast), and copper. Wooden lead-lined tanks have less resonance, and thus make less noise when water is discharged from them than do iron tanks. For this reason they are again coming into use after having been totally abolished for iron tanks.

Space does not allow for illustration and description of the different varieties of tank;





suffice it to say, that a before-and-after wash-trap is usually the kind adopted. The before-wash moistens the sides of the bowl, and prevents the adhesion of fecal matter. The after-wash carries everything through the trap into the sewer. The before-wash is produced when the seat is pressed down, and the after-wash is brought into play when the seat is relieved of pressure.

**Traps.**—Between water-closets and the soil-pipe, 4 in. or 3½ in. **S** or **V** traps are invariably used in the United States. The trap is porcelain, and forms a part of the closet in a large number of cases. When made in connexion with the closet, it sets above the floor.

The traps placed beneath closets are like the illustration (fig. 5 C, p. 5 ante). Under sinks, bath tubs and wash-basins, and laundry tubs, 1½ in. or 2 in. **S** or **V** are usually used (see fig. 10, F). Plumbing regulations require these traps to be ventilated. Grease-traps are rarely put under kitchen sinks, except in large public houses. A number of patent water-seal and mechanical traps are used to a greater or less extent under basins, baths, &c. I illustrate the kinds which have led or are having the most extended use.

The large English **D** and pot traps are never used in this country, as they are supposed to accumulate and retain waste matter instead of discharging it into the soil-pipe. Not many years ago it was common to place leaden **D** traps under closets. As it was a common occurrence for servants, and possibly other careless people, if the traps became in any way clogged, or if they wished to get any uncommonly large object through the trap to punch holes in them with sticks.

For this and other reasons mentioned in connexion with leaden pipe, iron traps are invariably used under closets. Small traps for wash-basins, baths, &c., are usually made of lead.

The subject of trap ventilation has been a bone of contention for some years in this country. Sanitarians a few years ago were unanimous in their advocacy of trap ventilation. It was claimed that thus trap syphonage, or the destruction of the water seal, was prevented, whether caused by vacuum, or momentum of the water, or by back-pressure of gases. This was supposed to have been an undisputed fact, and municipal plumbing regulations have invariably inserted a clause requiring trap ventilation. Mr. Geo. E. Waring, jun., and Mr. J. Pickering Putnam claim that it is not only useless, but wrong to ventilate traps. Both these have monetary interest in appliances which do not require ventilation, the sale of which is injured by the aforesaid regulations. This creates a natural doubt in the minds of those interested, unfortunately, for fear that their opinions are unknowingly biased by their pockets. E. S. Philbrick, Dr. John S. Billings, Henry C. Meyer (editor *Sanitary Engineer*), and others, assert that trap ventilation is the proper thing.

I am now carrying on an exhaustive series of experiments to determine these and other disputed questions in plumbing, under the auspices of the Museum of Hygiene, United States Navy Department.

The traps illustrated in fig. 10 are the different kinds usually used in connexion with wash-basins, bath tubs, and sinks.

The simple **S** and **V** are the kind most generally used, made of lead (fig. 10). As shown in the illustration, the vent-pipe is enlarged, so no deposit can take place in it.

The "Sanitas" trap is professedly anti-syphon. It consists of an **S** trap, with a glass compartment and separator let into the side. This trap holds quite a body of water, and the waste water has a tortuous passage in going through it (fig. 10, D and E).

The "Bower" is a mechanical valve, the ball being presumably able to resist any back pressure of gases. The ball floats. The bottom of the trap is glass, so any collection of sediment can be easily seen and removed.

The "Cudell" and "Bermor" traps both have a ball valve that takes its seat by gravity. The illustrations show their form and mechanism. They are easily taken apart, and the inside is always visible.

The tendency now is to use simple **S** traps, making them as small as the waste-pipe; in some cases smaller. The manufacturers are now making the outlets from wash-basins, bath tubs, &c., as large as the waste-pipe, so the pipes and traps will be efficiently scourged by the action of the water. This completes a running account of American methods of a house sewerage system. GLENN BROWN.

## PROTECTION FROM LIGHTNING.



ABOUT two years ago we drew attention to this subject,\* and pointed out the urgent necessity for a more general system of protection than exists in this country, and as we have reason to fear that very little improvement has taken place since that time, we are glad of the opportunity of the publication of a new edition of Mr. Anderson's work on "Lightning Conductors"† to revert to the same topic. The summer of 1884 pointed the moral which we attempted to draw in a very striking manner, for the records which Mr. Symons collected show that in the months of July, August, and September of that year no less than twenty churches, one hundred and twenty-two houses, twenty-one barns or sheds, forty-two chimneys, and eleven factories were struck by lightning in the British Isles, the damage being estimated at over 10,000l. It is somewhat surprising, and not altogether creditable, that such a state of things should exist at a time when we are congratulating ourselves upon the enormous advance that has been made in electrical science, which is undoubtedly the most striking feature in the scientific history of the last few years. Notwithstanding all this, one cannot fail to be struck with the thinly-veiled spirit of fatalism which characterises all accounts of lightning accidents which are given in the public press, showing that the public mind needs a very considerable amount of awakening on this subject. It is not too much to say that every account of damage to a building by a stroke of lightning might justifiably be followed by the words printed in large type,—"This accident might have been prevented"; and no opportunity should be lost of insisting upon this truth until its general acceptance becomes assured.

The work under notice is a very full, clear, and useful extremely interesting treatise on the subject of lightning-rods, giving the history of their invention and gradual spread, with a résumé of the scientific principles upon which their proper action depends. Since the systematic study of meteorology has been scientifically carried on, we have been able to gain a tolerably clear knowledge of the nature and formation of thunderstorms, but we are still only on the threshold of our knowledge of one of the greatest mysteries in nature, viz., the magnetism of the earth, which modern investigations show to have a very potent influence upon all terrestrial phenomena. The magnetism of the earth is constantly changing in intensity, and every now and then great magnetic storms take place, but these storms are still quite unknown; and these storms are attracting the close attention of scientists in various parts of the world, and the observed facts seem to point to a close connexion between them and the condition of the sun. Whether fuller data will show any connexion between the occurrence of a thunderstorm at one particular spot and the magnetic condition of the earth at the same place, cannot yet be decided, but it is quite possible some such connexion may be found to exist. Records have been kept at various stations showing both the hour of the day and the season of the year when thunderstorms are most frequent, and it is proved clearly that they occur chiefly during the time when moist, warm, currents of air are ascending from the ground. For instance, in south-eastern Europe thunderstorms chiefly occur in summer between noon and five p.m., whereas in Iceland they are

winter and nocturnal phenomena. It is certain that, the earth being a great storehouse of magnetic energy, the minute particles of vapour which are carried up by the ascending currents of moist air are charged with electricity, and these combine to form electrically charged cloud masses. The tendency of electricity is to accumulate on the surface of any conductor, and when thus accumulated, a charge of the opposite kind of electricity is induced on the surface of any other conductor within range, and thus the electricity of the clouds is frequently discharged between themselves. When, however, the clouds lie low, they and the earth react upon each other, the cloud being drawn down towards the earth, and the electrical density on the approaching surfaces of each increasing every moment until it becomes so great that the dielectric between them, &c., the air, is ruptured and the lightning flash occurs. The opposing electricities are endeavouring to get at one another, and if an easy path be offered to them they will take it quietly, and there will be no disruptive discharge. The true object of a lightning-conductor is to afford this easy path between the earth and the cloud.

There are two general systems adopted for the protection of buildings from lightning, that of Gay-Lussac, which is in use in France, England, and the United States, and that of Melsens, which is chiefly employed in Belgium. The former consists in the use of a small number of conductors of large sectional area, the rods towering above the topmost point of the building; the latter is on the principle of covering the building with a number of rods of small size forming a network, each rod being connected with each other and with the earth.

The French Government have instituted several inquiries into the protection of buildings from lightning, the first of which resulted in a report drawn up by Gay-Lussac in 1822, and, with few modifications, this still forms practically the basis of the whole science of lightning-rod construction. A careful abstract of this report is given in an appendix to Mr. Anderson's work. The only real point in which Gay-Lussac was in error was in his over-estimating the area of protection of a rod. He considered the protected space to be a cylinder whose radius was twice the height of the rod. Experience has shown that this must be very materially reduced, and the generally-received opinion is that the space protected would be represented by a cone whose apex is the point of the lightning-conductor, and the radius of whose base equals half the height of the rod. This space is less than that quoted in the report of the Lightning Rod Conference, when it is laid down that the radius of the base of the cone of protected space is equal to the height of the rod; but there was evident some hesitation about this recommendation, and we are of opinion that, if absolute safety is to be ensured, this rule should be altered. The best shape for the point of the terminus has been the subject of much discussion, as experiment and observation have both shown that the action of a stroke of lightning is distributed and not concentrated in one point; the modern practice is to supersede the original one terminal point by several small ones in the form of an aigrette. M. Melsens goes much further than most electricians in multiplying his terminal points. He covers his roofs with a network of wires with terminal aigrettes at every pinnacle and projection, and at several points along the ridge, all connected together, and practically forming a closed circuit. On the Hôtel de Ville at Brussels there are over 600 clusters of points. Of course, if all the wires, &c., were of copper, the cost would be very great; but M. Melsens claims that using iron wire of about 6 millimètres diameter very much cheapens the cost of protection, and we are sorry Mr. Anderson did not give some further detail on this point. Of course where cost is not an object of consideration, copper wire or tape is the best kind of conductors that can be used; but as copper is about ten times as expensive as iron, it is a costly article for use on a large number of buildings that specially need protection. Although copper is a much better conductor

\* See the *Builder*, January 29, 1883.

† Lightning Rods, their History, Nature, and Mode of Application. By R. Ward Anderson, F.R.S., F.G.S. Third edition, revised, rearranged, and enlarged. London: E. & F. N. Spon, 1885.



electricity than iron, yet as the specific heat of the two metals is approximately the same, copper of equal conductivity is heated more than iron because of its smaller mass per foot run. M. Melsens' experiments have proved more than this, for he has shown that if a powerful current of electricity be passed through wires of copper and iron one-tenth of a millimetre in diameter, the iron will stand while the copper will be fused. For this reason it is not wise to use copper of less than three-eighths of an inch in diameter; but M. Melsens uses iron wire of about a quarter of an inch in diameter with perfect safety.\* It used to be considered that prominence was the special element of danger to a building, but isolation is equally so, and the probability is that a small farm-house or barn standing by itself in a hollow, especially if the neighbourhood be damp, is specially liable to be struck. The cheapness of the Melsens system is its great recommendation, and the inventor has published details of cost which show that small buildings can be efficiently protected at a cost of about 2d. per square metre of surface, while the elaborate system adopted at the New Palais de Justice in Brussels cost only 6½d. per square metre.

Whatever system of protection be adopted, there are three points of absolute importance:—(1) That conductors should be continuous for their entire length; (2) that all prominent masses of metal in a building should be brought into connexion with the conductors; and (3) that the conductors should have ample communication with damp earth. The first condition of continuity is, perhaps, best fulfilled by using the solid copper tape which was invented some years ago, and which is made in lengths of from 200 ft. to 400 ft., according to its weight per foot. When joints are necessary, it is not sufficient that the two adjacent ends of the rod should merely touch,—which state of things has been responsible for many accidents,—but the ends should be placed in close contact for about 6 in., and, in the case of circular rods, if the contiguous ends are filed so that the surfaces in contact are square so much the better; they should then be bolted together and covered with a mass of pewter solder. The second condition of safety is to connect all prominent masses of metal used in the construction of a building with the conductor, and it would certainly be better that the connexion should be at two points. This condition was not laid down by Gay-Lussac, because iron was not largely used in buildings at his time, but if the metal in a building be not connected with the conductor it is extremely probable that even if a portion of the lightning discharge takes its proper course, part of it may leap across from the conductor to the metal and do considerable damage. The third condition of adequate earth contact is the most important of all, and has been the most neglected. It has been stated that in order to transmit to moist earth an electric current with no more resistance than it meets with in traversing an iron rod of one square centimetre sectional area, the earth contact ought to consist of an iron plate 492 yards square. Of course, these theoretically perfect conditions cannot be practically complied with, but it should always be borne in mind that the superficial area of the underground portion of the conductor should be made as large as possible, and that in dry localities some artificial means of keeping it damp should be resorted to. Several means of securing extensive contact with moist earth are described by Mr. Anderson. In towns the gas and water mains afford an excellent earth, and it is calculated that by this means the earth contact of the conductors fixed to the Hôtel de Ville at Brussels is no less than 330,000 square yards. In country districts where mains are not available the conductor should always be laid in a trench and packed round with broken coke or charcoal, and should terminate if possible in a pond or some running water. It should never be forgotten that an artificial tone tank or reservoir is not an earth at all.

Now, if the carrying out of certain well-known conditions will ensure the safety of a building

from lightning strokes,—and, apart from scientific testimony, the fact that many manufacturers are willing to guarantee the security of buildings fitted by them with lightning rods, is fairly good evidence that this is the case,—what is the cause of so many accidents occurring to buildings even when they have been furnished with rods? Simply that no systematic arrangements exist in this country for periodically inspecting and testing lightning-rods. Mr. Anderson lays great stress upon the necessity for this regular inspection, and it is impossible to insist upon it too strongly. We do not believe that any conductor which has been fixed for five years, and not inspected and tested in the meantime, would be found perfect at the present moment. The conductivity of a lightning-rod may be impaired in many ways. A lightning stroke may have passed harmlessly and yet have caused damage to the pointed terminals. In the case of iron, rust may have corroded the points. Artisans at work on the roof may have carelessly cut off the connexion with the gutter and other ironwork; new metal-work may have been introduced in such a way as to offer a readier path for the electric current than the conductor itself; alterations in the drainage of the neighbourhood may have converted a good earth into a bad one,—these and a thousand other simple accidents may have completely altered the conditions which existed at the time when the rod was first fixed, and it may often happen that these alterations cannot be discovered by mere inspection, but only by a test conducted by an experienced investigator, with the help of a galvanometer. Both the continuity of the conductor and the earth resistance should be tested, and the accurate determination of the latter is sometimes a rather complicated piece of work. What is the maximum earth resistance compatible with safety is a moot point. Mr. Anderson says that in France a resistance of 25 ohms is considered safe; but a correspondent of the *Electrician* says that we ought never to be satisfied with a higher resistance than 2 ohms in dry weather, and in most cases it would not be difficult to get a result as low as this, but the special circumstances of each individual case must be taken into account. The great point is that some competent person should be appointed by Government to test periodically the lightning conductors of all public or semi-public buildings, such as factories, workhouses, or schools, with authority to compel the proper authorities to make good any defects that may be discovered. The cases which have come under the writer's personal notice prove that the risk which the inmates of such buildings run is enormous, and it is undoubtedly increased by the fact that the buildings are supposed to be secure from danger. In most cases the fancied security could be made real at very small cost, and were such an inspector appointed, the saving both to life and property in a single year would repay a thousandfold all the expenses of the appointment. In this respect, as in many others, we should do well to take a lesson from our neighbours across the Channel. As Mr. Anderson very justly says:—"It is lamentable to think that although the periodic inspection of lightning-conductors has been admitted long ago to be a necessity in many countries on the Continent of Europe, we as yet have taken no steps whatever to realise it." May we hope that with a new Parliament some steps will be taken to alter this lamentable state of things?

**Lectures at Exeter Hall.**—We hear that the evening lectures at Exeter Hall, by Mr. Gribble, on "Science of construction," given in the Educational Section of the Young Men's Christian Association, have been so well received that the Committee have arranged with him for the delivery of two courses, advanced and elementary, on Mondays and Thursdays, from half-past seven to half-past nine, p.m. The subject for the opening lecture, on the 11th inst., is stated to be the Cannon-street Station Roof. Those who are desirous of attending such lectures should send to the secretary, Exeter Hall, London, for the syllabus.

## TWO DOOMED LONDON CHURCHES: ST. THOMAS IN THE ROLLS AND HOLY TRINITY, MINORIES.

It appears that the Bishop of London is proceeding, under the Union of Benefices Act, with a scheme of his predecessor in this See, for de-consecrating four more London churches. These are the churches of St. Olave, Jewry; St. Katharine Coleman, Fenchurch-street; St. Thomas in the Liberty of the Rolls; and Holy Trinity, Minorities, in the Liberty of the Tower. To the former two edifices and their history we have already adverted in our columns.\* The Rolls Chapel marks the site of the *Domus Conversorum* which Henry III., in 1233, gave up to the use of such Jews as embraced Christianity. But the rigorous enactments of his successor on the throne left few Jews for conversion, and to them the new faith was scarcely presented from its most attractive side. The house was accordingly given (1377) to Thomas Burstal, clerk, our first *Custos Rotulorum*. For nearly two hundred years the clergy supplied occupants for that honourable office; in 1534 Thomas Cromwell was appointed Master. This present generation has seen one of our greatest judges,—himself an unconverted Jew,—preside over the Rolls Court. The existing chapel was built in 1617-20, at a cost of 2,000*l.*, and, according to Pennant, edit. 1790, by Inigo Jones. The echoes of Dr. Donne's consecration sermon, of Burnet's, Atterbury's, and Butler's eloquence, have long died away. But within its flint walls, encumbered from time to time with record-chests, are preserved a valuable set of monuments. Chiefest of all is one in a style infrequent in this country, but familiar to us at Bologna and Florence, and ascribed by Walpole and Vertue to Torregiano. It commemorates Dr. John Young, Master of the Rolls temp. Henry VIII. There are others to Sir Edward Bruce, Master of the Rolls to James I. who advanced him Earl of Kinloss, and ancestor to the existing noble houses of Elgin and Ailesbury; to Sir Richard Allington, of Horseheath, co. Cambridge (1561), and to Sir John Trevor, Speaker, whereof the simple inscription, "Sir J. T., M.R., 1717," fails to recall how he had to put the question to the House that he himself be pronounced guilty of bribery and corrupt practices. A large west window contains good specimens of stained glass, comprising the arms of Sir Robert Cecil and Sir Harbottle Grimston. Most of the surrounding houses (since replaced) were built when Sir Joseph Jekyll on entering office took up his residence here. He contributed 3,500*l.* towards the expense for ten of them, saying he "would have them built as strong and as well as if they had been his own inheritance." Next, northwards of the Rolls, stood Symonds' Inn, wherein Richard Carstone, of "Bleak House," had chambers.

To destroy Holy Trinity Church, together with its more venerable neighbour the Sieve Tavern,† will finish the demolition in the Minorities which has accompanied the construction of the railway from Aldgate to the Tower. As rebuilt in 1706, of brick, and at a cost of 700*l.*, the church can boast of but slender architectural attractions. Nevertheless, it stands a useful landmark, inasmuch as in its northern wall may yet be traced some vestiges of the Convent owned by the Poor Sisters of St. Clare. The Nuns Minorities had been established here by Blanche, Queen of Navarre, second wife to Edmund, first Earl of Lancaster, and founder of that distinguished house.‡ To their charge Edward I. committed the heart of his mother, Eleanor of Provence (who died at Ambresbury 1291); and Dean Stanley reminds us how Edmund's tomb in

\* See the *Builder* for December 16th, 1882; and October 20th, 1883.

† Northern side of Church street. Already in part dismantled, this interesting structure is well-nigh as old as the more celebrated Fountain Inn which, standing hard by, was pulled down in 1796. A good view of the Fountain will be found in the *Crowle Pennant*; and a model thereof in "Old London," South Kensington; No. 19.

‡ Both Peter Cunningham and John Timbs, followed by many less careful inquirers, wrongly connect Holy Trinity, Minorities, with the adjacent Priory of Holy Trinity without Aldgate.

\* Of course there must be a large number of rods of this size.



Westminster bears the roses,—misnamed "of Provence,"—which, carried thither by the Crusaders, he brought to England from Provence and adopted as the Lancastrian badge. In the convent churchyard were interred Henry Waleys, oftentimes Lord Mayor in the end of the thirteenth century, a benefactor to these as he was to the Franciscans at Grey Friars, Newgate; and Elizabeth, widow to Sir Henry Bourchier, who by her marriage with Thomas (Howard), first Duke of Norfolk, was mother to the Viscountess Rochford, Anne Boleyn's mother. Here, too, were buried some bones from Culloden field. The *Sorores Minores* borrowed their style, as also their rule and the colour of their habit, from the Franciscans, or *Fratres Minores*, whose founder was a fellow townsman of their own, St. Clara. Dame Elizabeth Salvage, last titular abbess, surrendered the convent to Henry VIII. in 1539. The site was afterwards occupied by a colony of gunsmiths and founders,—the deformed Mulcibers whom Congreve pictures as forging "those stows of steel, which arm Aurelia with a shape to kill."

After the Dissolution this property passed in turn to several persons of quality, including the Bishops of Bath and Wells (in lieu of their Strand "inn") and the Greys.\* Henry Grey, Duke of Suffolk, held it by patent of Edward VI., 1552; but, within a few months, he conveyed it to his two brothers, Lords John and Thomas Grey, and one Mr. Medley. On the Duke's attainder and execution (1554) it reverted to the Crown until the Restoration, when a new residence was built on the ground, and called the King's, for what reason, says Pennant, is unknown. Meanwhile the convent precincts had been formed into a separate parish, with a church especially appropriated to the inhabitants of the Close. "The church," writes Strype, "pretends to privileges, as marrying without licence." This franchise was probably a *beneficium* as early as 1294. The font comes from the old church, where until lately stood the homes of Newton and Hogarth. In the old church, too, was buried (1633) Cornelius Deibel, who may justly claim to share with Fontana the honour of having invented the microscope. Extending over five acres the parish is extra-municipal, but lies within the Tower Liberties. It takes so much out of Portoken Ward as is covered by the space bounded by Church-street, the Minories, and Haydon-street, together with the space occupied by Haydon-square, and the depot (with part of the branch line) of the London and North-Western Railway Company. A Roman burial-ground to the east was site of the Convent-farm whereat Stow in his youth would buy "many a halfpennyworth of milk. . . always hot from the kine." One Goodman let out the land for pasture and then for garden plots. On Goodman's Fields were subsequently built Prescott, Ayliffe, Leman, and Maunsell streets, whilst the Clothworkers' tenement-grounds gave a name to Tenter-street. Charles II. granted the King's House to Colonel William Legge, who attending Charles I. to the scaffold, was there charged by the king that he should bid the Prince of Wales to remember the faithfullest servant that ever prince had. His fidelity was further rewarded with several lucrative and honourable offices. Colonel Legge lived here until his death in 1670.† Elevation to the peerage, December 2nd, 1682, his eldest son George was the celebrated naval and military commander in the service of kings Charles II. and James II. But falling, together with his party, at the Revolution, Lord Dartmouth was deprived of his high employments, and committed to the Tower. There he died on the 25th of October, 1691. His only son, William, was advanced Viscount

Lewisham and Earl of Dartmouth, September 5th, 1711, and his descendants for a long while enjoyed a right of sepulture in the vault which was built beneath the floor of this church by their ancestor, Colonel William Legge. At Holy Trinity Sir Philip Sidney's remains were laid in state, and thither came the Grocers' Company on horseback to take the body to St. Paul's.

In the year 1839 a decapitated head was dug up from the southern or parish chancel vault. When first found this singular relic retained all its teeth, the eyes, and ample traces of a ruddy beard. For twenty years past the head,—originally tanned, it is believed, by deposit in oaken sawdust,—has been shown as that of Lady Jane Grey's father, the Duke of Suffolk, of whom we speak above. Moreover, some authorities would fain discern in its well-preserved features a likeness to those of that nobleman as prefigured by Lodge's portrait, engraved after the original at Hatfield, and of which a replica belongs to our National Portrait Gallery. Others have claimed it for the Duke of Monmouth. The Legges, we gather, are satisfied that this head, which clearly bears marks of having been clumsily severed, belongs to no member of their family. In a recent communication to *Notes and Queries* (Oct. 17, 1885, 6th, s. xii.) the Rev. E. M. Tomlinson, vicar, discusses this point. After showing that, if of date earlier than 1706, the head must have been interred in the tower, he states that he finds no clue as to its identity in the registers, which begin with the year 1566. He goes on to propound a theory, and upon what are apparently tenable premises, that it is the head of Edmund de la Pole, Earl of Suffolk,\* whom King Henry VIII. caused to be executed in 1513. There is evidence that this Earl of Suffolk, his wife, and his daughter were all buried in St. Clare Convent, and that the daughter had taken vows there. A tradition exists that the pious daughter, anticipating Margaret Roper, induced her sister nuns to join her in proceeding to the Tower, there to ask that the head of the duke (sic) of Suffolk might be delivered to her care. Duke her father never was; and at the date of Henry Grey Duke of Suffolk's execution, the Minoreesses had ceased to be. Still it is by no means improbable that the decapitated head is a relic of the De la Poles who, descended from William, "king's merchant" to Edward III., are famed alike for their successes as for their misfortunes.

#### NOTES.

**T**HE snowstorm of Wednesday morning found the local authorities of the metropolis, as usual, for the most part quite unable, or unwilling, to cope with the difficulties which it interposed in the way of street locomotion. Making due allowance for the heaviness of the fall, and for the circumstance that it continued during all the busy hours of the morning, it is inexplicable to us why more vigorous efforts could not have been made on Wednesday afternoon to clear at least the main roads and streets of the metropolis of the slush which then covered them, and which was then easily removable. But, so far as our observation went, it was only in the City proper that anything was done in this direction. The frost of Wednesday night added to the miseries of pedestrians and horses in those localities where helpless inability or easy indifference had been the attitude of the "authorities." Take the case of Holborn as an instance. On the "Viaduct" and in all that part of Holborn within the City boundary, traffic on Thursday morning was conducted with tolerable safety and facility, because the City street authorities had done something on the previous day to clear the roadway. West of the City boundary, however, and especially between Gray's Inn-road and Chancery-lane, the snow had been left to itself up to one o'clock on Thursday, and the struggles of the long-suffering horses were painful to witness. The "masterly inactivity"

of most of the metropolitan vestries and district boards on these occasions ought to give a fresh stimulus to the London Government question. Such scenes as were to be witnessed in some of the main thoroughfares of London on Wednesday night and Thursday morning are emphatically a disgrace to a civilised capital. The breaking of several of the overhead telegraph and telephone wires added to the discomforts and dangers of pedestrians.

**T**HE Schliemann Museum at Berlin is about to receive substantial additions. After protracted negotiations, the German Ambassador at Constantinople, Herr Radoivsky, has succeeded, on behalf of Dr. Schliemann, in buying back from the Turkish Government the pottery and other objects discovered in the excavations of 1878, 1879, and 1882, at Troy. Part of these, it will be remembered, fell by contract to the Turks. Dr. Schliemann intends to undertake the cost of such restorations as are necessary, and will then hand them over to the section of the Kunst-Gewerbe Museum, which has for some years borne his name. It is matter of universal congratulation that a collection of so great importance, and most unhappily sundered, should thus be brought together under one roof.

**I**T is proposed to hold a conference in some conveniently central room in London about the end of February to discuss the question of emigration, with the view of ascertaining what is the exact state of the labour market in the colonies; what workers are really required, and stand a chance of finding employment if they emigrate; what accommodation is provided for emigrants on the voyage; and at the depôts; and what have been the actual results of sending young females to the colonies. A circular which has been sent to us with this announcement states also that the Committee desire all information on the subject from any who will give such information to the secretary. The circular, however, does not give the name or address of the secretary, which is rather unbusinesslike. The subject is of the greatest importance.

**B**Y good fortune the site of the ancient Etruscan city of Vetulonia seems to have been placed beyond a doubt; it proves to be actually about five miles further north than geographers have hitherto placed it. Signor Falchi, in excavating at Colonna (in the province of Grosseto), has lighted on what he considers to be incontestably the burial-ground of the city. So far all the tombs which have been excavated give evidence of the custom of cremation. The objects found in the tomb point to a very remote antiquity. The majority of the vases are undecorated, but where any design occurs it is of the very early geometrical class. A few objects of bronze have been discovered, arms, fibule, &c., but metal on the whole is scarce. A paper by the discoverer appears in the "Notizie degli Scavi," pp. 98-152, and a few sketches of the objects found.

**W**E print elsewhere the first half of Mr. Robins's paper on "The Temple of Solomon" (read before the Architectural Association on the 1st inst.). The paper was an exceedingly interesting one, and was remarkable as being very fully illustrated, as the plans of the many writers who have conjecturally "restored" the Temple being exhibited on the walls. The paper elicited a lively discussion, Professor Kerr leading off with a speech in which he stoutly maintained that Solomon's Temple was, and could only have been, a wooden structure. Inferentially he expressed something akin to contempt for the theories of the archaeologists who had devised "restorations" of the Temple, most of which were in stone and more or less partaking of the character of Greek or Egyptian temples. Mr. Robins, in concluding his paper, expressed his general concurrence with Mr. Fergusson's views. Mr. Stannus, in the course of an interesting speech, referred to the ability with which Mr. Fergusson had treated the

\* John Clerke, who succeeded Wolsey in that see, was buried here 1540.

† Vide the registers. "Colonel William Legge of the Red-hamber, and Lieutenant of his Majesty's Ordnance, was buried in the vault of the chancel, Oct. 20th, 1670." He died October 19th of that year; so see also Collins's Peerage, 1714; on his monument in the church the year is given as 1672.

\* Nephew to Edward IV. and younger son to William, first Marquess and Duke of Suffolk, who was beheaded at Dover.



question in his "Temples of the Jews," and expressed his great regret,—a regret which all our readers will share with us,—that that able writer, who has done so much to throw light on obscure points in the history of architecture, is dangerously ill.

IT seems that the town of Brunswick, not satisfied with the ousting of the ducal family who have reigned there for over seven hundred years, are seriously contemplating the destruction of their ancient castle,—one of the six or seven buildings in Germany in which may still be seen the general arrangements and some of the architectural details of the residence and fortress of one of the practically independent nobles of the twelfth century. The projected Vandalism is of especial interest to Englishmen, from the fact that Queen Victoria is a member of the Guelph family, whose ancestral home it is proposed to demolish to make way for a new street. The original foundation of the castle dates back to the dark ages before the twelfth century, and is attributed to Dankward, a descendant of Wittekind, after whom it was called Dankwarderode. In the twelfth century it passed by right of his wife to the Emperor Lothair, and through his daughter Gertrude, who married the Duke of Bavaria and Saxony, to the Guelph family. It was Gertrude's son, Henry the Lion, who, about the year 1166, erected what, notwithstanding all additions and alterations, may be regarded as the existing building, and placed the world-famed Brunswick lion upon his pedestal in the courtyard, facing the flight of steps which led to the great hall of the castle. For the next hundred years Dankwarderode was the centre of all that was great and splendid in the land, second only to the Burg of the Emperor himself, the scene of constant hospitality and of frequent festivities; but its history subsequently to the death of Albert the Great in 1279 is a sad one. Belonging by arrangement to all the scattered branches of the family alike, jealousy prevented its being long inhabited by any; it was unrepared, for that which was every one's business was no one's, and so ruinous had the castle become by the sixteenth century that a fire which took place at that period seems to have hardly made matters much worse. It, however, aroused Duke Julius in 1559 to undertake a scheme for the restoration at least of the great hall, a scheme which, through the jealousy of the other branches of the family, and the opposition of the town, was only very partially carried out in his lifetime, and was subsequently abandoned. This was fortunate as far as the historical interest of the structure is concerned, for the preservation of the Romanesque remains did not enter into the scheme. In 1700, and again in 1763, restorations of a more or less history-destroying character were carried out. Then came the period of the Westphalian rule in Brunswick, during which the castle was fitted up as a barrack; in 1867 it was given up to Prussia as a building used for military purposes; and in 1873 became, on the same grounds, the property of the German Empire. Another fire in this year destroyed the southern part of the building, and the rest, including the great hall, was sold to the town in 1878 to be pulled down to make way for new streets. The scheme has been vigorously opposed by the artistic and archaeological world in Germany, and especially in the neighbouring learned little town of Wolfenbützel, and has not yet been carried out; but, as has happened more than once or twice in similar circumstances in England, the united opinion of all who are capable of forming one is in danger of being contemptuously set aside by those in authority in Brunswick.

SO far as we are aware no action has been taken by the City authorities and the other bodies concerned to stop the erection of the warehouses at the eastern end of St. Paul's Churchyard, to which we have referred on two or three recent occasions. If the whole of the site of the St. Paul's School building cannot be thrown into the roadway it would, at any rate, certainly be desirable to set back the

building-line a few feet, for the roadway is so narrow here that there is no room for a footpath on the side next the Cathedral railings. We are informed, however, that an arrangement has been come to for a mutual modification of their respective designs, by Mr. Delissa Joseph, the architect of the six warehouses now being erected upon the larger portion of the site of the School, and Mr. Frederick Heming, the architect of the three warehouses building upon the remainder of the site, whereby, we are told, "the whole frontage of over 240 ft. will be harmoniously treated as one imposing façade."

AMONG the discoveries reported during the excavations at Pompeii for 1885, the first place is undoubtedly taken by a mosaic, with a design representing doves drinking at a fountain. The mosaic is closely analogous to the well-known slab in the Capitoline Museum which goes by the name of "Pliny's doves." On a white slab stands a bronze basin supported by three lion's claws; it is filled with water. Three doves are already drinking; they stand perched on the rim of the basin; a fourth has just alighted; its wings are still outstretched; two others are standing beneath on the white marble slab. In the Capitoline mosaic, it will be remembered, all four doves are perched on the bowl, one only is actually drinking. The find of mural paintings this year is of no special interest.

THE railway traffic receipts for the month ending on the 27th of December, 1885, do not afford a very cheerful outlook for the half-year's dividends. On four lines, viz., the Great Northern, the London, Chatham, and Dover, the London and South-Western, and the Metropolitan, the aggregate increase in the gross receipts for the half-year (with four days' income yet to be added) has been 46,500*l.* But against this has to be set an aggregate decrease, on the sixteen other main lines generally brought forward for comparison, of nearly 570,000*l.*; making a net deficit in income of 523,000*l.* on a gross income of a little over 31,000,000*l.* The main fallings off which go to make up this deficit are, on the Great Western Railway, 105,000*l.*; on the London and North-Western, 110,000*l.*; and on the North-Eastern, 128,000*l.* It remains to be seen how far this decline on income is balanced by economy in expenditure. Against this, however, has to be reckoned the demand for interest on additional capital brought to account in the half-year. Roughly speaking, while our railway income ought, in a normal state of affairs, to show an increase of about 3½ per cent. in each year over its predecessor, the outcome of the last half of 1885 shows a decline of about 1½ per cent. on the income of the corresponding period in 1884.

THE *Berliner Philologischer Wochenschrift* reports an archaeological discovery on the Acropolis at Athens, which seems almost too good to be true. It is said that a colossal brazen statue has been found representing a female figure draped with a girded chiton, and extending the right hand in the attitude of one taking a solemn oath. With the statue was found a plinth of terra-cotta, on which is carved in very deep relief the figure of a man in armour, wearing a helmet. Traces of colour are still observable on the surface. Above the head of the warrior is the word KALOS in very archaic characters. From the same paper we learn that the excavations carried on in Boeotia have been rewarded by interesting discoveries. Two colossal lions, of archaic style and excellent preservation, have been found; also an archaic xoanon of Apollo and some inscriptions from which it may be safely inferred that near to the temple of Apollo Ptoos, the site of which has already been discovered, there was also a shrine sacred to Athene. Of the temple of Apollo Ptoos considerable architectural remains, among which are some coloured fragments, have been found. It was this temple that was seen by Pausanias, it will be remembered, in his wandering round Akraiphnia.

TWO or three correspondents have addressed letters to us, for which we cannot find space, in regard to the letter by Mr. Maclaren in our last number [p. 64], about the advisability or possibility of changing the style and title of the "Royal Institute of British Architects," and shortening the array of letters indicating membership; but only one of the suggestions made is much to the point. This is, that the word "British" should be omitted. It is not used by the Institution of Civil Engineers, nor by the "Royal Institute" or "Royal Society" of Water-Colour artists, and it certainly appears superfluous. The letters "F.I.A." are suggested by one writer as preferable to "F.R.I.B.A.," but these are already appropriated, and stand for "Fellow of the Institute of Actuaries." "F.R.I.A.," leaving out the "British," is not unreasonably long, and sufficiently explanatory. We are distinctly in favour of the suggestion to omit "British." It is, no doubt, "greatly to our credit" that we are British architects, but there is no need to be always proclaiming it.

#### THE TWO LOAN EXHIBITIONS.

THERE can be no doubt that the chief interest in regard to the two principal loan exhibitions of paintings is this year centred at the Grosvenor Gallery. The constantly-increasing popularity of Sir John Millais, as the most representative English painter of the day, has been emphasised and brought to a head, so to speak, by this very large collection of his works, which is crowded with eager and mostly enthusiastic spectators. We have the same complaint to make about the hanging which we have made in regard to previous exhibitions of a single painter's works at the Grosvenor. The system of hanging, if system it can be called, is simply stupid. As in former cases, there is not the slightest attempt to arrange the works chronologically, or in regard to phases of style; they seem to be arranged according to the size and proportion of the frames. The scene from Keats's "Isabella," which is the most remarkable of the works of Millais's pre-Raffaellite period, and one which every one wishes to see, is placed at the extreme end of the small gallery, where, owing to the crowd and the cramped access, it is difficult to get to it at all. Looking at the paintings in regard to style and feeling, the jumble is more extraordinary and gratuitous than even if we regard the chronological arrangement. An arrangement of the paintings chronologically, as we have remarked before in regard to similar collections, would have given the exhibition a far higher interest, and even an educational value for the public, who could (such of them as go to a picture exhibition for more than mere amusement) have thus traced the steps in the change and development of the painter's style. An arrangement according to style, subject, and "aesthetic" generally would have had a special interest of another kind. The present arrangement is, as we have said, merely dependent on the size and shape of the frames, an absurdity for which the only possible excuse is the way in which the wall is cut up into sections by pilasters. Let architects who have to build picture-galleries for large annual exhibitions, where a number of pictures of constantly varying shapes and size have to be provided for, bear this hint in mind. When the Grosvenor Gallery was first instituted it was understood that it was to be for small and select exhibitions, and in such cases, where the entire wall space was not wanted, the division of the wall into compartments was suitable enough. But when it comes to making a large collection of the works of "the Reynolds of the nineteenth century" (or of "the Millais of the eighteenth century"), then the architectural divisions of the wall are a great inconvenience, and interfere with the proper and sensible arrangement of the works. A gallery for constant successions of exhibitions of various characters should have its walls entirely unencumbered by permanent architectural decorations. As Dr. Johnson is made to say in "Rejected Addresses":—"That which is permanent cannot be removed, for if removed it soon ceases to be permanent." If the pilasters at the Grosvenor Gallery would cease to be permanent it would, perhaps, be better for the hanging.

The paintings here collected, forming the most representative exhibition of their author's



work which has yet been seen, are as remarkable for their variety of aim as for their variety of power; in the case of the paintings dating from thirty to thirty-five years back it would be difficult for any one seeing them for the first time to believe that they were by the same artist who painted the later works. To those who have followed the work of Millais year by year at successive exhibitions, of course, "The Huguenots," and the other works of that date, have always remained as an impression, surviving in the mind as a background to the long array of portraits which have made the later fame and success of the artist. It is curious and very interesting to meet them again face to face with the artist's recent works; curious to think of the dislike, derision, and anger with which they were regarded on their first appearance, of the intensity of which Mr. Stephens has opportunely reminded us by citations of some criticisms of that time, in his copious and interesting notes to the catalogue. To-day there is a kind of murmur going about, among the throng at the Grosvenor Gallery, of regret that the artist had abandoned his earlier aim and method for his later style, and enthusiasts look fondly at the works of the pre-Raffaellite epoch, and shake their heads with a sigh over the lapse of one who began as an ideal and imaginative artist. But this reaction is not much more balanced or reasonable than the attacks which were made on these works when they first appeared. We share the regret so far as this, that we could have earnestly wished that an artist who showed at that early age so much imagination and such intense interest in telling an ideal story, should not have given his matured powers more often to subjects of this higher class, and with the same earnestness and enthusiasm. But it is a mistake to characterise these early works as showing an intensity of expression and of artistic purpose superior to that of Sir John Millais's later works. There is as much intensity and concentrated purpose in the portraits of Mr. Gladstone and Mr. J. C. Hook as in any of the early works, and a much greater style. In pictures like "Lorenzo and Isabella" there is most strenuous determination to paint the whole thing as thoroughly as possible, but it is a mass of brilliant parts rather than a whole, so far as painting is concerned. As a realisation of character it is, however, a most remarkable work, even in relation to the present fame of its author. So also is that odd creation, "Ariel luring Ferdinand." No one after first making the acquaintance of this painting could go back to the scene in the "Tempest" without feeling that he had got a new and more vivid perception of Shakespeare's weird fancy. Ariel, floating backward before Ferdinand, seems to draw the prince after him, and the attitude of the latter, with his hands hollowed over each ear, as if to catch a whisper, is a stroke of true genius; it makes us feel how vague and mystical is the sound of Ariel's song. The shortcoming is in the prince himself, whose face is simply a realistic portrait, not an ideal of the character, one of the odd perversities of "the pre-Raffaellite brethren," who were realistic exactly where idealism was specially demanded. "The Huguenot" retains its old hold over the spectators, but we have always considered this work over-rated, in comparison with others from the same hand. It is a wonderful piece of painting, but it does not express the real situation. A tender lovers' difference of some kind it is, but not a matter of life and death; there is no such stress of feeling in either countenance. We should even say that its great popularity is partly owing to the fact that it touches only such a pitch of feeling as the average or popular mind can rise to without difficulty.

Among the portraits which form by far the larger portion of the collection, are some which are below the artist's real level; but these shortcomings we take to be, in a kind of inverted way, among the evidences that he has the same intellectual interest in his art as when he was an "earnest" P.R.B. Sir John Millais paints his best when his subject interests him. Looking round at his gallery of portraits, it seems as if we could say almost with certainty in which of the sitters the artist was interested, and whom among them he cared little about painting. Whenever the subject of the portrait is a remarkable man, one of strongly defined character and personality, the portrait is sure to be remarkable too. Where the artist has been at work on a commonplace subject, he paints carelessly. This we take to be the true

explanation of the great contrast in execution between one painting and another in this remarkable collection. As to the artistic *morale* of painting a thing (or a person) when you do not care for it,—well, that is a very large subject, which we will pass over just now.

Among the portraits which Sir John evidently did care for are, besides the two splendid ones of Mr. Gladstone and Mr. Hook before mentioned (the latter of which would have stamped its author a great painter if he had done nothing else), "Mr. Bright" (99), the "Duchess of Westminster" (which for true grace of ladyhood even Reynolds could not have surpassed), "the Marquis of Salisbury" (82), "the Earl of Beaconsfield" (84), "the Earl of Shaftesbury" (72), and "Sir James Paget" (103). All these are masterpieces of character in portraiture, giving not merely the outer physique of the sitter, but forming a kind of pictorial comment on his life; the "Marquis of Salisbury" seems the embodiment of the higher Toryism, the "Earl of Shaftesbury" of evangelical religion.

Among the later works of the painter which treat more or less ideal subjects, the finest is the large painting of "The Knight Errant" (41), which impresses us more than when we saw it at the Academy; the light and the situation are better for it, for one thing. The nude figure and the man in armour are equally fine as illustrations of two problems in painting, and the expression of the knight's face gives a nobility of meaning to the whole which raises it quite above the ordinary category of "nude studies." Not far from this the eye is caught by one of the most remarkable little bits of painting in the collection, the head of the rabbit in "Orphan" (49). The child is exquisite, but the rabbit fairly divides our attention, by the power with which the character and expression of the animal, and the texture of the fur are rendered, without the slightest giggling, or over-finish. "The North-west Passage" (60) asserts its power as fully as ever, as a grand painting of a figure of vigorous and energetic age. "Stella" and "Vanessa" (16 and 24) are two of the artist's greatest successes in ideal character; the style is wonderfully broad and powerful, and the figures very true to the ideal of Swift's two unhappy friends. Among the landscapes the first of all, "Chill October" (21), which came as a revelation to the artist's admirers, remains still the most poetic work of this kind which he has produced; but, on comparing it with "Over the Hills and Far Away" (17) we find the latter, which was regarded with some disappointment on its first exhibition, the more powerful work of the two; the foreground is a wonderful piece of realistic truthfulness, though there is less feeling in the painting than in "Chill October." Among other works which surprise us into an admiration which we had not felt on their first exhibition, is the large group of portraits of three Misses Armstrong, as they were then (two of the ladies, fortunately for two men at any rate, have changed their name since then), who were exhibited at the top of the large room at the Academy in 1872, under the title "Hearts are Trumps" (83). The over-large mass of crushed crinoline which occupies the lower part of the canvas is unfortunate in effect, and created a prejudice against the picture when it appeared; but then that was partly the ladies' fault for wearing crinoline; the full broad painting of the three fine young heads, the grace, the dignity, the admirably-contrasted character and manner in each of them, combine to make this a great picture, if only the lower portion of the canvas could be cut off.

We might expend more more time very pleasantly in going over other characteristics of this collection, so remarkable as the work of one man, but have not space to say all we could wish to say. We may quit the exhibition with the remark that Sir John Millais, at least, does not suffer under that severe test, the collection of a great number of his works in one gallery, and that most of those who study his paintings in this "collected edition" will have a higher estimate of his powers than ever, in spite of some hastily-painted and not very fortunate works among the later portraits.

The exhibition at Burlington House has been voted a failure in some quarters, but we do not see how this can be said of any exhibition which contains some superb Reynolds's and a whole room full of Turner's water-colours, and one of the finest Constable's in existence

("Stratford Mill," 158). Of course, one cannot expect the wealth of old masters in England to be absolutely inexhaustible, but Sir Joshua Reynolds seems almost to be so. Every year there come out some works of his not seen before at these exhibitions, and which seem as fine as anything he ever painted. The two leading examples this year are "Miss Fleming" (154) and "Lady Worsley" (157), both the property of the Earl of Harewood. The first is a full-length figure in profile, standing in, or, rather, walking slowly through, a landscape, with that natural ease of manner with which Reynolds animated his portraits. The small delicate head is beautifully painted. The other represents a very dashing young lady, in a kind of regimental uniform, with a riding-whip in her hand, and a black hat and feathers. Another beautiful work by Reynolds is the portrait (head and bust only) of "Mrs. Abington as Roxolana" (33), in the act of raising a curtain to come on the stage. In the same room is one of the numerous portraits of "Nelly O'Brien" (19), and one of the most charming in expression and pose of the head; Nelly might have been a saint, if beauty and sweetness of expression could have made her so. The picture is the property of Mrs. Cooper. In this first room is a small collection of the works of "Wright of Derby," which serves to show that he attempted other things than the clever effects of artificial light by which he is best known; it shows also that these were the things he could do best. His portrait of his sister (14) is, however, a fine work. Stothard's gay but hard little painting, of "Sane Souci" (22), in the same room, is, we are sorry to say, covered with a whole network of cracks, and does not seem long for this world. A landscape by Reynolds, by the way (42), is a sufficiently unusual incident to be mentioned; it is a pleasant little painting.

Among the Dutch paintings in the second room the best are Jan Steen's "Afternoon" (86) and Ostade's "Interior of a Public-house" (97); there is a larger Jan Steen (90), an interior occupied by various more or less dissolute figures, but not painted with his highest finish or brilliancy; a good Snyder's (81), for those who care for Snyder's, of whom we are not, and an exquisite moonlight scene by Van der Neer (88).

The large room contains what purports to be one of the original repetitions by Titus of his well-known "Venus and Adonis" subject (109). It looks like an original. One of the most striking works in the large gallery is a picture which at once proclaims itself as Velasquez's "The Water-seller" (119), a picture in the painter's inimitable and powerful style, of a man in a brown robe giving water to a boy. This is a thoroughly good Velasquez, though not of so much interest in subject as some of his. Among other works not previously mentioned in the large gallery, are Reynolds's effective but stagy portrait of "Mrs. Hall as Euphrosyne" (147); Gainsborough's "Lady Brisco" (150), not a very good Gainsborough; Constable's "The Hay-wain" (153); and Turner's "The Pilot Boat" (156), one of the early and brown Turners.

Among the early Italian paintings in the fourth Gallery, the two gems are two works by Botticelli, "The Virgin and Child" (191), and, remarkably beautiful profile head, "La Bell Simonetta" (196). There are other works of artistic and historic interest in this part of the collection, including a fine portrait of Henry VIII., by Holbein (184), and we must return to this portion of the exhibition, but must close our memoranda for the present.

**The Bombay Screen.**—We learn from Bombay that the carved screen which is intended to be placed round the Bombay exhibit at the Colonial Exhibition in London this year is rapidly approaching completion. The work has been executed at the establishment of Mr. Winbridge, at Gwalia Tank. The total cost of the screen is estimated at 16,000 rupees, which is considered a very moderate sum for work on such an elaborate scale. The material employed is unpolished Bangalore teak. The carved portion is an imitation of the ancient models found at Surat and Ahmedabad, the stone carvings of the latter mosques being reproduced in wood. The designer of the screen is Mr. J. Griffiths.



## THE RIGHT TO AN EXTRAORDINARY AMOUNT OF LIGHT.

It is to be regretted that the law upon the above subjection is not in a settled state, because it is a matter of much importance to many who have valuable businesses in our great towns to know what their rights are if the light to their premises is diminished. In ordinary cases, it is well known there must be a substantial diminution of light in order to give the owner of the dominant tenement a right to legal relief. But where light is used to an extraordinary extent for the purpose of a particular business, it is obvious that a less amount of obstruction may put an end to the business altogether. Is then the owner of the servient tenement in such a case as this to be in a worse plight than if he had obstructed the light to a dwelling-house or to a building which only required a normal amount of light? It is unfortunate that as full and satisfactory a reply to the question cannot be given as is desirable. The law may, however, to a certain extent be definitely laid down, and it is as follows, putting it into the form of a legal proposition. The owner of a dominant tenement has a right to an extraordinary degree of light necessary for a particular purpose when such an amount has been openly and uninterruptedly enjoyed for twenty years. So far as the first part of that proposition goes the law is plain and is supported by several judicial decisions, but these to a certain extent qualify it. In *Lanfranchi v. Mackenzie*, decided some years ago by the late Vice-Chancellor Malins, the judge laid it down that such a right as above expressed was good against all persons who had reasonable knowledge of such uses. This, it is obvious, very considerably diminishes the extent of the above proposition and only allows the right to prevail against a limited class of persons. But the general principle on which a right to light is gained in ordinary cases is by a twenty years' enjoyment, irrespective of any knowledge on the part of the owner of the servient tenement or any one else. The mere open and uninterrupted enjoyment creates the right and therefore it is a little difficult to see why there should be a distinction between the use of light for ordinary and for extraordinary purposes as regards creating a statutory right to it. Hence we are inclined to think that the right is valid whether persons know of it or not, so long as the enjoyment is open and uninterrupted. But the late Vice-Chancellor Stuart gave relief in the case of an obstruction of light used for an extraordinary purpose after eight years' enjoyment, and the same has been done in Ireland in the case of a seed merchant who had used a room for sampling seeds for seventeen years. But it is here again difficult to see why a person who has a special use for a room with a strong light should be in a better position than a person who only uses one for ordinary purposes. In both these cases to which we have referred, there was, no doubt, a right to a substantial amount of light, but that again seems to be no sound reason why a right to a still greater amount of light should be engrafted on the other right in a shorter period than is required for obtaining a statutory right under ordinary circumstances. If this legal doctrine is sound, the result is that if A builds opposite a counting-house or a bank in the City, and slightly darkens the rooms, he has done no legal and actionable wrong. But if he happens to have opposite to him a diamond merchant or a silk merchant, who requires a strong light for sampling there, his building may be stopped, because though he has thereby only slightly diminished the light of the dominant tenement, yet he has obstructed it sufficiently to interrupt the particular business which requires an unusual amount of light. Therefore, the view of Vice-Chancellor Malins that twenty years' user of an extraordinary amount of light is required seems the soundest in law and most consonant with general convenience. We have a strong doubt, indeed, whether it is altogether advisable that there should be any right to an extraordinary amount of light obtainable. It causes one class of owners or occupiers of dominant tenements to be favoured above others to the disadvantage of the general body of building owners. Moreover, the balance of convenience seems to be in favour of allowing a person to build if he only slightly disturbs a man's light, and for the person who requires an extraordinary amount of light to move elsewhere. The conflicting interests of

the owners of the dominant and servient tenements are always difficult and often impossible to reconcile. In the case of granting interlocutory injunctions to prevent the continuance of buildings which obstruct the light of another building, the Court always regards "the balance of convenience," and if we apply the same test to this point now under discussion, it will compel most persons to say that there should be no right to an extraordinary amount of light. Meanwhile, however, the law says that such a right can be gained, but judicial decisions differ as to the manner in which it can be acquired, and until some authoritative decision of the Court of Appeal the question will remain a doubtful one.

## ANTIQUITIES OF MALVERN.

The little affection in the title of this book\* may well be forgiven for the sake of its really valuable contents and for the tasteful manner in which, to the credit of local industry, they are offered to the public. Every one knows more or less of Malvern and of its Priory Church, which stand in picturesque prominence upon the slope of the Worcestershire beacon. But Mr. Nott, who has lived for thirty-five years beneath the shadow of the Priory and has already published some valuable notes upon its ancient stained glass, has a good deal to tell which has not hitherto been told, and, while professing no literary skill nor archaeological learning, he has displayed quite sufficient of both to make his modest little history both interesting and valuable.

The historic memories of Malvern centre in its Priory which owed its foundation to the sagacity of Wulfstan, the last Saxon Bishop of Worcester. Instead of encouraging his neighbour Aldwin, a hermit of Malvern chase, to follow the fashionable pietism of the day and spend himself and his substance on a pilgrimage to Palestine, he bade him serve God at home and not seek Him at Jerusalem. The fruit of his advice was the establishment of Malvern Priory (taking the place of a smaller monastery) at the end of the eleventh or very beginning of the twelfth century. It was, therefore, almost coeval with Wulfstan's cathedral at Worcester, which Aldwin must have seen rising in the plain below.

It is scarcely necessary to say that the Norman building is not now to be seen in its entirety, but the church, which, with the gateway and refectory is all that remains of the Priory, possesses a good many of its original features. Of these the most important are the massive arches and pillars of the nave. "Plain though they are, there appears to have been at some period an intention to ornament them, as will be seen from the respond of the north-east pillar adjoining the tower. There a beginning at ornamentation was made, and on the third arch westward traces of zig-zag ornament are faintly marked out." Why these designs were not carried out we are unable to say, nor have we any means of ascertaining whether in the chancel and the other parts of the old church which have been reconstructed the same absence of detail prevailed. Undoubtedly the church underwent many alterations in the Transition and Decorated periods, but the great change in its character was effected in the fifteenth century, when the passion for Perpendicular work was at its height. Mr. Nott considers that the cause for the practical reconstruction of the church at that date is to be found not in the influence of a prevalent fashion, like that of "restoration" in these days, but in some unrecorded disaster in which the centre tower fell, and by its fall destroyed or irretrievably damaged the eastern portion of the church. He quotes Professor Willis's remark that it is some "proof that a tower is not Norman if it has not fallen," and that "this falling was a way they had got into and they could not help it." Of course, it is abundantly true that a good many Norman towers have fallen, and that a good many more, e.g., Canterbury and Wells, would have fallen but for timely intervention; but these admissions come a long way short of evidence that the Perpendicular architects at Malvern merely availed themselves of an unsought opportunity. Be that as it may, they certainly made good use of it. The tower was carried up to its present lofty height, the parvise added, the great east window inserted in the

new-built choir, the transepts widened, the aisles of the choir vaulted, and the walls of the chancel panelled throughout. In fact, the Priory Church received from the hands of Sir Reginald Bray very much the same impress as was left by the same architect upon his better-known works,—St. George's Chapel, Windsor, and Henry VII's Chapel, Westminster Abbey.

With the dissolution of monasteries the glories of Malvern Priory departed, and at the close of the eighteenth century the church was in a deplorable condition. In 1788 it was described as being in "too ruinous a state to be used with safety," and an anonymous contributor to the *Gentleman's Magazine*, after depicting, in bitter terms, the worse than neglect which prevailed, went on to describe the havoc committed by the children, "whose recreation consisted in throwing stones at the numerous windows, all full of the finest stained glass." Not much was done to remedy matters during the next forty years, and A. W. Pugin reports, in characteristic language, what he saw when visiting Malvern in 1833. "A few years ago a meeting of the fashionables in Malvern was called to subscribe towards the repairs of the dilapidated building, and by the help of raffles, &c., a few pounds were collected. Two hofduls of mortar were got to repair the church, and the remainder of the money expended in putting in a window of the aisle the arms of the subscribers in stained glass, with their names in full,—a monument of their folly and arrogance. The very mullions in which the glass is placed, are rotten and falling. The church itself is in dreadful repair; fall it must, and all that is to be hoped is that in its fall it may annihilate those whose duty it was to have restored it; but of this we may be sure, that if it falls while there is a congregation within its walls, it will clear some away that ought to be got rid of, for such a set of lounging idlers as the fashionables of Malvern are only to be matched at Brighton or Cheltenham." Here Pugin rather unfairly ignores the honest efforts which the then vicar, Dr. Card, was making to retrieve past neglect. What he did was done substantially, though neither tastefully nor correctly, and he really set the example which succeeding vicars, living in happier times and aided by larger knowledge, have followed. The marvel is that, in spite of ignorant destruction and ignorant restoration, so much that is beautiful has survived, and that Malvern Priory Church can still show a wealth of stained glass and ancient paving tiles scarcely to be surpassed elsewhere, and no lack of those varied architectural features which make our ancient churches a constant source of interest and pleasure.

## COMPETITIONS.

*Basinstoke School.*—The School Board have recently invited six architects to submit designs for the new schools to accommodate 1,400 children. On receipt of the plans, it was decided to ask Mr. Roper, of John-street, Adelphi, to advise the Board upon them. This he has done, and recommended the adoption of the design marked "1885," as showing the greatest knowledge of school planning and most suited to the purpose. The author is Mr. Charles Bell, F.R.I.B.A., of London, and the Board have accordingly instructed Mr. Bell to prepare the requisite contract drawings forthwith. The estimated cost is 9,000l.

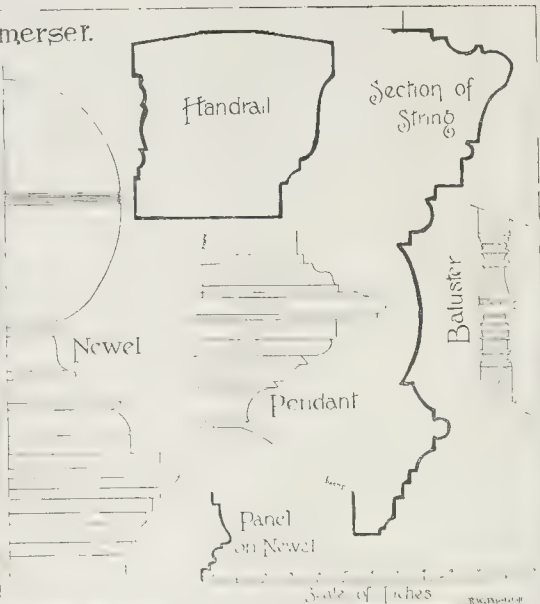
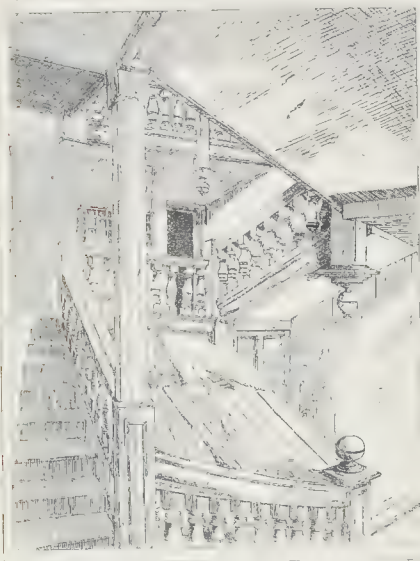
*The Birmingham General Dispensary.*—The plans for the proposed new branch building in connexion with the Birmingham General Dispensary have been selected by the committee appointed for that purpose. Messrs. Dempster & Heaton, of Corporation-street, in a limited competition, have been appointed the architects of the new building, which will be at the corner of Stratford-place and Moseley-road, near the old branch, which is at the Stratford-road, corner of Stratford-place. The new premises, which were urgently needed to meet the increased number of patients, will be erected on a site, the area of which is 765 square yards, with a frontage of over 100 ft. to the Moseley-road. The design of the building will be in the Jacobean style, freely treated. The front of the building will be of pressed red brick, with Kenilworth stone dressings, whilst the tower will be almost entirely built of Kenilworth stone. The roofs will be covered with plain red tiles.

"Sir Frederick Leighton, Bart."—We are very pleased to notice the new honour which has been bestowed upon the President of the Royal Academy of Arts.

\* Some of the Antiquities of "Moche Malverne" (Great Malvern). By James Nott. Malvern: J. Thompson.



Staircase, Chelvey Court, Somerset.



## Illustrations.

## DESIGNS FOR THE LIVERPOOL CATHEDRAL.

**I**OR remarks on the three designs for this proposed cathedral, published among our illustrations for this week, see the first article in this number.

## NEW ENGLISH CHURCH, BERLIN.

This building, which was consecrated by Bishop Titcomb on November 21st, the birthday of her Imperial Highness the Crown Princess, is situated in the gardens of the Monbijou Schloss at Berlin. While many other German cities have long had churches where large English congregations worship, the colony in Berlin has hitherto had to be content with a room in this same Schloss, which was originally intended for the ante-room to the theatre. It was mainly through the exertions of the Crown Princess during her last visit to England that funds were collected for the erection of the present church, and, by her influence, the site was presented by the Emperor. Her Royal Highness has also shown the keenest interest in the work, and, during the progress of the building, has been in frequent communication with the architect, Professor Raschdorff, of the Berlin Architectural School, best known here by his work on German Renaissance.

The church is built of rock-faced granite rubble work, with dressings of sandstone from Schleswig; and the roofs are covered with parti-coloured slating, except those of the bell-turret and porches, which are shingled. Inside, both the walls and roof, which is open-timbered, are covered with colour decoration in black, red, white, and gold; the gangways are paved with tiles presented by Messrs. Minton, who also gave those for the dado which surrounds the chancel. The seating and furniture is of oak. The organ, by Herr Sauer, of Frankfurt-on-the-Oder, is placed in the chamber on the north side of the chancel, while the vestry and royal pew are on the south of the church.

The total cost has been about 300,000 marks, or 6,500*l.*; and sittings are provided for 300 worshippers.

It is to be regretted, from the point of view of almost every interest concerned, that a German architect should have been employed to erect an English church,—the distant situation of which only made it the more desirable that it should be peculiarly English, and the more difficult to make it so. But Herr Rasch-

dorff may fairly be congratulated on having succeeded quite as well as could have been expected in a most difficult task, that of erecting a monumental building to satisfy tastes and requirements, presumably quite strange to him, in a style probably foreign alike to his own tastes and previous studies.

## "RESTORATIONS OF SOLOMON'S TEMPLE."

The two pages of plans, sections, &c., are given in illustration of Mr. E. C. Robins's paper, of which we print the first half this week (see p. 103).

## THE CHARTERHOUSE.

THE Bill to authorise the sale or lease of the Middlesex estate of the Governors of Sutton's Hospital in Charterhouse has been printed. The preamble recites the Charter of the ninth year of the reign of King James I., granting full power, licence, and lawful authority to establish at or in a house called the late dissolved Charterhouse, besides Smithfield, and other premises, one hospital house, or place of bidding, for the sustentation and relief of poor, aged, maimed, needy, or impotent people, and also one free school for the instructing, teaching, maintenance, and education of poor children or scholars. The foundation of the hospital and school was established and confirmed by an Act of Parliament of the third year of King Charles I. By another Act of Parliament, of the thirty-third of King George II., powers were given to the Governors to grant building leases of certain portions of their lands and estates, but this Act did not include the lands used in connexion with the hospital and school. The Charterhouse School Act of 1867 empowered the Governors to sell the school and the several residences in connexion therewith, and to acquire a new site for the school. This arrangement, as is well known, has been carried out, and the school removed to Godalming. An application has been made to the Charity Commissioners for a scheme for the more beneficial disposition of the endowments and revenues of the hospital, and to that end for the removal of the hospital and the establishment of a system of out-pensions in lieu thereof.

These objects, it is recited, cannot be effected without the authority of Parliament, and it is therefore proposed to take powers to enable the Governors to dispose of their land, or any part thereof, or to grant building or other leases for terms not exceeding ninety-nine years, provided

that no such sale or exchange shall be made without the consent of the Chancery Division of the Supreme Court or of the Charity Commissioners. The Governors may further pull down and remove the buildings on the site of the hospital, and may form streets or roads or open spaces subject to the same consent as before. The burial-ground of the Charterhouse is proposed to be laid out as an open space, and power is given to hand it over to the Corporation of the City of London or the Metropolitan Board of Works. This burial-ground, which was the cemetery of the monasteries, was closed by Order in Council in 1854, together with a number of other metropolitan graveyards.

## THE ROYAL ACADEMY.

## ADMISSIONS TO THE ARCHITECTURAL SCHOOL.

## Upper School.

Allen, N. W.	Jones, W. C.
Gibbon, W. J.	Jennett, A. R.
Goodham, H. R.	Russell, S.
Hart, F. C.	Sedding, E. H.
Herbert, E.	Stenthal, A. H.

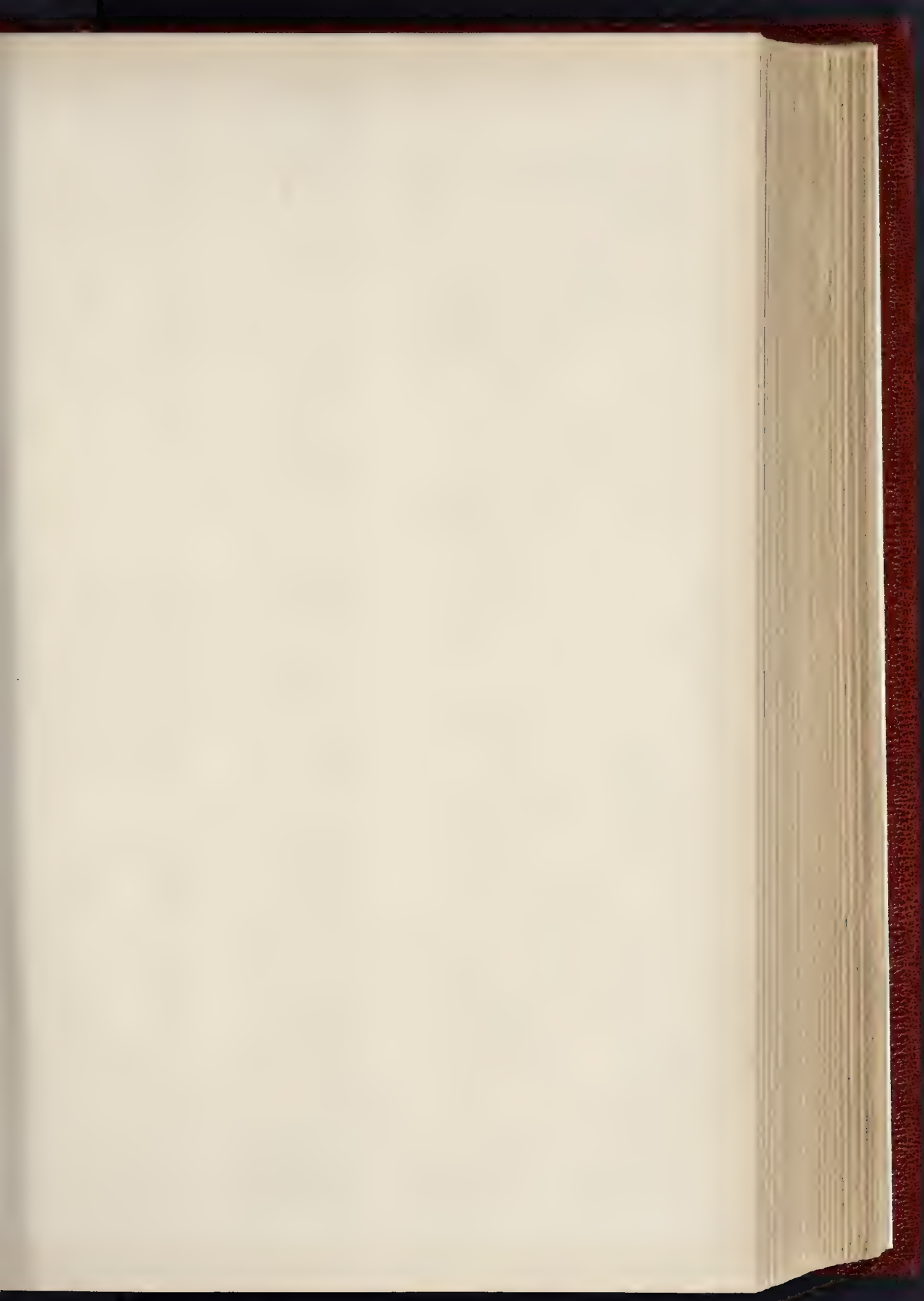
## Lower School.

Barnsley, S. H.	Pierce, R. L.
Butler, W. R.	Piper, S.
Cooper, C. J. H.	Ryde, F. C.
Cooper, W. F.	Shortridge, A. D.
Cox, A. A.	Vickers, A. E.
Hart, A. H.	Wilson, A. N.
Haywood, C. S.	Worthington, T. L.
Morris, J. A.	

## Probationers.

Butter, A. M.	Nicolay, G. W.
Daniels, H. S.	Paul, R. W.
Duke, W. M.	Spooner, C. S.
Frere, E. C.	Stoddart, A. E.
Haarer, F. E.	Taylor, N.
Homan, S. H.	Wilson, W. R.
Hopson, C. H.	Woolcott, H. E.
Murray, J.	Youngs, L.

**Clock.**—The Episcopal Church of St. Margaret, Forgue, diocese of Aberdeen, has been presented, at the sole cost of Mr. J. Morison, of the British College of Health, with a clock of superior design, specially constructed by Mr. J. W. Benson. The new clock has two coppe-  
dials of 4 ft. diameter, strikes the hours on a bell of 11 cwt., and is fitted with Graham's dead-beat escapement and all recent improvements. The additions to the tower necessary for the reception of the clock were planned by Mr. J. Duncan, Turriff.





# Temple of Solomon.

Commandadore Caninis

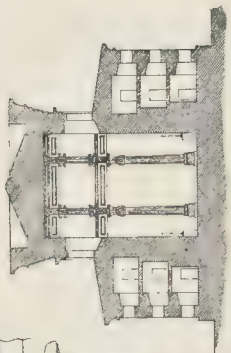
Design:

E. C. Robins' F.S.A. Design:

Prof. Wilkins' Design:



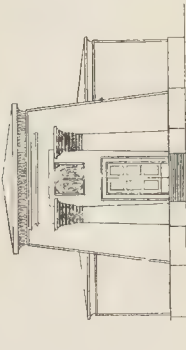
Section:



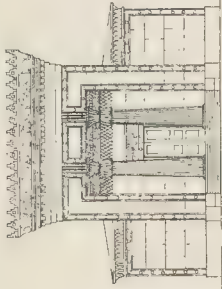
Section:



Sketch of Column at Tersepolis:



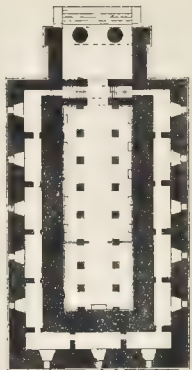
Elevation.



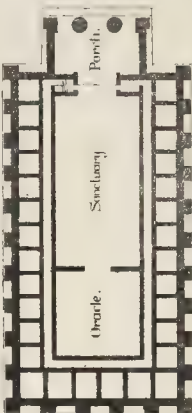
Elevation:



Ground Plan:



Ground Plan:



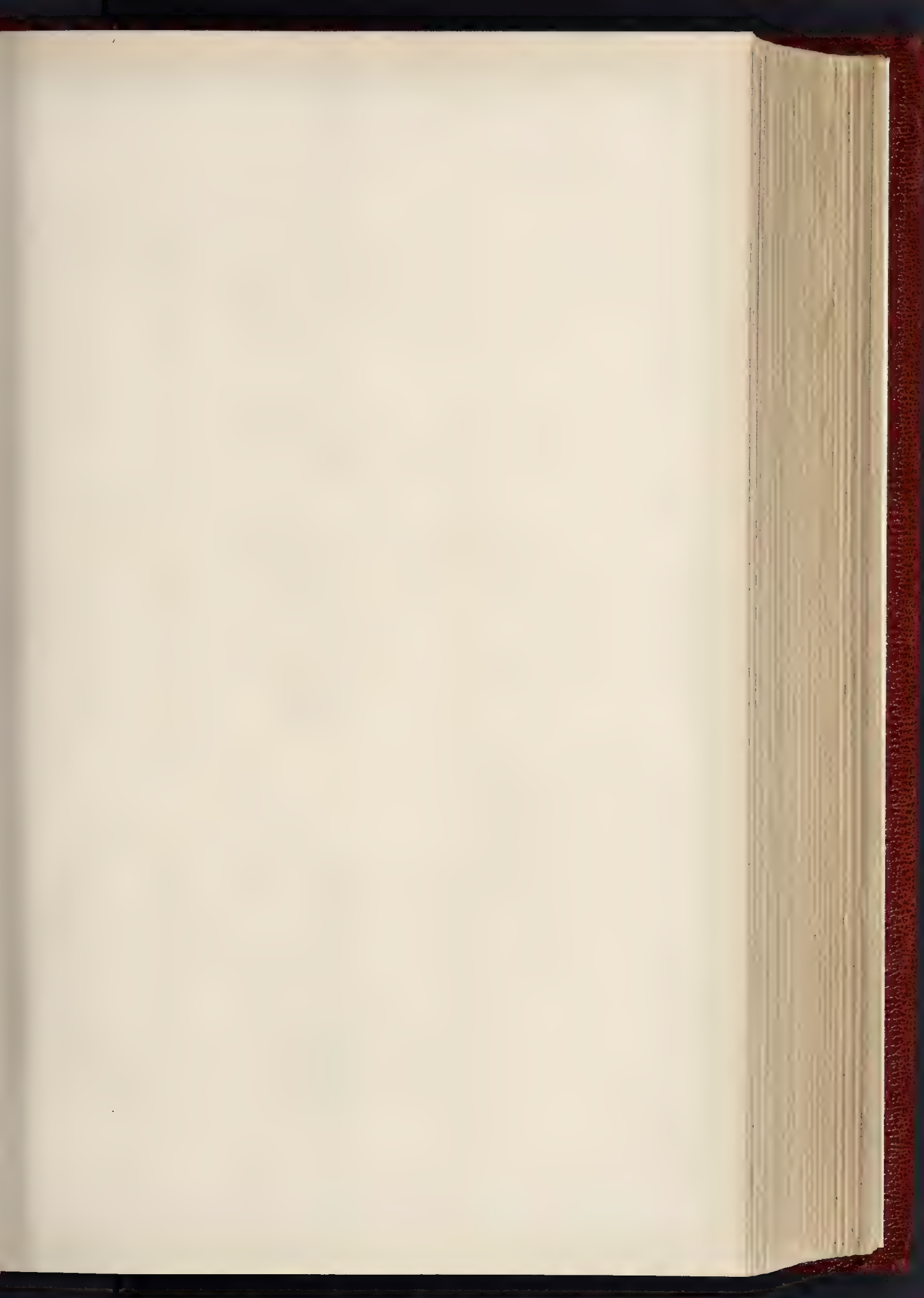
Ground Plan:

Scale 1/4" = 1' of Cubits. Bronze Column: Scale 1/4" = 1' of Cubits.

Scale 1/4" = 1' of Cubits.

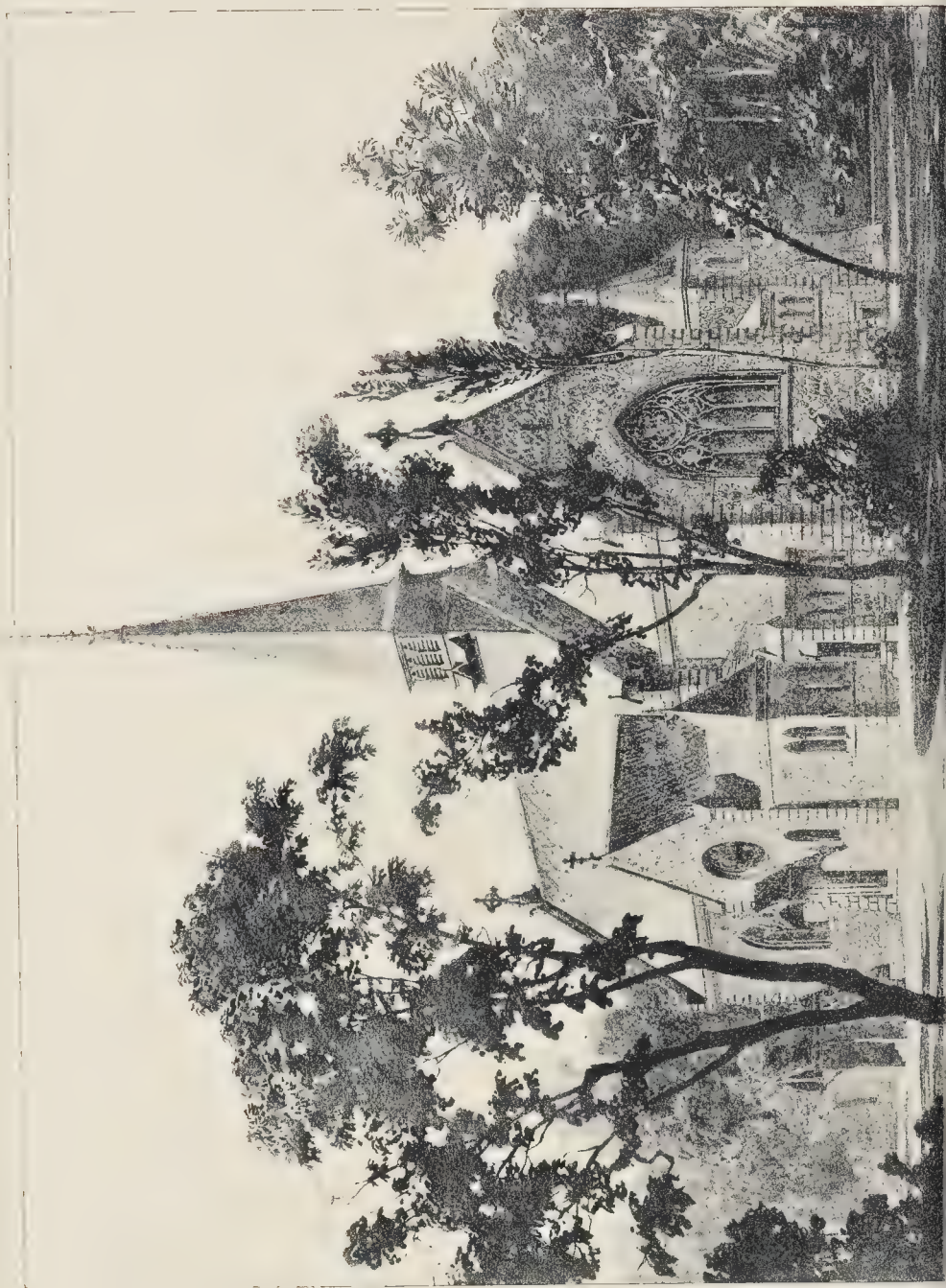
Scale 1/4" = 1' of Cubits.

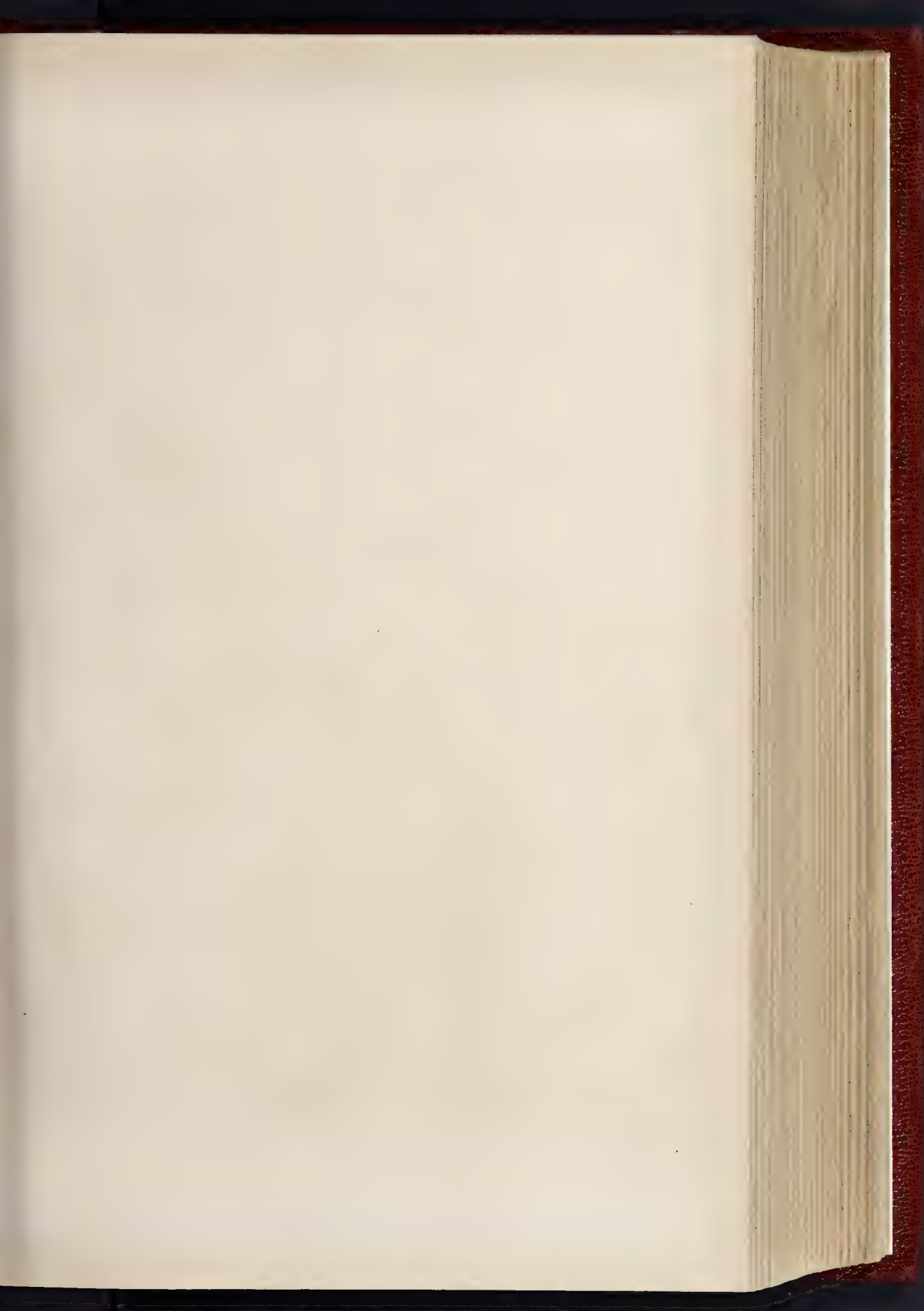
Scale 1/4" = 1' of Cubits.





THE BUILDER JANUARY 9, 1886.







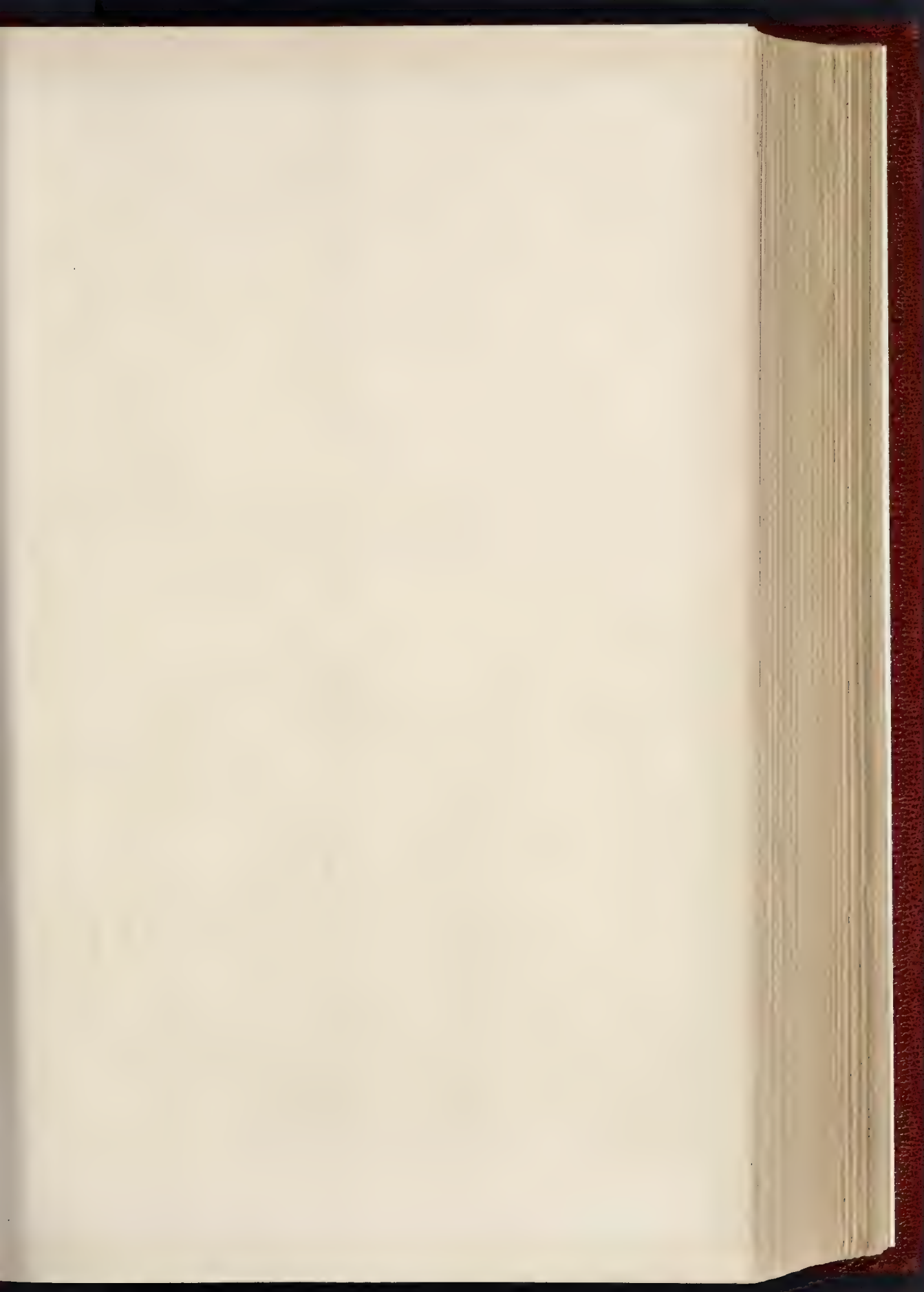




LIVERPOOL CATHEDRAL COMPETITION — DESIGN BY MESSRS. DOBNEY & GARNER.  
INTERIOR VIEW LOOKING WEST, SHewing CENTRAL OCTAGON











LIVERPOOL CATHEDRAL CO  
VA

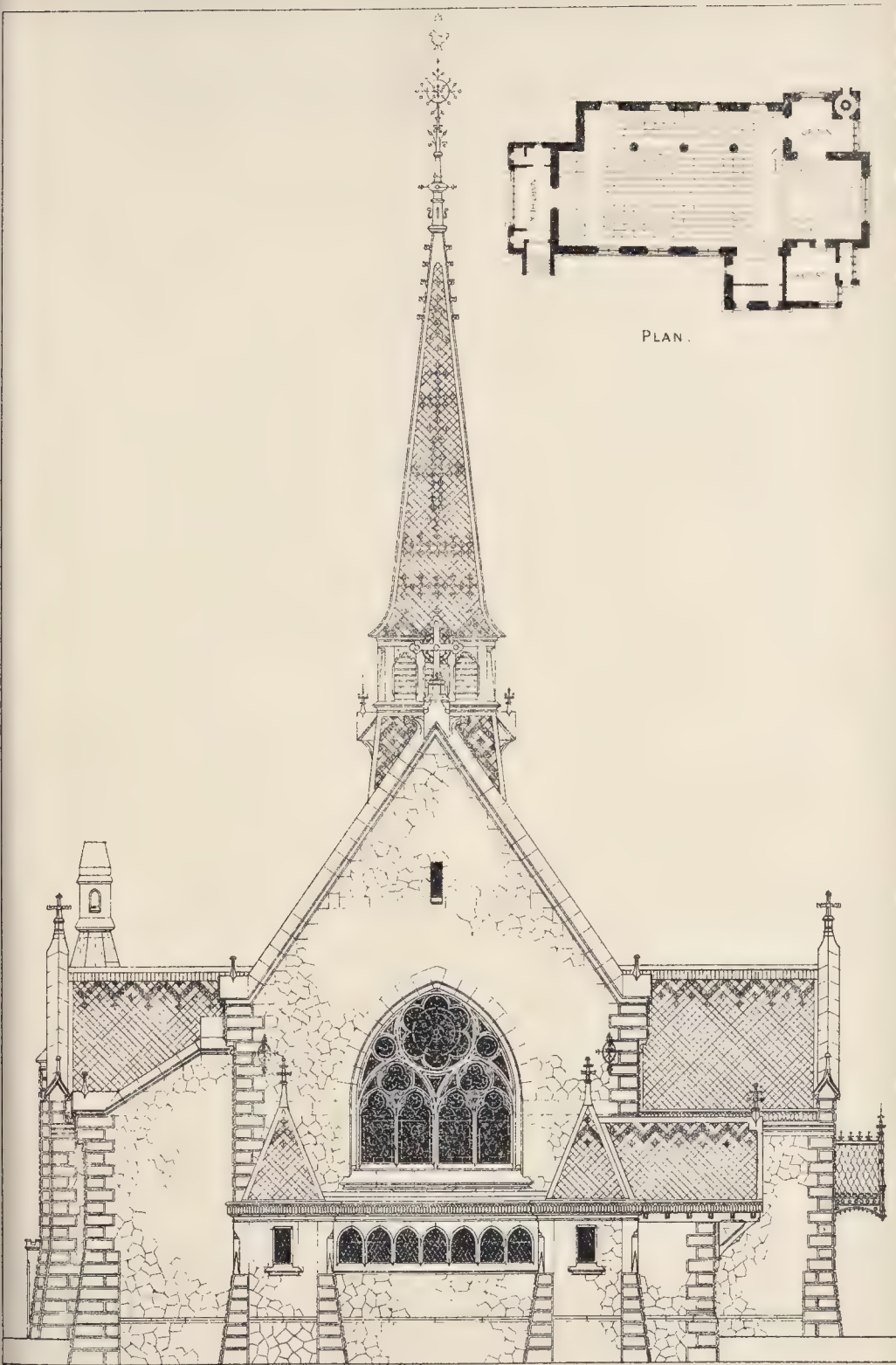


IGN BY MR WM. EMERSON FRIDA  
TH-EAST.

INK PHOTO SPRAY & CO. LONDON







NEW ENGLISH CHURCH, BERLIN.—HERR J. C. RASCHDORFF, ARCHITECT.

WEST ELEVATION.

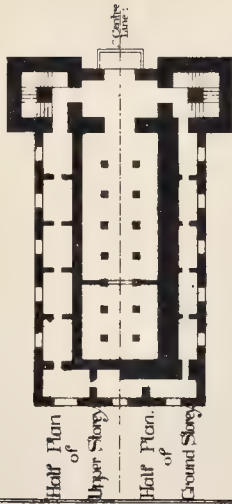




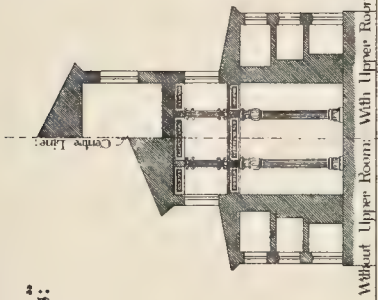
# Fergusson's Third Design:

from the

"Temples of the Jews":



Plan:



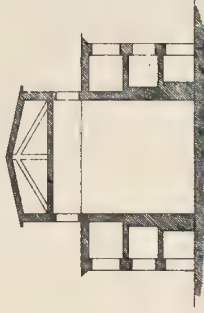
Section:

# Fergusson's First Design:

from the

"Principles of Beauty in Art":

for the Temple of Solomon:



Section:

# Fergusson's Second Design:



Plan:  
from the

"History of Architecture":

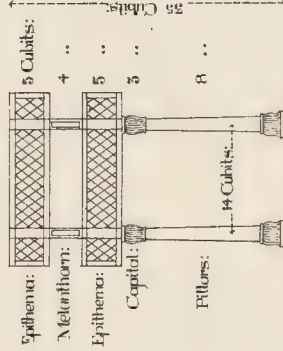


Diagram explanatory of Screen supported by the Pillars of Jachin and Boaz in front of Solomon's Temple:



Plan:





## THE TEMPLE OF SOLOMON.\*

THE architectural form and style of the Temple of Solomon is a subject of inquiry interesting to all students of Biblical antiquities and literature. Much learned discussion has been expended upon it, and many volumes written to establish the views of their authors, some of whom have allowed their imaginations full play, making their wishes father their thoughts, and so have described a building or series of buildings, the like of which the world never saw for size, costliness, and general magnificence.

I propose to give some of the leading theories propounded chiefly by eminent architects, and to indicate also what appears to me to be the most reasonable hypothesis, the most probable form and style of architecture of that first building of which scarcely one stone remained upon another, even in the days of Herodotus, the Father of History.

The Jews were not a building people, and have left no native monuments but what are the result of forced labour in foreign lands. In this they were not singular, for their immediate neighbours, the Tyrians and Sidonians, have left no monuments either at home or abroad. Tyre, Sidon, Jerusalem, Basbec, Palmyra, Carthage, possess no architectural antiquities anterior to Roman times, except, perchance, vast masses of masonry, the retaining walls of imposing platforms upon which were reared those structures which have since disappeared.

The two great authorities on the subject are, of course, the Bible itself and the Jewish historian, Josephus. The first of these sources of information is the more reliable as regards the Temple of Solomon.

Josephus was well acquainted with Herod's Temple, and may be trusted in his description of that remarkable series of buildings, except, perhaps, as regards their height. Into his account of Solomon's Temple he imports his knowledge of Herod's, and gives to Solomon the credit of much that belonged to a later age. His example in this respect has been followed by subsequent writers and expositors, and thus there has been much idle speculation which could never have arisen had the 6th chapter of the 1st of Kings been the accepted authority for all subsequent theories.

Take one curious example, viz., an illustration given in Stackhouse's large Bible, dated 1810. The observer is referred to the 6th chapter, 1st Kings, for an explanation of the plate, but the real key to it is to be found only in Josephus's "Antiquities of the Jews," with the addition of stairs and terraces mentioned in Chronicles, but considerably multiplied in number. The Temple proper rises above all, and is four times the height given in Kings, the whole being designed in the Roman manner of many centuries later. That the Jewish historian's style has favoured such theories as this, a single extract will suffice to show:—

After stating all that is given in Kings he goes on to say that having built the Temple beyond the wall of the court surrounding the house in the form of a quadrangle, "Solomon erected for great and broad cloisters which were entered by very high gates, each of which had its front exposed to one of the four winds enclosed by golden doors. But he made that Temple which was beyond this a wonderful one indeed, and exceeds all description in words; nay, if I may so say, is hardly believed upon sight, for when he had filled up great valleys with earth, which, in account of their immense depth, could not be looked on when you bended down to see them without pain, and had elevated the ground 400 cubits (600 ft.) he made it to be in a level with the top of the mountain on which the Temple was built."

Now, as a matter of fact, since ascertained by modern explorers, the lowest stone of the oldest wall of the present Temple area stands in the rock itself, and the summit of Mount Moriah is but 163 ft. above the rock upon which the lowest stone rests. That is to say, Josephus has quadrupled the height in his own description above quoted.

In short, this historian gives full play to his imagination whenever he can safely do so, in speaking of the depth of valleys since

filled up, or the height of towers since levelled with the ground. He rarely contradicts the sacred Scriptures, but rather omits or supplements them, or else takes advantage of some verbal discrepancy or peculiar mode of expression to introduce his own notions, whenever it serves his purpose so to do, or tends to exalt the glory of his people Israel.

Of Jewish religious structures, of course the earliest was the tent of the Tabernacle, the plan of which was divinely revealed to Moses at Sinai, and was never subsequently departed from; so that when Solomon built his Temple, in the year 1013 before Christ, he did not alter the general disposition in any manner, except that he doubled every dimension. And thus the Holy of Holies became a cube of 20 cubits or 30 by 30 by 30 ft., and the Holy place became 20 by 40 by 30 cubits or 30 ft. wide by 60 ft. long by 45 ft. high, and so on.

The Temple which Ezekiel saw in vision, 575 years before Christ, was identical in its dimensions with that of Solomon. Additional courts and passages were added, of which Canina and Fergusson have each made a restoration, shown on the drawings.

The Second Temple, as it is called, or Zerubbabel's (before Christ 520), which was built by the Jews on their return from the Captivity, likewise corresponded exactly with Solomon's building, but was shorn of its decorative splendour.

The Third and last Temple, erected by Herod, twenty years before Christ, is thus described by Mr. Fergusson:—"In this we have a perfect illustration of the architectural history of the country. The priests restored the Temple itself, not venturing to alter a single one of its sacred dimensions, only adding wings to the façade, so as to make it 100 cubits wide, and, it is said, 100 cubits high, while the length remained 100 cubits as before."

At this period, however, Judaea was under the sway of the Romans, and under the influence of their ideas the outer courts were added with a magnificence of which former builders had no conception.

An area, measuring 600 ft. each way, was enclosed by terraced walls of the utmost lithic grandeur, on these were erected porticoes unsurpassed by any we know of. One, the Stoa Basilica, had a section equal to that of our largest cathedrals, and surpassed them all in length; and within this colonnaded enclosure were ten great gateways, two of which were of surpassing magnificence. The whole making up a rich and varied pile worthy of the Roman love of architectural display, but in singular contrast with the modest aspirations of a purely Semitic people."

But I do not propose to enter upon the discussion of Herod's temple at all. The arguments in favour of Mr. Fergusson's views are great and manifold, and they are given *in extenso* in his splendid work on the "Temples of the Jews," to which I must refer you.

The important explorations in and about Jerusalem, which have been carried on since 1864 under the auspices of the Palestine Exploration Fund, are speedily coming to a close, without having revealed anything which materially militates against the views of Mr. Fergusson, Mr. Lewin, or Mr. Thrupp, who all agree that Herod's temple and associated courts extended to 600 ft. a side, and were situated at the south-western corner of the sanctuary or Haram area.

Solomon's Temple may have occupied the same area, as Mr. Lewin thinks, or much less, as Canina and Fergusson think; while it is most probable that Solomon's palace occupied the south-eastern corner, where are situated the sub-structures, commonly called Solomon's stables.

The majority of the drawings which I exhibit were prepared by me in the year 1858, and since that period I have been interested in observing the progress made in the elucidation of this subject, which, however, has resulted in the illustration of but few examples anterior to Roman times.

The great work, entitled "The Survey of Western Palestine," is being published, and therefore I have thought it a fitting time to have my "say" on the matter and to recall the earlier labours of others in the same field, so far as they throw light upon the main object of my inquiry, viz., the form and style of art employed in the construction of Solomon's Temple.

It will be desirable, however, to pass, very

rapidly, in review the more important facts brought to light by the excavations of Captain Warren at Jerusalem.

Upon the Ordnance Survey of Jerusalem, made by Captain Wilson in 1845, I have tinted the famous enclosure called the Noble Sanctuary. It is described by Captain Warren as a raised plateau, measuring about 1,500 ft. from north to south, and about 900 ft. from east to west,—which is sustained by a massive wall, rising on the exterior from 50 ft. to 80 ft. above the present level of the ground.

The general level of this plateau is about 2,420 ft. above the sea, but toward the east, at the Golden Gate, it is not filled up to this general level by some 20 ft. or so. Almost in the centre of this plateau is an irregular four-sided paved platform, rising some 16 ft. above the general level of the plateau. About the centre of this platform the sacred rock appears, over which is built the celebrated Dome of the Rock, ascribed to the Moslem chief Abd-al-Melek,—but claimed by Mr. Fergusson as the Church of Constantine, erected over the Holy Sepulchre,—which Mr. Fergusson believes to have been in this position and to have been without the walls in Herod's time: a question upon which I express no determinate opinion till I have myself visited Jerusalem, but, in the meantime, as I stated in my letter from Rome to Mr. Barry (when President), which was published in the "Transactions" of the Institute of British Architects, there exist in Rome at this day circular temples strongly corroborative of Mr. Fergusson's contention.

Each of the three temples, as already observed, must have occupied the same site, which all admit was contained within the area of the present Noble Sanctuary.

Some authorities, says Captain Warren, as M. de Sauley, Sir Henry James, the Comte de Vogüé, supposed the whole sanctuary to have been occupied by the Temple and its courts, at least, in Herod's time.

Mr. Williams supposes 950 ft. square of the northern portion was thus occupied.

Messrs. Kraft, Robinson, Barclay, Kiepert, and Porter think the Temple and its courts must have stood upon the southern portion of the sanctuary on a square of 925 ft. or thereabout.

Messrs. Tobler, Rasen, and others suppose the Temple to have covered a space about 600 ft. a side,—nearly co-incidental with the present raised platform in the centre of the sanctuary, upon which site now stands the Mosque of Omar.

Captain Warren claims this position for the site of Solomon's Temple.

But I incline to the theory already referred to as that of Mr. Fergusson, Mr. Lewin, and Mr. Thrupp. And I think with them, that the successive temples occupied the south-western corner of the sanctuary,—while Solomon's Palace occupied the south-eastern corner. At all events, the most ancient remains are to be found in the walls at the southern end of the Haram area.

The result of the explorations adjoining the southern and eastern walls is as follows:—

The noble sanctuary enclosure being considered too sacred to be meddled with, especially by sacrilegious hands, shafts had to be sunk by Captain Warren at a distance of more than 20 ft. from the walls to reach the rock; horizontal galleries or tunnels had then to be driven therefrom to the base of the walls, which were founded on the rock, and appear to have been carefully wrought with drafted edges, and at one time to have been exposed to view.

I exhibit an enlarged drawing of this process, taken from Captain Warren's book, and also enlarged drawings of the elevations of the southern and the eastern walls, taken from the volume entitled "The Recovery of Jerusalem."

The lie of the rock is given below the accumulated earth above it,—showing the depth from which the walls spring, and from the carefully-dressed edge-drafted and bevelled masonry, it is reasonably conjectured that the whole of the wall was originally visible.

It will be observed that at the Triple Gate in the southern wall,—the rock rises to the sill of the gateway, and towards the east it inclines to the old bed of the river Kedron,—some 211 ft. in depth, or 107 ft. below the lowest stones of the wall at the south-eastern angle; and on the west side of the Triple Gate the rock descends to 90 ft. below the gateway to the old bed of the Tyropean valley, and rises again towards the upper city, being some 30 ft.

\* A paper by Mr. Edward Cookworthy Robins, F.S.A., entitled "A Review of the various Theories respecting the Form and Style of Architecture of the Temple of Solomon," read before the Architectural Association on January 1st, 1886.



higher at the south-western angle, beyond which is shown the base of the pier which sustained the western side of Robinson's arch,—under the pavement of which is a drainage channel cut in the rock.

Below the present level of the ground are three successive pavements, showing the gradual filling up of the valley, upon the lowest of these pavements the fallen voussoir of the arch have been discovered lying.

From the examination of this south wall, in nine separate places, there appears to be no doubt, says Captain Warren, that the whole of the stones below the present surface are bevelled or marginal drafted (though the faces are not all equally finely dressed) and that they are *in situ*—

The courses of the great stones return along the western wall to Wilson's arch, passing the Wailing Place of the Jews, where some of the finest masonry is visible in what is called the Jews' Quarter.

Wilson's arch is about 600 ft. north of the south-western angle on the western wall, and marks the extent of Herod's Temple in this direction.

The restoration or reconstruction, or original foundation of the south wall by Herod,—from the double gate to the south-western angle seems a probable circumstance, prior to the erection of the Stoa Basilica, which extended to the triple gate, a distance of 600 ft., and marks the extent of Herod's Temple on the southern side towards the east,—thus confirming the correctness of Josephus's horizontal measures, who stated that the area occupied by Herod's Temple was four square of a stadium each side, or 600 ft. square.

This portion of the Haram area has a solid substratum. Beyond the triple gate the levels are raised on comparatively modern piers and arches, below which Captain Warren has discovered other passages and vaults, which lead him to surmise that the floor of the upper series of vaults rests on a lower range of piers and arches; but to what extent this may be the case has not yet been ascertained.

It is unnecessary for my present purpose to do more than indicate the position of Solomon's Temple itself. The courts surrounding it, doubtless, varied in succeeding times. Mr. Fergusson cannot stretch them so far even as the present south and west walls. Mr. Lewin, however, claims the whole of the Haram area as we now find it, not only for Herod's time but also for the Solomonic era; yet, as aforementioned, restricting the area of the Temple proper and its more immediate courts to the square stadium at the south-west corner; and he asserts that the rest is included in the statement that "Solomon built Millo," by which he caused the defection of the ten tribes who afterwards revolted under Jeroboam.

Canina provides a little over 500 ft. by 300 ft., and Mr. Fergusson considerably less.

Much of the eastern wall of the inclosure has evidently been the work of comparatively recent times, since the remains of former buildings are built into it, and the stone on which Mahometans believe that the prophet will sit to judge the world, is the end of a column, so treated, which projects from the face of the wall, not far from the Golden Gate, which belongs to the fourth century after Christ.

These remarks, having reference to the site of the Temple, will clear the way for what is to follow, viz., a comparative analysis of the various special designs made by different architects to illustrate the probable form and style of architecture employed by Solomon in the erection of the Temple building itself.

The theories of modern antiquaries may be conveniently divided into three classes—

Firstly, The African, or those which assume that the Temple was designed on the model of Egyptian edifices, or in the Egyptian style.

Secondly, The European, or those which assume that it partook of the forms and design peculiar to Grecian architecture.

Thirdly, The Asiatic, or those which assert that it is Phœnicia, Assyria, Babylonia, and Persia, we must look for the style of architecture employed.

In this cursory analysis of these several theories I shall endeavour, as far as I can, to describe each view in the spirit of the author's intention, the plans on the walls fully illustrating the same.

Firstly. *The African.*

Professor Hosking, in his Treatise on Archi-

itecture, prepared for the "Encyclopædia Britannica," thus expresses his opinion:—

"We think that the probability is great that the Temple was built in the Egyptian style, as far as the Jewish ceremonial would permit, and certainly the descriptions of its distribution accord better with that of an Egyptian than of a Grecian Temple.

The pillars Jachin and Boaz,—which are said to have been set up before the Temple,—correspond exactly in relative situation with the obelisks at the Temple at Thebes."

I have sketched a portion of an Egyptian Temple, showing the position of the obelisks with reference to the entrance,—but they do not answer to the description in Kings,—and it appears to me that the very names of the Pillars are sufficient to indicate their position as chief supports.

"Jachin, wherewithal it is established, and Boaz, in the which is strength." Akin to the pillars of Philistia, which sinewy Samson clasped in his fatal embrace.

#### Canina's Design.

The late Commendatore Canina of Rome took the Egyptian side of the question, and many years ago published a small folio work on the antiquities of the Jewish nation.

I have copied several of the geometrical drawings given in illustration of his views, to which I have added a perspective view to give full effect to what is certainly the most rational representation of the Egyptian theory (see lithograph plate in this number).

Canina agrees with Professor Hosking, that the two pillars were outside the porch of the Temple. Yet he does not suppose them to have been obelisks, but forms them into a portico in front of the porch.

The nets of checker-work and wreaths of chain-work for the chapters, which were on the top of the pillars, seven for each chapter, with two rows of pomegranates, 100 in a row, he supposes to have been in part the pattern of the capitals of the brazen pillars; and not a brazen network overhanging the lily-work of the chapters, these he disposes in another way,—placing them in the cornice of the entablature connecting the two columns in his design, thus forming a porch or portico in front of the porch which alone is described in Kings.

Probably this view is based on the 19th verse, "And the chapters that were upon the top of the pillars were of lily-work in the porch four cubits." Whatever these four cubits may refer to (which Mr. Fergusson originally ascribed to the intercolumniation, but which seem to me rather to refer to their diameter, elsewhere described as two cubits in circumference), it can hardly apply to the height of an entablature, or things so opposite as the supports themselves and the thing supported. And with reference to their position it is expressly stated that the chapters, which were of lily-work, were in the porch, and not outside of it.

The height of the true porch Canina rightly makes the same as the sanctuary, but he has increased the length of the sanctuary by the thickness of the wall separating the oracle therefrom; whereas, in every description in the Bible, the whole length of the house is given as threescore cubits, and the separation of twenty cubits for the oracle was afterwards made.

The description in Kings, 21st verse, is, "Solomon overlaid the house within with pure gold, and he made a partition by the chains of gold before the oracle," in which bronze columns may have been introduced to carry the additional height of the end wall of the sanctuary.

Canina's arrangement of the chambers round the house I think most correct. Neither their number nor their length is given in Kings or Chronicles, though the former gives their width and height, while the latter does not mention them at all.

Ezekiel, in his vision of the restored Temple, tells us that "the side chambers were three, one over another, and thirty in order," that is, thirty in all on the sides of the house, besides those at the end of the oracle.

Our ingenious friend, Josephus, finding that the phrase "thirty in order," might be translated "three and thirty times," or thirty times three, says there were thirty chambers on each floor, in all ninety chambers,—it mattered not to him how small they were in plan, for what they lost in length he quadrupled in height.

The Count de Vogüé has been misled by him, and so was Fergusson in his earliest design.

The cubit measure is variously taken as 1 ft. 3 in., 1 ft. 6 in., and 1 ft. 9½ in. long; but the successive Temples must have used the same measure. If the second Temple was built to cubits of 1 ft. 6 in. long, the first Temple was the same, the walls of the former being based on the foundations of the latter.

The letter of the adversaries of the Jew, addressed to Artaxerxes, during the rebuilding of the Temple in Ezra's time, favours the assumption thus:—"Be it known unto the King that the Jews which came up from the rebellious and the bad city, and have set up the walls thereof and joined the foundations," literally, "sowed together the foundations," showing that they already existed, although the superstructure was burned to the ground by Nebuchadnezzar, at the time of the Captivity, who also carried away the Brazen Pillars after he had broken them into fragments.

#### Thrupp's Theory.

Canina's restoration would not appear to be appreciated as it ought to be by those who favour the Egyptian theory, and in 1855 a work was published by the Rev. Mr. Thrupp, "Ancient Jerusalem," containing some singular speculations on the probable form of the Temple. I have enlarged the plan given in his book.

Mr. Thrupp starts with the settled conviction that Solomon's Temple was like unto Egyptian fane, that a parallel may be found in the Jewish Temple for nearly every peculiarity of the Egyptian. He details the several characteristics of the former, and endeavours to establish their coincidence with the latter. The body of the Jewish Temple he likens to the stekos of the Egyptian, and the chambers surrounding the house of the former to the galleries encompassing the latter.

In the Jewish porch he sees the proscenium of the Egyptian type. To obtain the necessary height, he adopts the 120 cubits given in Chronicles, while, to gain the required width, he resorts to his imagination, and says—"The interior length of the portico of Solomon's Temple was 20 cubits, the same as the interior breadth of the sanctuary; but," he continues, "it may have been prolonged by lateral chambers or porticoes rising to the same height within, and may thus, like Egyptian porticoes, have externally outflanked the body of the house." In the pillars Jachin and Boaz he finds traces of the Hall of Columns; but as he dares not attempt to add the one, no place is left for the other, so that the unfortunate pillars are lost altogether.

The Court of the Priests he converts into a propylon, surrounding it with pillars in the first place, and with chambers in the second.

Finally, he recognises the large pyramidal towers in front of Egyptian temples, in imaginary eastern front to the Court of the Priests.

#### The Count de Vogüé's Design.

The latest resuscitation of the Egyptian style, as the type to be followed in restoring Solomon's Temple, is by the Count de Vogüé, the author of the "Syrian Antiquities," who has published a work on "Jerusalem and its Temples." His design for the Solomon's Temple throws little light on the subject.

His main façade consists of a large Egyptian temple, with an opening in the centre 20 cubits square, in which are situated the Pillars Jachin and Boaz, the ornamentation of the capital containing the lily work and pomegranate. The porch is 10 cubits deep by 20 wide, 60 cubits high, while the rest of the massy pylion appears to be solid, except where staircases to the chambers occur on each side.

He adopts Josephus's number of chambers forming a series of dark closets.

He makes the Holy of Holies a cube of 20 cubits, but the height of the Sanctuary reduced from 30 cubits to 17 cubits, by introduction of an upper chamber, and thus light is admitted to the Sanctuary, any more than to the Holy of Holies.

#### Secondly. The European. Prof. Wilkinson's Design.

Passing to the second section of the subject, we come to consider the views entertained



advocated by the accomplished author of the "Prolusions Architectonicæ."

"The chief object of the present essay" (says Professor Wilkins in his essay entitled "The Temple of Jerusalem the Type of Grecian Architecture") "is to show the influence produced on the Arts by the commencement and accomplishment of this great enterprise, and the example it afforded to the architects of the ages immediately following, as yet unskilled in architecture, and wanting some type of great authority for their guidance."

"If we compare," says he, "the plan and proportions of the Syrian Temple with those of some of the earliest examples of Grecian origin, such, for example, as those at Paestum and Egina, a resemblance will be found to exist that can only be attributed to the adoption of the same principles by the architects of Palestine and Greece" (see Illustrations).

On the assumption that the Jewish cubit was equivalent to 21·888 in., the extreme length of Solomon's Temple, by a little stretching, is made, in his restoration of it (see Plate), to agree with that of the Temple of Paestum within 2 in., and to be of the same width within 3 in.

To achieve this result, however, passages have been introduced to eke out the thickness of the walls of the house, and the end chambers are made deeper than the side chambers.

But these narrow passages in the thickness of the walls serve a double purpose; they are substituted for the "windows of narrow lights." There being commonly no windows in ancient Grecian temples, Professor Wilkins has felt it incumbent upon him to show that none necessarily existed in Solomon's Temple; and he quotes a passage from the Odyssey, where the same word is translated "intervals," interpreted by him to mean "narrow passages in the thickness of the walls."

To make the total height agree with the usual proportions of a Grecian elevation, he considers the length and breadth of the house, as given, were internal dimensions, and the height was an external measure. By this arrangement he contrives to make the sanctuary, and the oracle and the porch, of equal external height, whereas the first is distinctly stated to be 30 cubits high, the second 20 cubits, and the third is not given at all in Kings, and is exaggerated in Chronicles by the curious multiplication of the height of each of its sides.

By adding 5 cubits for the roof, and 5 cubits for a raised floor, and deducting this from the 30 cubits given as the height of the sanctuary, it is made to agree with the internal height of the oracle. By further adding 2 cubits to the height of the side chambers, these also are made to fall in and range with the rest, and the general conformation is complete. In the number of chambers he follows Josephus, and provides thirty on each floor.

We now come to the celebrated pillars in the porch, but where are their chapters of lily work and pomegranates? As no early Greek temple was ever 5 cubits deep, these also had to be got rid of; and as, moreover, an entablature and pediment was indispensable to make the resemblance complete, the learned Professor proceeds to provide them in the following ingenious manner.

He first gives a translation from the Septuagint text, which runs as follows:—"And he made two epithemata of molten Brass, to place them upon the capitals of the columns, 5 cubits was the height of one epithema, and 5 cubits was the height of the other epithema." And then explains that the architectural term epithemata, translated chapters in our version, properly means some numbers placed over the capitals, and not only the whole entablature, but the pediment of a building also; and that the words in Kings translated, "Upon the tops of the pillars," should be rendered "Upon the capitals of the columns."

Mr. Fergusson has also taken advantage of this suggestion, since he has needed arguments to support his latest idea, viz., the likeness of the pillars and their appurtenances to the Indian prau.

Now, we have all heard it said that the Doric order originated in the petrification of wooden beams of construction, and that the pediment grew out of the sloping timbers of the roof; the triglyphs being suggested by the ends of the tiebeams; but Professor Wilkins believed that neither wood nor stone was the material of the original type, but molten brass.

As for the brazen network and pomegranates

encircling the chapters, these he suspends from the epithemata, and to them refers the origin of the guttæ in the Doric and Corinthian orders.

Then as to the "lily-work of the chapters," he suggests that this was an ornamental fascia, resembling the painted ornament so frequently found in Grecian temples; and in this way every distinctive peculiarity of Solomon's Temple is merged into that of a succeeding period, of which it is proclaimed the type.

#### Hakewill's Design.

With passing remarks upon the views of Mr. Hakewill, as published by him in 1851, we will conclude this notice of the European side of the question (see Illustrations).

Mr. Hakewill follows up Professor Wilkins, but is much less scrupulous than he, and wonders that the learned Professor "should have so clearly seen and proved the fact of the resemblance with the Greek temples, and yet following Villalpandus and Le Roy, should have suffered the question of chambers, in reality, so to mar his theory, as to leave no resemblance in his illustration."

Therefore, suiting the action to the word, he defines the word "chambers," in our translation, to really mean "defined and limited space"; and the word "window" to stand for "means of light," and sweeps the side chambers and the narrow passages, substituting a peristyle of columns for the outer walls, with a wooden screen formed against them inside, which he continues all round the building, and even in front of the porch, and then very naively remarks, "The close similarity between this and the universal form of the Greek Temple is too obvious for remark." \*

#### THE POLLUTION OF WATER SUPPLIES.

At the January meeting of the Association of Public Sanitary Inspectors, held on Saturday evening at No. 1, Adam-street, Adelphi, an important paper, on the "Pollution of Rural Water Supplies," was read by Mr. James Bateman, C.E., Surveyor of the Eveleigh and Pewsey (Wilts) Local Board, before a large audience of inspectors and visitors. The Chairman of the Council, Mr. G. B. Jerram, presided. The paper was illustrated with plans drawn to a large scale, showing the defective construction of existing cesspools on the farms of a district which supplies London with enormous quantities of milk daily, and exhibiting improved forms of cesspools effectively ventilated.

Mr. Bateman, in his paper, admitted that the question of water supply was one for the engineer rather than the sanitary inspector, but held that at the present day the latter official should know enough of hydrostatics and mechanics to report upon and suggest at least temporary remedies, in pressing cases of failure or contamination. Sanitary science was almost totally unknown in the rural districts, and the provisions of the Public Health Act of 1875 were, in the lecturer's opinion, totally inadequate. Villagers whom he could name depended almost exclusively upon a well in a churchyard for their drinking-water; and last summer, this failing, they were compelled to travel a distance of five miles for the water required for domestic purposes. The samples on the table were fair specimens of that obtained from the domestic wells of the whole town of Pewsey, an unpolluted well being a rare exception. They were contaminated with soakage from manure heaps, piggeries, privies, and land dressings generally. The earth-closet system, as a remedy, had been a failure, in his experience,—the tenants being unable, and the sanitary authorities unwilling, to incur the expense of making it effective. The present depressed state of agriculture almost precluded the hope that anything would be done to remedy these serious defects by private individuals, but it was imperative upon sanitary authorities, the custodians of public health, to supply one of the first essentials of healthy life,—a pure and wholesome water. In many other counties of the west, besides Wilts, the water supplies were equally scanty, foul, and filthy, and in some districts where the cloth manufacture was carried on, the streams themselves were highly polluted, the Rivers Pollution Act seeming to be more

\* To be continued.

honoured in the breach than in the observance. Of the Green Pump at Calne Professor Stoddart had reported as follows:—"The water is of a yellow-brown colour, full of suspended matter, consisting of iron dust and partly of flocculent organic matter, with infusoria and bacteria." The Abyssinian tube-wells had been tried in some places with partial success, but in no case within the lecturer's experience had an adequate supply been reached. He did not say the system was at fault, and he thought a better result would have been obtained had Messrs. Legrand & Sutcliffe, or other persons as competent as they, been employed to sink wells. The Rivers Pollution Act scarcely went far enough. Penalties were only indicated where new drains were turned into the water-courses, but the old drains went scot free. The volume of sewage was being added to every day by the connexion of new drains, and one of the most valuable sources of water supply was thus becoming more and more contaminated. The question had an important aspect for Londoners. A large tract of country extending between Reading and Trowbridge, the Kennet and Avon Canal, and the Berks and Hants extension of the Great Western Railway, which formerly was exclusively devoted to corn-growing, had been turned into pasture land, the corn farms becoming dairy farms for supplying milk to the various milk companies of London. The farmer had altered the character of his farming, but he forgot then to change the noisome surroundings of his homestead. The hollowed centre of the farm-yard formed a gigantic cesspool, filled up with the manure of the pig-styes, stables, and stock-sheds, and the rotting mass was constantly churned up by the passage of cattle over it. The rain-water from all the roofs discharged itself into the mass, which became by constant accumulations a large pool of most offensive liquid sewage that in time filtered through into the well, from which the supply of water drawn for cattle and man was exclusively taken. The most scrupulous cleanliness was observed in the cow-houses and the dairy. In the course of a tolerably long experience the lecturer had never detected a sour or dirty churn, and the refrigeration of the milk and its carriage were carefully carried out, but it could not be wondered at that the tenants were subject to diphtheria or that the medical profession should be occasionally baffled by the outbreak of diseases of mysterious origin. The first of the remedies he would recommend was the placing of the cow-houses under the inspection of the sanitary officer instead of under that of the county police. The police were an excellent body, but not qualified for an important duty demanding a really technical training. There should also be a stricter supervision by the metropolitan dairy companies, and a determined opposition to the reception of milk from any but those farms which had been certified by the sanitary authority as being properly drained and having a pure, wholesome, and sufficient water supply. Until that became law there must be periodical outbreaks of disease.

In the discussion which followed the Chairman, and Messrs. Boulter (Bexley), Poulson (Chelsea), Alexander (Shoreditch), Middleweek (Kensington), Rumball (Barnet), and Dee (Clapham) took part.

#### THE ALBERT DOCK.

The enormous trade of the Port of London makes everything connected with the development and extension of its stupendous docks a matter of wide and really national interest. One of the most powerful of these dock companies owns the London and St. Katherine and the Victoria and Albert Docks, as well as the Cutler-street Warehouses and the East Smithfield Railway Depot; and has invested in these vast undertakings a capital of over ten millions of money, upon which, even in these times of commercial depression, and in those gloomy days of the shipping trade, a dividend of over three per cent. is earned and paid.

The tendency of all the new dock extensions is progressively towards the sea. The Victoria Dock was the first step down the river, and by that work a great bend of the Thames was avoided. The direct extension from that fine shipping haven was the enormous Royal Albert Dock, opened for the admission of ships in 1880. By this vast engineering work a broad peninsula was cut across, and another bend of the Thames



avoided, vessels entering the new dock 11 miles down stream. The particular locality of a dock in respect to the trade and warehouses of the City has very important bearings on its influence as well as on its own returns of profit and its commercial success. And as the various dock enterprises now in execution are brought so far towards completion that the trade and traffic with them are commenced, many features of value are brought out in strong relief. This is particularly striking in the present instance of the Albert Dock. Its distance from London is not too far for cartage or lighterage. City merchants have already found that, once their goods are loaded in their vans, it is cheaper and more expeditious for their horses to draw them the whole journey than to re-load into barges or on to the railway trucks. Again, in the case of wool, the total annual importation amounts to about 1,100,000 bales, of which the London and St. Katherine Docks and two wharfers take one million bales. As the warehouses at these docks are handy for merchants to inspect and sample the goods, it is of the greatest advantage to the Dock Company to have their warehouses remain the customary depôts for this commodity. The easy distance between the Victoria and Albert and the older London and St. Katherine Docks permits of barging between them. The trade brought already by the large Australian and other steam-ship lines is of great magnitude, and it is of the highest importance to facilitate the arrival and departure of the immense vessels now employed in the ocean-carrying trade. Hitherto, both entrance and exit have, since the opening of the Albert Dock, had to be conducted through one and the same channel, the outgoing ships having the precedence of coming out on the flowing tide. The original design of the Albert Dock provided two locks from the river into the outer or Galleons Basin; and it was the engineering works of the second entrance that a large party of practical visitors were on Monday last invited by the chairman and directors of the Dock Company to inspect. The Act of Parliament authorising these new works was passed in May, 1884, and the entire undertaking, it is expected, will be completed early in the spring of the present year. The new works consist of an extensive enlargement of the Galleons Basin, giving an additional water space of some fifteen acres, with two additional berths for the largest steamship liners; a second entrance from the Thames by means of a lock 550 ft. long and 80 ft. wide contiguous with and parallel to the existing entrance, but with this difference, that the new lock has a depth of 36 ft. below Trinity high water, or 6 ft. more than the present one. Besides this there is, branching off from the new entrance into the river, a very fine landing-stage with a river-front parallel with the shore extending for a length of 1,120 ft. down the Thames, and having a depth of water alongside of 27 ft. at low water. The passenger traffic between London and the Albert Dock is carried on by four trains an hour each way between Galleons Basin and Fenchurch-street, and amounts to an annual total of over two millions of passengers. The railway lines are being carried right on to this river wharf, so that passengers may have the facility of landing as soon as the ship arrives at the pier, and then taking train on the spot, save some notable time by proceeding immediately on their forward journey, over what they would be able to do if the dock or the basin had to be entered. Equally well facilities of latest embarkation be afforded by the river wharf, as well as opportunities of discharging at the earliest, or despatching light or perishable goods at the latest, moments. There is one very valuable feature in the construction of this river-wharf, viz., its division at intervals by walls of concrete and brickwork as a protection from fire. The river shore inside the wharf has also been thoroughly well embanked. The excavation for the lock has been made in clay, peat, sand, and gravel, and over 500,000 cubic yards of soil have been removed and deposited on the company's land.

The great sumpt for the drainage of the engineering works has been carried down to a depth of nearly 60 ft., and enters the chalk. The pumping is effected by four 24-in. pumps, throwing out 1,000 gallons per minute. The lock and basin walls are of concrete, faced with vitrified bricks, the quoins and cills and copings being of Cornish granite. There are three pairs of iron lock-gates,

which are being built in position, and these will be opened and closed by hydraulic power. The roller-paths are made of cast steel. The invert of the lock is formed of seven rings of bricks strengthened by concrete, and under the entire lock there pass four culverts for the conveyance of drainage and the service of the gas pipes and electric wires.

The works have been designed and carried out by the General Manager and Consulting Engineer, Colonel Martindale, C.B., R.E., and Mr. Carr and Mr. Thomas, the Company's Engineer. The execution of the lock has occupied a little over eight months, and stands for rapidity of accomplishment, probably the first in speed of any such work on record. The perfection of the construction reflects the greatest credit upon all concerned.

The works have been protected from influx of the river by a copper dam across the mouth of the lock-entrance, whilst at the rear they have been defended against the water in the basin by a concrete wall 20 ft. thick at its base and 530 ft. long. This wall is in process of being blasted away; the final coup it is intended shall be given by about a thousand shots fired simultaneously by electricity.

## LONDON DRAINAGE.

MEDICAL OFFICERS AND ENGINEERS.

In the current number of "The Asclepiad," a book of original research in the Science, Art, and Literature of Medicine, preventive and curative, and which is written entirely by Dr. Richardson, F.R.S., there appears an article on the drainage of the metropolis, headed "Under London: a Prospect for Radical Reconstruction."

The main points raised in the article are:

The advocating of a dual system of removal for sewage and storm-water by the introduction of iron sewers, for the sewage, to be inserted in the existing sewers, which are proposed to be used for storm waters only, and the application of an exhaust in lieu of water as a sewage carrier.

The remedies for existing evils are drastic.

The word-picture is dramatic, being written in that forcible and lofty English which attracted so much attention to the same author's "City of Hygiene."

Dr. Richardson makes complaint that the existing state of the drainage question is due to the interference of engineers in matters medical, in the following words:—

"If our engineers had kept to their own splendid department of science, instead of assuming the position of doctors of health, or if the latter had been stancher at the first, all the present trouble might have been saved. By reverting to their true positions and functions, both can make a magnificent amende."

A reply to the article has been addressed to Dr. Richardson by Mr. Ellice-Clark, M.Inst.C.E., of which we print the first part:—

"To B. W. Richardson, esq., M.D., F.R.S."

Dear Sir,—I have read your article, 'Under London,' in 'The Asclepiad,' with that interest and attention which not only the importance of the subject must command from sanitarians in general, but also with that desire which is possessed by myself, in common with most municipal engineers, to advance the present system of removing the voidance of great cities, and to bring the practice of that removal nearer the ideal of the more advanced professors of preventive medicine, of which you may be deemed the foremost.

You will pardon me, if the remarks which I presume to make on your paper are prefaced with a dilution upon the inferential conclusions drawn from the statement, that engineers trespass upon the work of doctors of health.

A knowledge of the facts as they exist in provincial towns enables me to draw different conclusions to those you appear to hold on this subject. If you take those great centres of population, where the doctors of health have as complete a knowledge of preventive medicine as can yet be obtained, you will find that, so far from the engineer having strayed over the border of his own professional area into that of preventive medicine, too often the reverse has been the case.

No doubt, there are examples of municipal engineers undertaking work which properly belongs to the municipal doctor, but this interference on both sides depends very largely upon individuals. Nor must it be forgotten that while the Borough Engineer has had an existence of nearly half a century, the creation of the Medical Officer of Health is comparatively recent. In the latter's absence, the municipal engineer was, from the very exigencies of the case, compelled to intermingle some of the well-

known facts and theories of preventive medicine with those of engineering, in order to prove the necessity of sanitary works to those who governed, and who too often were special pleaders for the *status quo ante*.

But let me be understood, with that deference and admiration which high attainments must command from all thoughtful men, and which brethren of appreciation, have been ungrudgingly given by engineers to many eminent men in your profession, who have brought the study of preventive medicine to its present standard, that it is no exaggeration to say more than seventy-five per cent. of those who have been called upon, often reluctantly, to fill the office of Doctor of Public Health, have not only had no technical knowledge of their work, but there was until lately, no literature out of which a knowledge could be built up; and while the medical schools continued to ignore the claims which this branch of the profession had upon them, it was by no means astounding.

One may venture to think that such an interference as you describe is inborn of the practice of all sciences which are still in their infancy.

Probably had not the Doctor practised Sanitary Engineering and the Engineer practised Preventive Medicine, the pre-eminence of England,—such as it is,—in public health matters, would as yet be an unaccomplished fact,—certainly, it would have not attained anything like the standard of efficiency it has at the present time.

It may be that the time has now arrived when this practice of engineering by doctors and of doctoring by engineers, should cease, although an intimate acquaintance with a majority of the local officials of this country does not hold out the hope that this desirable consummation can yet be brought about with advantage to the community. Indeed, it cannot be so until the State insists upon every doctor of health and every engineer of health proving fitness, by a test examination, of the necessary qualifications for their respective offices.

It would appear incredible, were it not demonstrated to every-day understanding incessantly, that men should be appointed to offices requiring special and complete knowledge in special and complete brains, without any test whatever as to their possession of even the elementary principles of such special knowledge, or of such special brains. No one would be accused of exaggeration by those who know, if they stated that half of those appointed, at the inception of their public employment were in the former case.

This statement is not made by way of reprisal,—it, alas! applies equally to my profession and your own. Municipal engineers would indeed be living in that metaphorical straitened place, a fool's paradise, in which they are accredited by the public, as the outcome of their work in the most practical of all the professions, if they made any attempt to place all their existing order on a high platform of efficiency.

We know too well how their appointments are made, and by whom, and how often sinister influences are brought to bear to secure the services of those who are miserably incompetent, so that their employers may have some excuse for ill payment, and we should raise a false issue if we declared that competent men now filled every office.

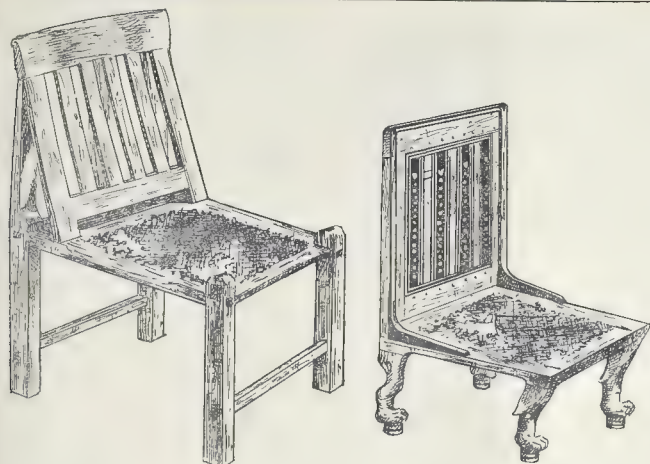
That will not, however, prevent us from seeing ourselves in a shade of light only a little darker than that in which others see us, and of endeavouring to raise the now much too low standard of efficiency in the rank and file of the municipal engineering army.

These remarks are intended to apply to provincial places and not to the metropolis. To many of us unsophisticated provincials it is news to hear that there is any friction between the engineer and the health doctor of the overgrown and still-growing Babylon. In the first place, we were not aware that municipal government had reached such a high stage that there was any individual who had committed to his charge the task of directing the practice of preventive medicine for the metropolis; and if conflict there be between professors of public hygiene and engineers, it must be outside the charmed circle of chief officials. That there are great, grave, and deplorable defects in the administration of municipal engineering in London, we provincials are well aware, and that there is ample room for the complaint of doctors of health; any week in London makes stilly apparent; and you may like to be advised that we do not set a higher value on the metropolitan sanitary engineer, or that it brings in the open market of public opinion.

Such a conflict as you assume is being waged between engineers and medical men in London is well understandable when it is remembered that London has in reality no municipal government,—that is, no municipal government as is meant by that term in the provinces. It would be strange, indeed, if there was not conflict of opinion, and, in fact, of practice, between officials themselves, and between officials and outsiders in such a disintegrated, hotch-potch medley of government as misrules London.

As to the question apart from local considerations there now exist, except in the isolated cases named, no reasons why Captain Engineer and Captain Doctor should not each sail his own ship on his own course. The line of demarcation between





Two Egyptian Chairs

the work of such officials at all points is not very clearly defined,—but sufficiently so to keep each ship out of collision. It only requires that mutual forbearance between individuals, without which success cannot be attained in any walk of life. We believe, at all events, so far as the provinces are concerned, not only has the 'magnificent amende' of which you speak, been made, but that as complete harmony prevails as is practicable where matters mundane are governed by erring humanity.

Brighton."

E. B. ELLICE-CLARK.

Dr. Richardson's article is well worthy of perusal by all municipal engineers. "The Asclepiad" is published by Longmans.

## TWO EGYPTIAN CHAIRS.

THESE two chairs, which are in the British Museum, are here reproduced from drawings by Mr. J. H. Eames. The larger one has a very purpose-like and remarkably modern appearance, and both, except the seat portion, are in wonderful preservation, considering their age.

## THE FORTH BRIDGE.

SIR,—There is a correction of a personal nature in your otherwise very satisfactory notice of the Forth Bridge works in last week's issue [p. 10] which I should like to make. The name of my partner, Sir John Fowler, K.C.M.G. (now on his way to Australia in search of more sunny skies) should have preceded my own as chief engineer of the work.

B. BAKER.

Westminster, January 2, 1885.

## QUANTITIES.

SIR,—It is impossible silently to pass over the anonymous letter from "A Suburban Builder," contained in your last issue [p. 64]. The items referred to are maliciously misquoted and understated, and, were it not for their misleading character, would have been passed over with the contempt they deserve. I may state that great stress was laid by the committee upon the tenders being in by the first week in January, so, owing to short time for preparation, abbreviation had to be adopted; still, the only part of the bill mentioned by your correspondent that exception might be taken to is the last, viz., the mitres to dado being omitted, and a glance at the drawings would suffice to explain their number. The latter are fully detailed and figured, and with the specification no competent builder need have any difficulty in thoroughly understanding the work in the minutest detail.

Answering the items in detail, the first has reference to facing; here "face and soffit measured" has been tacked on to the real clause, to render it absurd, though it is borrowed from the following item, which reads, "rough arches, face, and soffit measured." The gables and ornamental work quoted are not in this item, as a glance at the elevations would show where they are distinctly written on as terra cotta, and a price allowed for the same at the end of the bricklayer's bill, of 70*l.*, fixed complete.

The mason's bill is abbreviated. Your correspondent does not add, as the quantities state, that a tender has been received to execute the whole item fixed and cleaned down complete for 5*s.* per cubic foot, this being from a first-class mason used to my work, and after a careful study of the drawings, it being at the option of the contractor to quote lower if so disposed, or leave this item at the figure stated.

The carpenter's bill is again misquoted. All the extra labour to roof timbers has been taken separately, as would be found on a proper study of the bill, and the curved ribs to principals are taken in superficial feet in an entirely separate item, likewise the turret; and surely the dado is sufficiently described for an intelligent joiner to estimate from, especially as it is fully detailed on the drawings.

HENRY A. CHEERS.

## OWNERSHIP OF DRAWINGS AND SPECIFICATIONS.

SIR,—Having lately prepared for a client sketches of a house he proposed building, he approved of the sketches and had the working drawings and specifications completed, and got estimates for carrying out the work. Expense was never named, and after the offers were got, the cost was far in excess of what he was prepared to spend, and the work was abandoned.

A charge was made for the preparing of the sketches, working drawings, and specifications, which was taken exception to, and, after some correspondence, a compromise was effected,—as it was perfectly evident that no more could be got,—thus reducing the charge to considerably below the usual percentage.

The client now asks for the plans and specification, three days after a discharge was given.

I shall be glad if any of your readers can inform me, through the medium of your valuable paper, (1) to whom do the sketches belong; (2) to whom do the working drawings and specification belong,—to the client or the architect? SCOTLAND.

## NON-ACCEPTANCE OF LOWEST TENDER.

SIR,—In your issue of the 2nd inst. (p. 64), I read that several of the first-class builders in London are somewhat dissatisfied with the mode and matter with which their tenders are at times treated. Messrs. Rider & Son especially complain that although their tender was some 90*l.* below the next, yet they were not accepted on the grounds of the explanation given by the clients.

While sympathizing to the utmost with the builders who are put to unnecessary loss of time and enormous expense, which must be the case in getting out the cost of these large jobs, yet I have often felt how the various branches of the trade which the builders have to deal with are treated, as compared to the builders themselves.

What I specially mean to call the attention of your readers, and especially of the builders themselves, to, is that when manufacturers are invited to estimate for their goods along with probably a dozen or twenty competitors in the same line of business, they very rarely have any other satisfaction than that of spending quite as much of our valuable time and incurring quite as much expense as the builders themselves do.

While admitting that the builders are probably

overtaxed by letters from the manufacturers backing up their estimates and asking for the order in a variety of different ways, and likewise their representatives waiting upon them with a desire to secure the order, yet my opinion is that they have themselves to blame for thus allowing themselves to be so troubled.

There are many who issue post-cards or circular letters, thanking the manufacturers for having quoted, and regretting at not being able to accept their tenders. This, as a rule, ends the matter so far as the builder is concerned. But the manufacturer is quite as anxious to know who his competitors are, and at what prices the order has been accepted, so that they may go into the matter with a view of finding out wherein the discrepancies are; but, unfortunately for the manufacturers, the builders will never tell them the one thing nor the other, so that the builders themselves are on a better footing than the manufacturers; and I should just like to get this question answered by some of the builders themselves as to why they should object to send a list of the tenders to the manufacturers in the same open way in which they are dealt with by the architects. I do not go into the detail of the fairness or unfairness of your correspondents in any particular case, as I know there are architects and architects, as there are builders and builders; but we are now dealing with those builders who are worthy of the name, and not with what are termed the jerry-builders of London.

At one of the recent dinners of the Clerks' Benevolent Institution a very worthy man made a speech to the effect "that if the merchants that were present that evening would take his advice and only supply goods to the respectable builders of London, and ignore the jerry-builders, their masters (meaning the respectable builders of London) would not only make more profit, but that they, as builders' clerks, would most probably be in the receipt of higher wages," &c. This I considered a very sensible speech, and one which a merchant could but endorse; if the respectable builders of London would not encourage merchants whom we have an equal right to term jerry-merchants.

R.

## THE LONDON PAVILION MUSIC-HALL.

SIR,—In your description of the London Pavilion you state that the lifts are fitted by Messrs. Goddard & Co., of High-street, Peckham. This is an error, as we supplied the lifts in the Pavilion proper.

R. WAYGOOD &amp; Co.

## TIMBER MEASUREMENTS.

SIR,—In reference to the letter on this subject in your last [p. 64], the principle upon which the calculations of the siding sale and timber measurers' tables are given appears to be as follows.

If the sectional area of a piece of square timber be 4 ft. superficial, each side will be 2 ft. across, and a cord meeting round it 8 ft. long, of which the side or parallel diameter is one-fourth, and the cord twice doubled would give the side from which to obtain the area.

It is clear that a circular piece of timber of the same diameter must have a less sectional area than the square one, from the loss of the corners. To ascertain the difference, the practical measurer assumes that a cord applied to a circular piece of timber will, as with a square piece when twice doubled, give the proper side (quarter-girth it is called) from which the area, and thence the cubic content, is to be derived.\*

Thus, in the case in question by your correspondent, J. Wardale, the length being 15 ft. and the quarter-girth 2.25 ft., which squared gives 5.0625 ft. as the sectional area, the cubic content of the piece comes out 75.9375 ft., or, in "Hoppus," 75.11" 3" (15' x 5.0625' = 75.9375 ft.).

GODALMING.

SIR,—Since writing last week, I have looked through the preface to Hoppus's "Measurer,"—one which I am told is well used,—and I find there that he published his tables partly to correct the errors of existing tables; e.g., he says, "In Keay's tables this erroneous rule is given for measuring unequal-sided timber or stone: add the two sides together and take the half thereof for the true square, or take a fourth of the girth of the four sides."

His observation on this is, "a greater fallacy could scarcely be asserted."

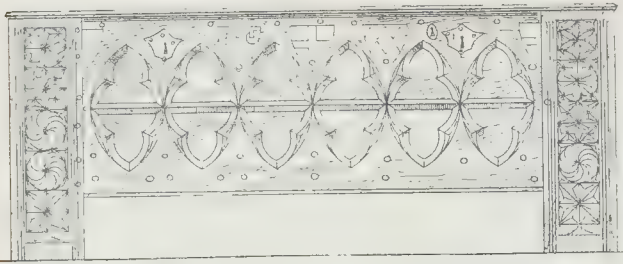
He is quite right.

But after this censure of Keay, one is surprised to find his own direction for measuring round timber,—"With a line gird the piece in any place, then double the line twice, and you have one-fourth of the girth for the side of the square," i.e., the square which is equal to the cross section of the piece of timber.

Surely, Mr. Keay might cry out at this, "Shall the blind correct the blind?" Why, to say that one-fourth of the circumference of a circle is the side of

\* Then the practical measurer is a blockhead, as so-called "practical" men often are. But see Mr. Wardale's letter following.—ED.





Ancient Chest, St. John's Church, Gloucesterbury.

the square, whose area is equal to that of the circle, is as great a fallacy as that of poor Mr. Keay!

In fact, he has exposed Mr. Keay's error, and fallen into as bad a one himself.

The error is a palpable one to any one possessing the smallest knowledge of mensuration.

And yet timber sellers have gone on for the last eighty years selling 100 ft. of timber as if it were 80 ft.

J. WARDALE.

#### CHURCH-BUILDING NEWS.

**York Town (Surrey).**—York Town Church has just received an internal addition in the shape of a new vestry screen in carved English oak. It is in the Early English style, and has ornamental moulded panels in its lower part, whilst surmounting the transoms there are arcades of nine bays, above which is pierced tracery. A bold cornice, with paterne in the hollows, carved in the solid, surmounts the whole. There is a door in the centre: the door furniture is of wrought iron. This screen has been designed by Mr. Arnold H. Hoole, architect, of London, and executed by Mr. Harry Hems, of Exeter.

**Norwich.**—From the *Norwich Argus* of the 26th ult. we learn that a new reredos of carved oak has just been erected in the well-known Church of St. Peter Mancroft, at an entire cost of nearly 1,000l. This reredos is of the entire width of the sanctuary (that is to say, nearly 18 ft.), and in height it is 16 ft. The work, which is Perpendicular in style, consists in the main of two series of niches, one above the other. There are nineteen of these niches on the top tier, but there are a lesser number underneath, as the two doors that lead into the eastern vestry are also incorporated in the design. The ancient doors have been retained and embraced in the new design, and with steps of polished Devonshire marble, and groined and canopied heads, now form good features. The niches are all groined, and take an ogee line. They are richly moulded and carved. The reredos has a bold cornice running from north to south, surmounted by a pierced and carved cresting. At intervals crocketed pinnacles rise above this, but otherwise it is continued across in an unbroken line. It is stated to be the intention to fill all the niches with sculpture, but at present only some of these statues are in place; others, however, are in hand. Mr. John P. Seddon, architect, of London, designed the reredos, and the carrying out of the work was entrusted to Mr. Harry Hems, of Exeter.

#### The Student's Column.

##### FOUNDATIONS.—II.

MADE GROUND.

**E**ARTHY material that has been deposited by human hands is commonly known as "made ground." We may include under this general heading all kinds of materials that are met with above the natural virgin soil.

**Town Sites** of any antiquity are always covered, more or less, with the rubbish of former buildings and the refuse of houses and workshops. In the City of London the original clay and gravel are covered up with soil containing in its lowest parts remains of Roman occupation. Above this is found Medieval and finally modern refuse, rising to a height of some 18 ft. in the oldest parts of the City. Until streets were properly paved and regularly cleaned, the hard materials thrown from the

houses, together with the stone used in repairs of the roadways, were continually raising their level. It has been roughly estimated that the City has risen one foot for every century of its occupation. Ashes and charred woodwork form a large part of the material found under the houses. The upper portion of this made-ground, that which is immediately beneath the walls of the buildings,—is generally dry and tolerably firm, having become compressed by their weight. The lower portion below the level of the sewers is wet, soft, and unsound. On the site of the Old Wallbrook, where the mud and rubbish brought down by the stream underlie the refuse of the town, it has been necessary to go down 45 ft. in order to get a firm foundation for an important building.

On the outskirts of a town all hollow places, such as old brickfields, places from which sand and gravel have been dug, and natural depressions of the soil, have been used as rubbish-shoots, and are filled up with town refuse, consisting partly of vegetable matter. In some parts of Finsbury there is a depth of 22 ft. of such ground. Refuse-heaps from mines and manufactories, acquiring in time, and aided by the percolation of water, a degree of solidity according to the nature of the material.

Whether the soil in which a foundation has to be obtained is natural, or the result of such operations as have been described, it is the business of the architect to form in the first place some approximate idea of the work that will be required, having regard to the nature of his building, and to the means at his command. When the work is begun he has to watch the excavations so as to determine the depth to which it is necessary to go, and the modifications that may be required in his original ideas in order to meet the ascertained nature of the ground. The object is to get, if possible, an unyielding foundation, but, as that is seldom obtainable in the strict sense, he will be satisfied if the settlement of the ground below the building is so small as to be imperceptible. Even if the settlement is so great as to be distinctly measurable it may be of no consequence if it is uniform over the whole area of the site. Nevertheless, in towns where buildings adjoin each other, and indeed have party walls in common, it is necessary to take such measures as shall prevent any perceptible settlement, and the mischief to which it would give rise.

##### EXAMINATION OF THE SITE.

The first notion of the nature of the subsoil of a site will generally be gathered from those who are acquainted with the locality. A builder will have a good knowledge of the soils in his district. An excavator will have a very special knowledge of the soils in which he is accustomed to dig. It is a mistake to neglect this experience which is ready to hand. Nevertheless in cases of any importance one or more trial-holes, according to the extent of the building, or the uncertain nature of the soil, should be dug to the depth of 4 ft. or 5 ft. In ordinary cases, where no underground basement or cellar is required. Below the bottom of the trial-hole the ground may be further examined by means of an ordinary pickaxe,—still better, by a large crowbar. If it is desired to extend the examinations several feet through a doubtful soil, a long, thin, round iron rod, with a large ring handle formed on its upper end, will be

found most useful. The use of such implements by one whose hand has acquired some delicacy of perception by practice will give pretty clear indication of any changes in the character of the soil as they penetrate with more or less resistance into the ground. On carefully drawing up the bar or rod, we can judge by the dirt or dust adhering to the point whether it has been in contact with such matters as brick rubbish, chalk, gravel, or clay. However valuable such examinations may be, they can only be of their full value to the person who actually makes them. To one who is accustomed to "ground work," the sensation experienced on dropping down on the feet to the bottom of a trial-hole or trench will tell whether the ground is loose, or sodden, or firm. For deeper investigations than such as can be made by hand, the apparatus used for boring will show the nature of the subsoil, foot by foot, to any required depth. If a well has to be made, and this is often necessary before deciding whether a house shall be built on a particular spot, all the information that is required may be got by that means. The natural level of the water in the ground will be ascertained at the same time, and it is important to know whether the foundation will be in tolerably dry earth or in a wet pervious soil, which will cause trouble in the excavations. But, whatever may be the nature and the extent of such preliminary trials, it is well, especially in the made ground of a town site, to be prepared for the contingency of a worse soil being found than these partial examinations indicate. The provision in a contract of as much additional excavation and concrete as can reasonably be thought prudent, will prevent the embarrassment which would otherwise be felt on the sudden discovery of unsatisfactory soil when the excavations are being made.

##### SOILS THAT ARE BAD AS FOUNDATIONS.

We have seen that such subsoils as rock and compact gravel form the best natural foundation, requiring only to be properly levelled to receive the footings of a wall. All other subsoils may be considered unsatisfactory in a greater or less degree. In respect of their defects they may be classed as follows:—

1. **Soils that are simply compressed** by a heavy load becoming firm when the full load has been put upon them. Made ground that has not become thoroughly consolidated generally yields in this way, particularly if the materials of which it is composed are soft or loosely packed or full of water that is driven out by pressure. The top soil of all ordinary sites will also yield in this way owing to the disturbing operations to which it has been subjected; but, as a rule, the virgin soil, deposited by water in its present position, does not compress very materially.

2. **Soils that squeeze out** under a load, escaping like a paste or thick fluid. Clay,—besides its liability to swell with moisture and to contract from dryness,—will squeeze out in this way when it is wet. When the wall of an ordinary building has its footings deep in compact clay unaffected by water no mischief may result; but if the clay becomes wet it will be forced aside from the part immediately under the wall and the projecting footways will be broken or tilted up, so as to become useless for their purpose. A soil that consists of wet silt or mud may be so soft as to be incapable of bearing a wall, which will, therefore, sink while the soil which it displaces is forced up so as to raise the surface of the ground adjacent to it.

3. **Soils of irregular composition** along the course of the same wall. Where the natural soil suddenly changes, owing to beds of different materials cropping up to the surface where a site extends from higher ground down to the margin of a stream, and where the ordinary variations of made ground exist, this kind of foundation has to be dealt with. Upon an old building site such irregularities have to be specially apprehended.

##### Manchester Architectural Association.

The last general meeting of this Association was held on the 5th inst. at the Diocesan Buildings, Mr. L. Booth (President) in the chair. Mr. J. Spencer Hodgson (Vice-President) read a paper on "Architectural Ethnography," to which we may return. A discussion followed, in which Messrs. Meo, Talbot, and the chairman took part.



## Books.

*Architecture, especially in Relation to our Parish Churches.* By the REV. H. H. BISHOP, M.A. London: Society for Promoting Christian Knowledge.

IF the illustrations were equal to the text this would be a very good book, for it is well written and shows something more than a superficial acquaintance with the subject. But the woodcuts have not been made for the work, and consequently do not fit it. Many of them are of very indifferent quality indeed. We renew a long-severed acquaintance with many of Birket Foster's charming drawings, and have nothing but admiration for them as pictures, worn to death as many of them evidently are. But as elucidations of our native ecclesiastical art they are of but little value. Indeed, the pictorial side of that art has been kept almost exclusively in view: there is not a single plan, nor any deliberate effort to deal with the interior arrangements of our parish churches, and the changes which they have undergone to adapt them to a changing ritual. The (probably) Roman Church at Brixworth is described, but not illustrated, nor is the well-known church of St. Martin at Canterbury, nor the more remarkable church in Dover Castle, while many of the very numerous illustrations illustrate nothing in particular. This is annoying, because the book deserves a few specially-prepared drawings, and a few would make what is now, at least, obscure to the general reader, fairly intelligible. A table of the names of the several periods and their dates should be added, and a glossary would be an improvement. The author has evidently imbued himself with the spirit of Ruskin, as the following extract *apropos* of thirteenth-century work will show. "It speaks clearly of work done by one who rejoiced in it, and delighted to see that it was good. And since the creation of the world no noble work has ever been done otherwise, or ever can be." And the following, whether original or not, shows the writer to have a firm grasp of the essentials of Gothic architecture. "Look at such a doorway as that of Adel Church, Yorkshire. How rude and irregular in its workmanship! You may find that no two points of its zig-zags are exactly of the same angle or of the same projection. Each is roughly worked out of its own separate stone, and takes its chance of being equal to the others. And as the stones happen to be of unequal width, so are the ornamental points upon them. This is why our modern attempts at Norman have failed; the mason of the present day feels he 'cannot make it bad enough,' and it becomes ridiculous when measured out with modern compasses and worked to smoothness by modern tools." The above and similar passages show an insight not met with generally in popular works on art. The popular element in the book is perhaps its least satisfactory feature, and the various dissertations on the beauty and superiority of a particular phase of religious faith, and the implied shortcomings of other creeds, might have been omitted.

The enormous number of churches referred to in the course of the work,—many of them apparently personally examined by the author,—is surprising; and, in so far as we are able to test it, so is the general accuracy of his multitudinous descriptions. We are disposed to think that the dog-tooth ornament was elaborated from the earlier "nail-head," and not from the "fining down and undercutting of the Norman zig-zag, where the zig-zag points meet upon an edge"; but that is a detail.

On the whole, we are very favourably impressed with this little work; but we should like to see the mass of information which it contains as to the idiosyncrasies of our numerous parish churches systematised, and the over-worn woodcuts give place to some suitably-chosen and architecturally-drawn illustrations.

*Easements and Rights of Light.* By JOHN HOLDEN, F.R.I.B.A., F.S.I. Manchester. 1885.

This is the reprint of a paper read before the Manchester Architectural Society. It can scarcely be considered as an essay, it is simply a collection of some of the cases concerning the right to light with a few comments, and shortened and analysed. So far as it goes the paper is well done, and may be of some use to architectural students who desire to form an idea of some of the leading cases in regard to the right

to light. It has, however, this drawback,—it has not the completeness of a regular legal collection of judicial decisions, nor the literary and professional interest of an essay on the easement of light. Nor are the cases classed under one particular head, or arranged in chronological order. The references also are extraordinarily erratic, being the first one and then another set of legal reports without any rule. The most that can be said of this paper is that such cases as are printed are accurately analysed.

*The Queen Eleanor Memorial, Waltham Cross, with Historical Notices of "Ye olde Four Swannes Hostelerie, A.D. 1260," and other Places of Interest in Cheshunt.* By WILLIAM WINTERS, F.R. Hist. S. (Churchyard, Waltham Abbey).

As the season advances, we would strongly recommend those of our readers who want an object for their walk or ride to pay a visit to Cheshunt, and, under Mr. Winters's able guidance, inspect the beautiful Eleanor Cross (restored by Mr. C. E. Ponting), the Four Swans Inn (formerly the Manor House), and Waltham Abbey, with its numerous points of interest. Mr. Winters deserves much credit for the unsparing diligence with which his researches have been prosecuted, as well as for their happy result.

*Über Antike Steinmetzzeichen. Fünf-und-vierzigstes Programm zum Winckelmanns Feste der Archäologischen Gesellschaft zu Berlin von OTTO RICHTER, mit drei Tafeln.* Berlin: Runer. 1885.

DR. OTTO RICHTER does good service to the history, and more especially to the exact chronology of ancient architecture by his monograph on the "stonemasons' marks" of antiquity. The subject of these marks has, as regards classical masonry, received as yet far too little attention. Isolated instances have, indeed, been noted. More than fifty years ago Mazois, in his "Ruines de Pompéi," published a series of Pompeian stonemasons' marks, and since then, from time to time, attention has been called to the marks on the masonry discovered at Samothrace, on the foundations of the Casereum at Alexandria, and especially to those on the Severian and Palatine walls at Rome. The recent discoveries by the Prussians at Pergamos and by Dr. Schliemann at Troy have brought to light new "marks." A systematic treatment of these marks was much needed, and this want Dr. Richter supplies. He gives us an introductory chapter on the geographical distribution of these "stonemasons' marks"; then a detailed account of the marks found at Rome, Pompeii, Perugia, and Bryx; and, finally, a chapter on the origin and significance of these marks. Three beautiful lithographed plates give facsimiles of the marks *in situ* on the masonry, and some isolated instances. The monograph appears on the fifty-fourth "Program" of the Winckelmann anniversary at Berlin.

## RECENT PATENTS.

## ABSTRACTS OF SPECIFICATIONS.

5,542, Slate-grinding Machine. G. Walker. Working across the surface of a horizontal revolving table are two chains or sheets, one on each side of the centre line, and running over the chain wheels, whose spindles are carried in girders extending across the revolving table, and resting at their ends on a fixed platform. Loose rollers are provided for the purpose of giving additional pressure to the slates. There is also a trough for collecting the spent sand and water. The slates are passed on one after another between the chain and the revolving table, and are carried forward by contact with the former, the grinding being effected by sand and water. After having passed across the table once the slates are placed under the other chain, which runs in the opposite direction, and traverse the table a second time.

11,308, Railway and other Carriages. W. Wainwright.

Carriage bodies as usually constructed harbour dirt, and require frequent painting. The present invention is designed to obviate this. Panels secured to the framework of the body inside and outside the carriage are made of sheet metal, and coated externally with a surface of nickel or silver. The borders of the panels may be provided with metallic beads or mouldings. The door-pillars and frames may also be made of metal coated if desired. An additional advantage is obtained by the better diffusion of light from the bright surfaces in the interior of the carriage.

12,046, Setting off Angles and Distances. J. Hermann.

This instrument is used for setting off points whose relative positions have to be obtained very accurately. The work is clamped to a platform on a wheel divided into 360 teeth, carrying a collar divided into 360 teeth, and clamped to the wheel as required. The toothed wheel is free to turn on an arbor fixed to a platform attached to a V-slide so as to be capable of rectilinear motion, the extent of which is indicated on a scale. Some point is chosen as origin, and the work is then clamped, so that the centre spindle comes exactly over this point. Zero being shown on the various scales. By advancing the V-slide, and turning the toothed wheel according to the given co-ordinates of the points to be obtained, the work is moved into positions for the points to be marked by the centreing spindle.

13,457, Staircase Treads, &c. J. Whitley. Plastic indiarubber is placed in the perforations of a metal grating, and fixed in its place by vulcanising. It is generally most convenient to place two gratings one over the other, fill the interstices as described, and then remove the upper grating, which produces a mat or a tread suitable for stairs, halls, passages, &c.

## NEW APPLICATIONS FOR PATENTS.

Dec. 24.—15,847, D. Howell, Improvement in Casement Window-stay.—15,856, J. S. Thompson and W. Thompson, Improvements in Slate or Glass Roofing.—15,860, H. Doulton, Improvements relating to the Joints of Stoneware Pipes.—15,868, F. Candy and N. Frere, Improved Closet Pan Disinfectant.—15,870, W. Lea, Improved Hot-air Heating and Ventilating Stove.—15,877, J. Dejaiffe, Process and Apparatus for Dressing, Polishing, and Squaring Stone, &c.—15,880, E. Palmer, Improvements in Open Trough Water-closets and Urinals.

Dec. 28.—15,931, R. White, Improved Vacuum Blower for Stoves.—15,937, H. Ker, Improvements in the Preparation of Timber for Flooring and Match-boarding.

Dec. 29.—15,975, P. Nisbet, Improvements in Hand-boring or Drilling Tools for use in Quarries, &c.—15,997, E. Laporte, Ornamentation of Var-nished Surfaces.

Dec. 30.—16,012, J. Kenjon and J. Conlong, Improvements in Water-closets.

Dec. 31.—16,065, G. Bishop, Improved Firebricks, &c.—16,069, J. Corry, Improved False Grate for Kitchen and other Domestic Fire-grates.—16,070, B. Finch, Improved Sanitary Pipes and Joints for same.—16,080, E. Johnson, Open Grates and Stoves for Saving Fuel and Consuming Smoke.—16,080, J. Hunt, Improvements in the Method of Producing Wall-coverings, Roofing, &c.—16,096, H. Haddan, Improvements in the Construction of Terraces and Flat Roofs.

## PROVISIONAL SPECIFICATIONS ACCEPTED.

13,757, C. Hollingdrake and W. Stanfield, Improvements in Hot-water Apparatus for Domestic and similar purposes.—14,794, R. Anderson, Apparatus for Ascending Chimneys, &c.—15,081, W. Colles, Jointing Cast-iron or other Rain or other Water Gutters.—17,070, T. Ray, Method of Fixing Hollow Metal Bars, &c., in Ladders, Gratings, &c.—13,247, H. Headland, Improved Pot for Preventing Down-draught.—13,565, A. Brookes, Improvements in the Manufacture of Artificial Stones or Marbles.—13,741, D. Baker, Improved System and Construction of Ventilating Flues.—13,841, H. Ashley, Improvements in Cooking Stoves.—13,921, W. Ryan, Soldering Iron.—14,222, J. Taylor, Improvements in Saw Spindles.—14,253, C. Garlick, Improvements in the Construction of Stench-traps for Drains.—14,321, W. Hucklebridge, System of Glass Roofing.—14,457, E. Verity and Others, Improved Pivot and Weather-bar Arrangement for Swing and Reversible Windows, Doors, &c.—14,584, E. Wright, Improvements in Saws.—14,743, A. Howell, Sash Fastener.—14,760, G. Haydon, Escutcheons for the Keyholes of Street-door and other Locks.—14,825, E. Brennan, Improvements in Window-sash Fasteners.—15,214, J. Hancock, Ornamenting Surfaces in Imitation of Inlaid Woods.

## COMPLETE SPECIFICATIONS ACCEPTED.

## Open to opposition for two months.

1,776, J. Tomlinson, Improvements in the Manufacture of Plaster or Cement.—1,862, J. Wilesmith, jun., Securing Door, Cupboard Knobs, &c., to their Spindles.—2,775, W. Donald, Manufacture of Refractory Materials, Bricks, &c.—5,188, A. Lake, Illuminating Combination Tiles.—13,265, E. Dredge, Improved Apparatus for Cutting Wood, &c.—14,518, J. Ward, Improvements in the Manufacture of Artificial Rock-work and Ground.—14,545, A. Bean, Improvements in Water closets.—2,469, J. Culton and W. Eglin, Folding Seats and Tables.—2,751, S. Hurst, Sash Fasteners.—2,956, E. Collier, Attaching Knobs to Spindles.—3,438, G. Stephens, Improved Process for Ornamenting Glass.—4,014, F. Wildegore, Stop or Bolt for preventing the further opening of Windows, Shutters, Sliding Doors, &c., when partially open.—13,699, W. Keller, Improvements in the Manufacture of Cement or Mortar.—13,958, Improvements in Kitchen or Room Fire Grates.—14,353, J. Peckover, Improvements in Stone Sawing Machines.—14,734, J. Marples, Improvements in Marking, Cutting, and Mortise Gauges.



## MEETINGS.

FRIDAY, JANUARY 8.

University College. Professor Newton, C.B., on "Greek Inscriptions." 4 p.m.—Professor Charles Graham on "Chemistry in its relation to Engineering and Architecture." 3 p.m.

MONDAY, JANUARY 11.

Royal Academy of Arts.—Mr. J. E. Hodgson, R.A., on "Art in England." 1. 8 p.m.  
 Surveyors' Institution.—Discussion on Mr. Wells's paper on "Farm Crops." 8 p.m.  
 Inventors' Institute.—8 p.m.  
 Leeds and Yorkshire Architectural Society.—Mr. W. M. Fawcett, F.S.A., on "Points in the History of Collegiate Buildings."

TUESDAY, JANUARY 12.

Institution of Civil Engineers.—Mr. F. J. Rowan on "Gas-Products." 8 p.m.  
 Society of Biblical Archaeology.—Anniversary meeting. 8 p.m.

WEDNESDAY, JANUARY 13.

Society of Arts.—Mr. W. H. Ablett on "Museums for Trade Fatteners." 8 p.m.  
 Civil and Mechanical Engineers' Society.—General meeting. 7 p.m.  
 Liverpool Engineering Society.—Mr. A. J. Maginnis on "A Strange Failure at Steel Bolders." 8 p.m.  
 Institution of Civil Engineers of Ireland (Dublin).—Mr. James Otway on "The Port and Harbour of Waterford." 8 p.m.

THURSDAY, JANUARY 14.

Royal Academy of Arts.—Mr. J. E. Hodgson, R.A., on "Art in England." 11. 8 p.m.  
 Society of Antiquaries.—8.30 p.m.

FRIDAY, JANUARY 15.

Architectural Association.—Mr. Lewis F. Day on "Stained Glass." 7.30 p.m.  
 Society of Medical Officers of Health.—Dr. Swete on "The Section of Sewer-gas into the Water-supply, a fertile Cause of Enteric Fever." 8 p.m.  
 Institution of Civil Engineers (Students' Meeting).—Mr. R. E. von Leuzette on "The Graphic Method of Determining the Flow of Water in Pipes." 7.30 p.m.

## Miscellaneous.

**Associated Carpenters and Joiners of Scotland.**—During the present week a conference of delegates connected with the Associated Carpenters and Joiners of Scotland has been held in Glasgow. The delegates, who number over a dozen, were gathered from centres as widely apart as the north of Scotland and the south of England. In the United Kingdom there are 101 branches of the Society, 91 being in Scotland, nine in England, and one in Ireland. The membership on the rolls at the end of the past year showed an aggregate of 4,534. During that period the income amounted to 6,088*l.* 12*s.* 11*d.*, and the expenditure to 6,266*l.* 15*s.* 10*d.* In spite of the demand thus made upon the funds, the assets still ran up to 8,720*l.* 12*s.* 2*d.* The conference has had in view the revision of the rules, and this involves some important matters, such as the vexed question of out-of-work benefit. On the occasion of the preceding conference, held six years ago, when, as now, trade was greatly depressed, the vote against the scheme was decisive, being almost two to one.

**Inland Navigation in Siberia.**—M. Sibirskoff, the enterprising St. Petersburg merchant, who, in conjunction with Professor Nordenskiöld, had for several years past been making efforts to open a shipping trade with the coasts of Asia on the Arctic Ocean, has at length been compelled to abandon the project in its original form. The experiences of the last two seasons have induced him to substitute, in place of the sea route, another method of reaching the chief rivers of Siberia. He has projected a canal, which is now under construction, with a view to connect the two rivers Obi and Yenisei, whilst other preparations on an extensive scale are proceeding upon the Angara, in order to render navigation practicable from the two stations on Lake Baikal and the Yenisei. If these plans can be carried out, they will enable various kinds of produce to be conveyed by water throughout Siberia, the Lena being already in communication with Lake Baikal. Thus, the total distance which it will be necessary to traverse by land between St. Petersburg and the Obi will only be 170 versts, or 112 miles. It may be added that in connexion with this new commercial route preparations have already been made for the cutting of a road from Petchora right across the Ural Mountains to the river Obi.

**Greek Archaeology.**—At University College, London, Professor Newton will deliver in the Second Term a course of three lectures on Greek inscriptions, followed by three on Greek Myths illustrated by Fictile Vases and other Monuments. The dates of the lectures are Jan. 8th, Jan. 22nd, Feb. 5th, Feb. 19th, March 5th, and March 19th.

**Water Supply of Walton-le-Dale, near Preston, Lancashire.**—At the monthly meeting of the Walton-le-Dale Local Board, held on Monday last, the 4th inst., a report upon the progress of the new works of water supply was presented by the engineer, Mr. William Wrennall, of Liverpool. From it we learn that the branch heading, which was yielding water at the face, has been continued during the past month; and the work all through has proved to be very successful in procuring water. This heading has now been cut to a length of 105 ft. from the main heading, the last 68 ft. having been driven during the past month. The cutting is in a direction parallel to the large fault which crosses the main heading, and follows close to it all the way. The rock roof of the cutting terminates at the fault, and as the dip of the strata is towards the fault, the heading is in the favourable position to receive, as it is continued, all the water which the rock contains. The strata has been mostly wet, and in places some large streams of water have been tapped, which have added very considerably to the total yield. The quantity pumped at the present time is about 190,000 gallons per day, as against 145,000 gallons per day reported last month. There is also every probability, from the knowledge now acquired of the favourable position of the present cutting, that further water may be procured as the heading is continued to be extended. The total length of headings cut up to the present time is 220 yards. We are informed that the Local Board constructed works of water-supply to their district some four years ago. The pumping station is situated in the adjoining township of Brindle. A well, 8 ft. in diameter, was sunk to a depth of 110 ft., and a bore-hole was continued from the bottom of it down to a total depth of 537 ft. from the surface. The yield from these two sources was, however, found to be considerably less than had been anticipated, and after some two or three years' pumping the supply proved to be quite inadequate for the then requirements of the district, and especially during the late dry seasons. Under these circumstances, the Board some twelve months ago called in Mr. Wrennall, to advise them in the matter, and under his direction the works are now being carried out.

**Works on Mediæval Costume, &c.**—Mr. Bernard Quaritch, of Piccadilly, sends us a list of works on Mediæval costume, illuminated ornaments, antique alphabets, furniture, ancient arms and armour, and architecture, by Messrs. Henry Shaw, F.S.A., Joseph Strutt, J. R. Planché, Sir S. B. Meyrick, and other writers. The list will require examination.

**Iron, Hardware, and Metal Trades' Pension Society.**—The thirtieth annual ball of the Iron, Hardware, and Metal Trades' Pension Society will take place at Willis's Rooms, early in February, under the presidency of Mr. Jonathan Pearson, a member of the firm of R. H. & J. Pearson, of London.

**Royal School of Mines.**—Prof. Warrington Smyth, F.R.S., in resuming his lectures upon mining in the Lecture Theatre of the Geological Museum, Jernyn-street, commented upon the importance of a thorough knowledge of geology in all cases where the discovery of mineral is the object in view. Practical knowledge holds good only so far as certain districts are concerned, and if such knowledge only is brought to bear upon other localities, very grievous mistakes, and consequent waste of capital, are always likely to ensue; indeed, it would be easy to point to recent cases where the prejudice of miners in this respect has led to such results. The only means to obviate possibilities of this kind is to familiarise ourselves with the recognised laws laid down by geologists, and to study the various conditions under which deposits are met with in the field. In cases where coal is the object of search, the miner too frequently presumes that a certain district will produce coal because the soil consists of a coaly clay, or because limestone and sandstone exist in the immediate neighbourhood, or because the wells and springs deposit a quantity of ferruginous matter. These appearances all accompany the occurrence of coal, but not always. The evolution of carburated hydrogen or fire-damp from the surface of the ground often leads to unfortunate conclusions. Such evolution occurs in large volumes sometimes, so that it affords artificial light or heat, as in the case of the fire-wells in China, and again in Hungary, where the main galleries in some of the mines are lighted by the carburated hydrogen so

derived. But cases are not infrequent where the evolution of this gas does not proceed directly from coal, as from some of the later formations in which the Americans have sunk bore-holes and wells for the purpose of extracting petroleum. Again, in the case of salt, where the occurrence of salt springs is supposed to indicate the presence of salt; but this is not true, as in sinking through the sandstone of the coal-measures, the water is found to be notably salt. A knowledge of the geology of the subject may often meet all these objections in so far as it affords the necessary information to require for a clear conception of the origin of phenomena which may exist under certain conditions, but which are not exclusively confined to such.

**A Remarkable Factory Chimney.**—The Mechernich Lead Works, near Cologne, have now a chimney of the following dimensions:—

	Fe. in.
Depth of foundations.....	11 6
Length of each of the four sides of ditto.....	36 1
Height of basement.....	31 10
External diameter at base.....	24 7
External diameter at top.....	11 6
Internal diameter.....	9 10
Height of column alone (of round form).....	327 4
Total height.....	441 7

This chimney occupied rather more than a year in construction.

**Hull.**—An orphan asylum at Hull is now almost completed, the architects for the work being Messrs. Smith & Brodbeck, of Hull. Wood block flooring is being laid by Messrs. Geary & Walker, of Manchester, on their patent system.

**Partnership.**—Mr. Sidney Young and Mr. W. B. Brown, who have for several years occupied joint offices at No. 5, Henrietta-street, Covent-garden, have recently entered into partnership.

**The Surveyors' Institution.**—The Students' Preliminary Examination, 1886, will be held at the Institution on the 19th and 20th of January, commencing at ten o'clock each day.

**Newcastle-on-Tyne.**—A new Wesleyan Chapel has recently been opened at Byker. It has been built as a substitute for an older chapel in Shields-road, Byker, which has proved too small, and, like it, will be known as the "Bainbridge Memorial." The new chapel has sittings for 900 adults, capable of being increased upon occasion to upwards of 1,000. There is a lecture hall adjoining, which will accommodate from 300 to 350 persons, and there are five vestries or classrooms allocated to various purposes, also a ladies' cloak-room, lavatory, &c. In plan the chapel consists of a nave with side aisles and shallow transepts, the extreme internal dimensions being 98 ft. by 55 ft. 6 in. by 40 ft. high. There are galleries all round the interior, that for the choir and organ being behind the platform in an apsidal recess. The edifice is built of stone in the Early English style of Gothic architecture, and has a handsome tower at the north-east angle rising to a height of 90 ft. from the ground. The internal fittings are of pitch-pine. The general contractors are Messrs. Gresson & Stockdale, of Gateshead, who executed the carpenters' and joiners' work, and entrusted the masons' work to Mr. T. H. Hutchinson, and the ironwork to Messrs. Bainbridge & Crimmon, also of Gateshead; the lead glaziers' work to the Gateshead Stained Glass Company; the slating to Mr. John Hewitson; the plastering to Mr. Thomas Wallis; the plumbing to Mr. R. Heron; and the ordinary glazing, painting, and varnishing to Messrs. A. Robertson & Son,—all of Newcastle. The gas-fittings have been supplied by Messrs. T. Thomason & Co., of Manchester; the lecture-hall seats by the North of England School Furnishing Company; the lighting conductor by Messrs. Henry Walker & Son, of Newcastle; and the warming and ventilating apparatus by Messrs. Dinning & Cooke, of Newcastle. The buildings are warmed by hot water on the low-pressure system, arrangements being made for the admission of fresh air warmed by passing over coils of pipes, while the tower is utilised for ventilation, and forms a powerful extracting shaft for the vitiated air, tests by the anemometer showing that the air inside the chapel is changed three times an hour. The clerk of works is Mr. James Grant, and the architect is Messrs. S. Oswald & Son, of Newcastle, whose design were selected in competition, and under whose personal supervision the whole of the work have been carried out, the total cost, including site, being about 6,300*l.*



ISLINGTON. — For rebuilding the Chapel House		
public-house, Chapel-street.	Messrs. Wilson, Son, &	
Widdowich, architects, East	India-avenue, Leadenhall-	
street.	Quantities supplied:—	
Goddard .....	£1,735	0 0
Staines & Son .....	4,572	0 0
Kirk & Randall .....	4,198	0 0
Peto, Barr & Co. ....	4,463	0 0
Hearle .....	4,317	0 0
L. H. & R. Roberts .....	4,247	0 0
Jackson & Todd .....	4,242	0 0
P. & H. Mills .....	4,242	0 0
Ferry & Co. ....	4,049	0 0
Shurmer (accepted) .....	3,942	0 0



**KING'S LYNN.**—For the erection of new hotel and stables, at South Lynn, for Messrs. Eyre & Co. Mr. D. Clark, architect:

W. Jarvis .....	£1,048 0 0
R. Dye .....	980 0 0
R. Fayers .....	973 0 0
Bardol Bros. ....	968 0 0
W. H. Brown .....	943 0 0
J. Leach (accepted) ..	938 0 0
P. H. Dawes .....	925 0 0

[All of King's Lynn.]

**LEWISHAM.**—For enlargement of the schools, Lewisham Bridge, for the School Board for London. Mr. T. J. Bailey, architect:—

Goffrey & Son .....	£2,278 0 0
Bophenson .....	2,168 0 0
H. L. Holloway .....	2,125 0 0
E. C. Howell & Son .....	2,098 0 0
F. & P. J. Wood .....	2,090 0 0
T. Oldrey .....	2,060 0 0
W. Shurmer .....	2,077 0 0
Patman & Fotheringham ..	2,170 0 0
Lathey Bros. ....	2,059 0 0
Serviano & Co. ....	2,059 0 0
J. Grover & Son .....	2,053 0 0
Atterton & Lettis .....	2,017 0 0
Wall Bros. ....	2,046 0 0
Kirk & Randall .....	2,030 0 0
Stimpson & Co. ....	1,993 0 0
J. R. Hunt .....	1,917 0 0
W. Johnson .....	1,883 0 0
S. J. Jerrard .....	1,883 0 0

**LEWISHAM.**—For the erection of new workroom for Mr. Oster, Lee High-road, Kent. Mr. H. T. Bonner, architect, High-street, Lewisham:—

Jerrard .....	£558 0 0
Robson .....	602 14 0
Kennard Bros. (accepted) ..	495 0 0

**LONDON.**—For erecting and completing St. George's House, Eastcheap. Mr. Delissa Joseph, architect, Basinghall-street:—

Perry & Co., Tredgar Works, Bow (accepted) .....	£21,250 0 0
--	-------------

**NORTHAMPTON.**—For the erection of a new Wesleyan School Chapel, with wood black-booming, Kungley Park, Northampton. Mr. H. H. Dyer, architect:—

Walls .....	£589 0 0
Jahy .....	780 0 0
Mitchell .....	739 10 0
Reynolds & Son .....	700 0 0
Treson .....	680 0 0
Green Bros. ....	587 0 0
Dunkley .....	585 0 0
Woodford & Son .....	679 0 0
Hauton .....	577 0 0
Clayson Bros. ....	571 0 0
G. Fisher .....	570 0 0
Basford .....	557 13 0
G. White .....	557 0 0
Hickman .....	553 0 0
J. B. Clark .....	553 0 0
Hoop .....	545 10 0
Sonster .....	524 0 0
G. Tompkins (accepted) ..	472 10 0

[All of Northampton.]

**Vauxhall.**—For casing iron work, at Barrett & Co.'s factory, Bond-street, Vauxhall, with concrete. Mr. E. Rawlings, architect, Victoria-street, Westminster. Quantities supplied:—

F. Stant & Co. ....	£2,345 0 0
C. Drake & Co. ....	1,784 0 0
Hitchins & Co. (accepted) ..	1,374 5 6

**WORTHING.** For building mortuary for the Worthing Local Board. Mr. Walter Horne, architect and town surveyor, Worthing:—

W. Stanbridge .....	£166 12 0
Bridger & Son .....	120 0 0
T. Stears .....	113 7 0
A. Crouch .....	101 10 0
T. H. Churcher .....	110 0 0
Snowin & Son .....	97 15 0
C. C. Cook .....	96 15 0
J. Blaker .....	93 10 0
W. W. Sandell .....	92 10 0
J. Churcher .....	89 0 0
W. Churcher .....	83 0 0

[All of Worthing.]

[Surveyor's estimate, &c.]

**WEST HAM.**—For the construction of a brick barrel intercepting sewer, 4 ft. 3 in. diameter and 935 ft. in length, for the West Ham Local Board. Mr. Lewis Angell, M.Inst.C.E., engineer, Town-hall, Stratford. Quantities by Messrs. R. L. Curtis & Son, London-wall, S.E.:—

	No. 1.	No. 2.
McKenzie & Anderson .....	£3,618 15	£3,971 5 0
Edmondson .....	3,088 15	3,786 12 6
T. M. Wiswell .....	2,780 0	3,450 0 0
L. Bottoms .....	2,888 0	3,418 0 0
Botterill .....	2,679 0	3,145 0 0
W. Coultiss .....	—	3,112 13 0
J. J. Robson .....	—	3,128 0 0
J. W. & J. Neave .....	2,656 0	—
B. Cook & Co., Battersea ..	2,642 0	3,090 0 0
W. Nicholls .....	—	2,880 0 0

**SPECIAL NOTICE.**—Lists of Tenders frequently reach us too late for insertion. They should be delivered at our office, 45, Catherine-street, W.C., not later than Four p.m. on THURSDAYS.

#### TO CORRESPONDENTS.

Registered Telegraphic Address, "THE BUILDER, LONDON."

J.B.—G. & W.—A. J. V. L.—C.R.—L. T. G. R.—R. F. C. (not practical). We do not undertake to return rejected communications. Letters of communication beyond date, or which have been sent to the Editor, are not returned. If any good purpose would be served by publishing your account of expenditure in the "Builder," we do not know of any such publication. All statements of facts, facts, &c., must be accompanied by the names and addresses of the parties, not necessarily for publication. We are compelled to decline printing out books and giving all notes.

With the responsibility of signed articles, and papers read at public meetings, facts, &c., are not returned. We cannot undertake to return rejected communications. Letters of communication beyond date, or which have been sent to the Editor, are not returned. If any good purpose would be served by publishing your account of expenditure in the "Builder," we do not know of any such publication. All statements of facts, facts, &c., must be accompanied by the names and addresses of the parties, not necessarily for publication. We are compelled to decline printing out books and giving all notes.

#### PUBLISHER'S NOTICES.

Registered Telegraphic Address, "THE BUILDER, LONDON."

**THE INDEX and TITLE PAGE** for Volume XLIX, July to December, 1885, will be given as a supplement with our next Number.

A COLOURED TITLE PAGE may be had, gratis, on personal application to the Office.

CLOTH CASES for Binding the Numbers are now ready, price 2s. 6d. each, also.

READING CASES (cloth), with Straps, to hold a Month's Numbers, price 2s. each; also.

THE FORTY-NINTH VOLUME of "The Builder" (bound), price 12s. 6d. each, also.

Twelve Shillings and Sixpence, will be ready on the 13th inst.

SUBSCRIBERS' VOLUMES, (as being sent to the Office, will be bound at a cost of 3s. 6d. each.)

#### CHARGES FOR ADVERTISEMENTS.

SITUATIONS VACANT, PARTNERSHIPS, APPRENTICESHIPS, TRADE, AND GENERAL ADVERTISEMENTS.

Six lines (about fifty words) or under ..... 4s. 6d.

Each additional line (about ten words) ..... 6d.

Printed for the first time (about ten words) ..... 6d.

Printed for the first time (about ten words) ..... 6d.

Printed for the first time (about ten words) ..... 6d.

Printed for the first time (about ten words) ..... 6d.

Printed for the first time (about ten words) ..... 6d.

Printed for the first time (about ten words) ..... 6d.

Printed for the first time (about ten words) ..... 6d.

Printed for the first time (about ten words) ..... 6d.

Printed for the first time (about ten words) ..... 6d.

Printed for the first time (about ten words) ..... 6d.

Printed for the first time (about ten words) ..... 6d.

Printed for the first time (about ten words) ..... 6d.

Printed for the first time (about ten words) ..... 6d.

Printed for the first time (about ten words) ..... 6d.

Printed for the first time (about ten words) ..... 6d.

Printed for the first time (about ten words) ..... 6d.

Printed for the first time (about ten words) ..... 6d.

Printed for the first time (about ten words) ..... 6d.

Printed for the first time (about ten words) ..... 6d.

Printed for the first time (about ten words) ..... 6d.

Printed for the first time (about ten words) ..... 6d.

Printed for the first time (about ten words) ..... 6d.

Printed for the first time (about ten words) ..... 6d.

Printed for the first time (about ten words) ..... 6d.

Printed for the first time (about ten words) ..... 6d.

Printed for the first time (about ten words) ..... 6d.

Printed for the first time (about ten words) ..... 6d.

Printed for the first time (about ten words) ..... 6d.

Printed for the first time (about ten words) ..... 6d.

Printed for the first time (about ten words) ..... 6d.

Printed for the first time (about ten words) ..... 6d.

Printed for the first time (about ten words) ..... 6d.

Printed for the first time (about ten words) ..... 6d.

Printed for the first time (about ten words) ..... 6d.

Printed for the first time (about ten words) ..... 6d.

Printed for the first time (about ten words) ..... 6d.

Printed for the first time (about ten words) ..... 6d.

Printed for the first time (about ten words) ..... 6d.

Printed for the first time (about ten words) ..... 6d.

Printed for the first time (about ten words) ..... 6d.

Printed for the first time (about ten words) ..... 6d.

Printed for the first time (about ten words) ..... 6d.

Printed for the first time (about ten words) ..... 6d.

#### TERMS OF SUBSCRIPTION.

"THE BUILDER" is supplied gratis from the Office to residents in any part of the United Kingdom at the rate of the per annum. To all parts of Europe, America, Australia, and New Zealand, 2s. per annum. To India, China, Ceylon, &c., 3s. per annum. Remittance payable to DOUGLAS FOTHERINGHAM, Publisher, No. 45, Catherine-street, W.C.

#### Best Bath Stone, for Winter use.

WESTWOOD GROUND,  
Box Ground,  
Combe Down,  
Corsham Down, and { Summer  
Farleigh Down. { Dried.  
RANDELL, SAUNDERS, & CO., Limited,  
Corsham, Wilts. [ADVT.]

#### Box Ground Stone

is the best for use in all exposed positions being a well-known and tried Weather Stone. 50,000 ft. cube in stock.  
PICTOR & SONS,  
BOX, S.O., WILTS. [ADVT.]

#### Doubling Freestone and Ham Hill Stone

of best quality, in blocks, or prepared ready for fixing. An inspection of the Doubling Quarries is respectfully solicited; and Architects and others are CAUTIONED against inferior stone. Prices, delivered to any part of the United Kingdom, given on application to CHARLES TRASK & SONS, Norton-sub-Hamdon, Ilminster, Somerset.—Agent, Mr. E. WILLIAMS, No. 16, Craven-street, Strand, W.C. [ADVT.]

#### Doubling Free Stone

For prices, &c., address S. & J. STAPLE, Quarry Owners, Stone and Lime Merchants, Stoke - under - Ham, Ilminster. [ADVT.]

#### Asphalts.

The Seyssel and Metallic Lava Asphalt Company (Mr. H. Glenn), Office, 39, Poultry, E.C.—The best and cheapest materials for damp courses, railway arches, warehouse floors, flat roofs, attics, cow-sheds, and milk-rooms, granaries, tun-rooms, and terraces. [ADVT.]

#### Asphalts.

Seyssel, Patent Metallic Lava, and White Asphalts.  
M. STODART & CO.  
Office:  
No. 90, Cannon-street, E.C. [ADVT.]

#### EVERY DESCRIPTION OF

SEASONED WOODS AND VENEERS IN EXTENSIVE QUANTITIES.

#### B. J. HUDSON & SONS,

Millbank Sawmills, Grosvenor-road, S.W.; Whitfield-street, W.; And Store-street, London, W.C.  
Telephone No. 3,152, and Private Wire connecting Business Premises.

#### MICHELMORE & REAF

Manufacturers of

#### CHARLES COLLINGS'S PATENT.

COLLINGS'S PATENT HINGE

LEVER, SCREW, & BARREL BOLT

and IMPROVED GATE FITTINGS of every Description

36A, BOROUGH ROAD

LONDON, S.E.

DISCOUNT TO BUILDERS.

GOLD AND SILVER MEDALS AT AMSTERDAM EXHIBITION.

ZINC ROOFING

F. BRAY & CO.

LONDON. \*\* LIVERPOOL. \*\* GLASGOW

VIEILLE MONTAGE SOLE MANUFACTURING AGENTS.  
NO SOLDER. NO EXTERNAL FASTENINGS!

Particulars on Application. Chief Offices:—352 to 364, EUSTON ROAD, LONDON, N.W.

# The Builder.

Vol. L. No. 2311.

SATURDAY, JANUARY 16, 1886.

## ILLUSTRATIONS.

Liverpool Cathedral Competition: Interior View looking East.—Design by Mr. James Brooks, Architect .....	124-125
Liverpool Cathedral Competition: Interior View looking West.—Design by Mr. James Brooks, Architect .....	128-129
North and South Elevations of Mr. Brooks's Design for the Liverpool Cathedral .....	132, 133
Ground and Triforium Plans of Mr. Brooks's Design for the Liverpool Cathedral .....	136, 137

## CONTENTS.

The Late James Fergusson .....	113	Kirby Hall .....	122	Timber Measurement .....	143
Sewage Purification. By John C. Thresh, D.Sc. (Leeds), F.C.S. &c. ....	115	Society for the Encouragement of the Fine Arts .....	122	The Clapham Statues .....	143
Mr. Brooks's Design for Liverpool Cathedral .....	116	The Institution of Civil Engineers .....	122	The Examination in Architecture .....	143
Notes .....	118	The Temple of Solomon .....	139	Provincial News .....	143
Plumbing Problems .....	119	Architectural Ethnography .....	142	The Student's Column: Foundations.—III. ....	144
Christ-Lan Emblems in Architecture .....	120	Messrs. Stevens Bros. & Co.'s New Premises .....	142	Recent Patents .....	145
Letter from Brussels .....	121	Employers' Liability: Haines v. Cress .....	142	Recent Sales of Property .....	145
Act. n Sewage and the Metropolitan Board of Works .....	121	Street Improvement Cases .....	142	Meetings .....	146
Obituary .....	121	Plumbers and Parliament .....	142	Miscellaneous .....	146
Mr. James Brooks's Design for Liverpool Cathedral .....	122	Ventilation .....	143	Prices Current of Building Materials .....	147

### The Late James Fergusson.



AMONG those names in the history of architecture which are memorable rather in connexion with the study and critical elucidation of the subject than for practical achievements in the art, there are few more remarkable, few that will have left a more decided impress on the architectural thought and work of their own and of succeeding generations, than that of the clear-sighted student, historian, and critic whose death all architectural England is this week regretting. He was a brilliant representative of a class of intellect which finds its pleasure and its purpose in life not in practice, but in theory; not in carrying out actual work, but in drawing together all the information available in regard to the chosen line of study: in seeing and enabling others to see in what directions its boundaries can be extended, how its ideal can be heightened and perfected, and what are the lights which the history of the past sheds upon the problems of the present and future.

The place which Fergusson takes, and will, we think, long continue to hold, among those who have contributed to the elucidation of the subject which was his chief study, is almost unique. He is as important a writer on architecture in the modern world as Vitruvius was in the ancient world, but in a quite different sense. Vitruvius, though he was condemned by circumstances, and, perhaps, partly by his own idiosyncrasies of character (as hinted at by himself), to advise others rather than to make architecture of his own, was by education and learning a practical architect, more interested, in fact, in the practical than the artistic side of his profession, in regard to which latter his perceptions were not a little narrowed by mere scholastic pedantry. Fergusson always disavowed any claim to be an architect, in the strict sense of the word, and, in fact, understated his own perceptions and knowledge on practical points. But he possessed that power of taking a broad view of the whole subject, of perceiving the historic and aesthetic relations between architectural works widely separated in time and distance, which was the best possible qualification for the most important work which he has effected, the presentation of the history of the known architectural styles of the world in one comprehensive survey. Speaking not long since of architectural works for students, we mentioned this "History of Architecture"

as standing alone in the literature of the subject. There are theoretical works on the principles of architecture which are equally broad and comprehensive in their aesthetic view; but there is none which combines, with this breadth of perception and critical insight, the multifarious illustration and criticism of all the known styles of architecture. Such a work, of course, would have been impossible for any one except in modern days, when increased facilities of communication and increased means of producing and collecting architectural illustrations, from all parts of the world, enable a writer in his study to survey architecture "from India to Peru." But it would have been equally impossible, even with all these modern advantages, to produce such a work as this, not to mention the various other studies of special points into which Fergusson entered, without that dogged perseverance and persistence in labour, that "infinite capacity for taking pains," which has been sometimes described as the most essential element of genius. The list of works, besides the chief and central one, which Fergusson has left behind him, would be a tolerably long one even if they represented only so much good literary composition and thoughtful theorising. But considering that almost every one of them deals with some subject requiring special and laborious investigation to lay the basis of the conclusions arrived at, it will be recognised that there can have been few harder and more untiring workers than their author, among the men of this generation.

Fergusson was the second son of Mr. William Fergusson, M.D., who saw a good deal of service in the early part of the century as a military surgeon, became an Inspector-General of Military Hospitals, and appears to have held enlightened and advanced views, for his time, on many questions of military and civil hygiene, and wrote on such subjects with the terseness and perspicuity which are characteristic also of his son's writings on architecture. James Fergusson, who was educated at a school at Hounslow, was intended to be, and for a time became, a working partner in a mercantile house at Calcutta with which his family were connected. The ancient architecture of India, then almost unknown ground, attracted a great deal of his attention during his residence in the country, and he finally, having made some money in his business, gave his attention to the study of architecture. His first important work was his illustrated book on the "Rock-cut Temples of India," dedicated to the Royal Asiatic Society, and the result was a personal investigation and study of that remarkable and then little known series of monuments; a book which at once threw a new light on the subject

(perhaps we need not say a "new" light, for, in fact, there was little or none before), with which his name has been ever since connected. In his preface to this work he remarks on the confusion of ideas which prevailed as to the date and the architectural classification of these monuments, which, by any who had referred to them at all, had been constantly connected with those of Egypt, although, in fact, there was little resemblance architecturally, and Egypt had almost ceased to exist as a country before these works of the Indian peninsula were executed. With his peculiar turn for method and classification, he set about investigating the special characteristics of these works, distinguishing the special architectural forms and the special objects which marked out one class of structure from another; and it is an early instance of his power of seizing on and bringing out the latest resemblances of the architecture of various styles and countries, that he from the first described the Buddhist Chaitya caves as the "churches" of the region, as distinguished from the monasteries (Vihara), and even described their various parts in terms borrowed from English ecclesiology. The whole of Fergusson's subsequent architectural work, especially the "History of Architecture," is full of these suggestive comparisons between types of building usually regarded as far remote from one another, architecturally as well as topographically; this power of seeing essential resemblances beneath accidental distinctions of detail, which often enabled him to throw such a vivid and unexpected light on the meaning and *motif* of an architectural monument. It was two years after this that the book appeared which always remained his own favourite among his writings,—"The True Principles of Beauty in Art,"—a book which had absolutely no literary or commercial success whatever, and which has had, up to this day, we imagine, but few readers. It would have found a more congenial soil in France, or, perhaps, still more, in Germany. It is an exception among Fergusson's writings in being a work of pure thought, not of study; it is a metaphysical treatise, in fact, though not called by any such alarming title; and John Bull has never taken kindly to speculations of this kind. Burke's essay on the "Sublime and Beautiful," which had once a kind of success, would probably have not received so much notice had it not been for the fame which Burke subsequently gained in another department of intellectual effort, better understood of the people. Besides, Burke hardly attempted to teach anything on the subject, or to lay down serious propositions; he only speculated and reflected in well-turned periods. Fergusson set himself to lay down a complete theory of the relation of art



to science, expressed in formulated tables in which the various arts, from cooking up to poetry, were assigned their proper places in the scale of intellectual effort and intellectual pleasure. Whether any propositions on such a subject will ever gain universal acceptance or be regarded as scientific truths, may well be doubted; but the book is one which no thoughtful reader will go through without finding matter for most interesting reflection in it. What Fergusson considered the central point in it, the central point of his intellectual life, in fact, was the broad distinction which he laid down on it between art and science. "Science is knowledge of all nature does without man's intervention; art is knowledge of all those modifications that man works on nature's productions." The passage in which he describes the occurrence of this idea to him, and the effect which it had on his view of the whole subject of knowledge, is worth quoting here:—

"In early life my mercantile pursuits kept me too close to the desk to have time for society, and having no taste for the ordinary amusements of my fellow-labourers, I sought my only distraction in reading. Like most young men, the science that charmed me most was metaphysics; but I read also a good deal of chemistry and geology; tried hard to understand crystallography; and puzzled my head with problems of mechanics and astronomy; in short, I bought any book on science my limited means would allow, and more with reference to the price than the contents, and, as was to be expected, soon read my head into a chaos, from which I vainly attempted to escape. I struggled long and hard to classify the ill-digested mass of incoherent facts with which my brain was filled, but for a long time in vain; till this division into sciences and arts broke upon me, and all became clear. It came upon me like a flash of lightning. From that time I never had any difficulty, however various my reading might be. Every new fact found at once its appropriate pigeon-hole in my brain;—nothing came amiss to me; and I am convinced that if I have two ideas more original or more worth recording than my neighbour, I owe it to the happy inspiration of that hour.

This idea once broached, I was not long in constructing tables to represent it, and these were substantially the same as those now offered. As my knowledge increased, I continued to improve them, of course; but I have never had cause to doubt the correctness of the principle or of the base on which they were originally constructed."

The appearance of the "Rock-cut Temples" in 1845 had been followed two years later by the beautifully illustrated work, entitled "Picturesque Illustrations of Ancient Architecture in Hindostan," which seems to have been intended to give a popular interest and illustration to a subject which he had previously treated in a manner more especially addressed to architects and archaeologists. It is an illustration of the activity of his mind, and the variety of subjects to which he gave his thoughts in earlier days, that in the same year as the publication of the "True Principles" he published a tolerably elaborate work on "A Proposed new System of Fortification," a subject in which he was much interested. In the same year, also, he read a paper before the Institute of Architects on "The History of the Pointed Arch," and published a small work, not much more than a pamphlet, on the British Museum, the National Gallery, and the Record Office, suggesting improvements in the planning, arrangement, and architectural design of those buildings, or, at least, showing where the architectural design might have been improved while yet there was time. His remarks on this part of the subject show that at this period he had already adopted those strong views as to the futility of expecting anything good to come out of mere architectural precedent, which he maintained throughout his life, and which are exhibited, with amusing directness, in this little book, as when he recommends that the forty-four columns should be removed from the British Museum "and be made use of to erect a peristyle temple in one of the parks."

The great work now known as the "History of Architecture" first appeared in 1855, as a two-volume book under the title the "Handbook of Architecture." Even in this form it was a very large work, embracing an immense amount of research and labour, and a great success as supplying a form of text-book of the subject that was much wanted. But the

author soon perceived that more might be made of it, and ten years later it re-appeared in two much thicker and more fully-illustrated volumes as "The History of Architecture." The section on Indian architecture, as a subject on which the author had special knowledge, had occupied a rather disproportionately large space in the first edition; but this subject was now withdrawn altogether from the book, to re-appear in 1876 under the title of "History of Indian and Eastern Architecture," forming the third volume of the "History of Architecture." But previously to this, in 1862, another and remarkably interesting volume had appeared, the "History of Modern Architecture," which forms to all intents and purposes a fourth volume of the history. The division of subject here suggested is significant. Fergusson was the first to see clearly that since the days of the Renaissance, when architecture became an effort to reproduce the styles of former ages, or to work on their lines and suggestions, the art had entered on an entirely new phase, different from any which to our knowledge it had gone through before. He has succeeded in impressing this idea on his generation, so that it is now accepted as a commonplace and a matter of course by many who forget, or who never recognised, to whom they were indebted for it. Considering Fergusson's strong opinion as to the futility of architectural reproductions, his criticism on the productions of the modern period is singularly fair and well balanced. Recognising that the path taken by the architects of the modern era is essentially a false one from his point of view, he can, nevertheless, give full credit to the talent and partial originality of the architecture of this period, and do justice to genius though exhibited under what may be regarded as a mistaken system. What he does not seem to recognise is the comparative impossibility of reviving the old system and the old feeling. We are weighted now with a thousand precedents thrust upon us through our modern familiarity with styles of past ages and distant countries. We can never again work out our own original bent with the straightforward faith and ardour of those who knew no style but their own, and had no precedents and examples to disturb their singleness of aim.

We can only find space to mention the remainder of Fergusson's architectural works. An early production was his first essay on the "Topography of Jerusalem, with a Restored Plan of the Temple," published in 1847, a subject which was a favourite one with him always, and to which he returned in 1878 in his more elaborate work on the "Temples of the Jews." Of his views on the architecture of Solomon's Temple a good deal has just been said in Mr. Robins's interesting paper on the subject, the second portion of which is given in another column of this number. In 1851 appeared his work on "The Palaces of Nineveh and Persepolis Restored," and in 1862 a volume on the restoration of the Mausoleum at Halicarnassus. In 1872 he published a remarkably interesting work on the "Rude Stone Monuments" of the world, giving a comprehensive view of this subject as he had done of architecture in general in the "History"; this was followed in 1877 by a smaller work especially devoted to the consideration of the monuments of this kind in the Orkneys. In 1880 appeared a sumptuous work on the "Cave Temples of India," undertaken by him in conjunction with Mr. James Burgess, and illustrated from drawings made by the latter gentleman and his assistants during the progress of a survey in India. In 1883 appeared one of his most interesting works, "The Parthenon: an Essay on the Mode in which Light was introduced into the Temples of the Greeks and Romans," in which he summed up the reasons for his long-adopted opinion on this point, in favour of what may be called a "clearstory" method of lighting, by openings through the roof admitting light to a range of vertical windows; not skylights. Fergusson's views on this subject are well known among architects and archaeologists, and considering how little actual fact there is to go upon, he may be said to have established them with a probability which is next door

to certainty. His treatment of this subject is an admirable example of clear and logical reasoning.

Among the papers which Fergusson read before the Institute of Architects, and which are embodied in their Transactions, the following may be mentioned: "The Architecture of Southern India" (January 7, 1850); "The Architecture of Nineveh" (March 10, 1851); "The Architectural Splendour of the City of Bejapore" (November 27, 1854); "The Great Dome of Sultan Mohammed's Tomb at Bejapore" (December 11, 1854); "Notes of the Site of the Holy Sepulchre" (1861); "A Mode in which Light was introduced into Greek Temples" (November 18, 1861); "The Erechtheum" (February 14, 1876); supplement to the same (June 23, 1879); "The Temple of Diana and the Hypoethrum of the Greeks" (January 22, 1877); and "The Temple of Diana at Ephesus" (June, 1883); the latter in relation to Mr. Wood's famous discovery. On many of these papers he bestowed a great amount of thought and care; they were often the first presentation of ideas to be subsequently worked out in a more detailed and elaborate manner; and the reading of some of them marked some memorable evenings at the Institute.

There is no doubt that in one or two cases Fergusson's ingenuity in suggesting new solutions of perplexed problems in archaeology carried him a little too far; and his theories about the site of the true Constantinian Church of the Holy Sepulchre has certainly not proved itself, although the reasoning with which it was supported was so ingenious and interesting, and so admirably drawn out, that every one would regret not to have had it. In regard to this and some other of his favourite theories, he showed something of that defect which was attributed to Macaulay, and which seems indigenous with Scotchmen of ability, of being "too sure of everything," and once having formed a theory, he stuck to it through opposition, and conceded nothing to any or. In some cases, however, this hard-headed persistence gained its end thoroughly, and opinions which were at first regarded as very questionable were finally carried by sheer dint of hammering at them till he drove them home to people. Another defect which may be mentioned in his critical dealing with architecture, is, curiously enough, of an exactly opposite nature to this; it is that of being too much of an enthusiast. If the judgments on remarkable buildings in history, with which "History of Architecture" abounds, be compared, the reader will be surprised to find many different works of different periods has been desired to regard as superior anything or almost anything else that had been done; the writer's enthusiasm for the object of his admiration at the moment carrying him away, regardless of what he had said in the same terms elsewhere about some of the buildings. This is a fault very easily pardoned; it certainly makes a book more pleasant to read than one in which he is always asked to hold the balance of a cold criticism. Adverse criticisms in the "History," the reason why this or that building is wholly or partially a failure, are always worth reading; even we differ from the author, he always sets thinking.

Fergusson's assiduity of study did not prevent him from giving much time to society. His labours were carried on with unwearied punctuality during the earlier portion of his London day, up till about four in the afternoon. A few minutes only were allowed for lunch in the middle of the day, and with the exception the morning labours were regular and uninterrupted. Those who had the privilege of occasionally consulting him during his working hours about some architectural question would find him there, seated in an admirably-arranged library, occupied over the solution of some new point in archaeology, contriving a suggestion of his own for the means of carrying out some newly-proposed public improvement. From the cabinets placed about the room, photographs and drawings of buildings and architectural details from all quarters of the earth were forthcoming, to



up or illustrate any point on which the visitor might ask for information, or adduce a theory of his own. Fergusson was, in fact, an eminently business-like man, and without this quality he could never have got through the work he did in the way he did it. During the period when he acted as architectural adviser to the Office of Works,—a position which for a short time held, until he found it was to degenerate into a merely nominal one, such as he could not consent to hold,—he spent much trouble in improving and refining on the official architecture. When, however, it was claimed in official quarters that a certain building, which was by no means admired, had been passed with his approval, he was careful to distinguish, and in a dry letter addressed to this journal he acknowledged that he had done his best to improve certain elevations which he had found already drawn out, and hoped he had succeeded, but what his real opinion on the design was, he added, "is known only to yours faithfully, Jas. Fergusson." We share in the regret that has been elsewhere expressed, that his remarkable combination of critical insight, business habits, and absolute honesty of purpose, were not more systematically utilised by the Government in obtaining advice and assistance about many projects on which they have often very much needed such advice. We believe it was mainly owing to him that the Wellington Monument was ever so far completed as now, when it wants only its crowning equestrian group; we are sure it was not owing to him that it was placed in its present absurd position. It was also, we believe, owing to his persistent opposition that the wild scheme of internally veneering St. Paul's with marble, with an accompaniment of mosaics in the Byzantine style, was never commenced; completed it never would have been under any circumstances.

Though, as we have said, deprecating any claim to be considered as an architect, Fergusson had one building carried out from his designs, the picture gallery for Miss North's paintings at Kew, which was very successful in fulfilling its aim, and in which his idea of the Greek method of temple-lighting was put into actual practice.

Fergusson died at the age of seventy-eight, an age which would hardly have been credited to him by those who knew his eagerness in the pursuit of every new architectural topic, and the general impression of vigour and mental energy which his measured but incisive conversation left on his hearer. He spent a long life of labour over a peculiarly fascinating subject, he has left a noble record of steady work behind him, and done much to lighten and direct the studies of many others in the same field.

#### SEWAGE PURIFICATION.

BY JOHN C. THRESH, D.S.C.(LOND.), F.C.S., ETC.

**D**URING the past twenty years an immense amount of time and money has been expended in devising and testing methods of sewage purification, and the results have been altogether out of proportion to the efforts. Most unfortunately much energy has been wasted by the unscientific researches of numerous experimenters leading them to erroneous conclusions, thus placing impediments in the path of progress. Men, who neither by training nor education are adapted to undertake original investigations, are to be found enthusiastically experimenting, perfectly at random, in the hope of ultimately being by a lucky accident the discoverer of a successful solution of this great sanitary problem. Such men are encouraged by the fact that no scheme is too absurd to obtain a trial; in fact, in certain quarters it appears to be a *sine qua non* that a system must on the face of it be impracticable to ensure its being tried. So many promising plans when practically tested have been found wanting that corporations are to be found who will, as a forlorn hope, try anything, however preposterous. In many places heavy burdens have been placed upon the ratepayers in adopting systems of sewage purification which very

little investigation by an expert would have shown to be impracticable. In other cases, badly-devised experiments, only capable of giving fallacious results, have been undertaken and reports published which have proved eminently misleading and mischievous.

It is hopeless to expect that any one system of treating sewage by precipitation can be devised applicable alike for small and large towns, agricultural, mining, and manufacturing districts. Before any scheme is adopted it should be most carefully investigated as to its suitability for that particular locality; first of all in the sanitary laboratory of the town or district (and every town and district should have such a laboratory for the use of its officer of health, who, as well as being a medical man, should be a chemist), and afterwards, if it gives promise of success, let it be tried on the largest possible scale. Although a process may give fairly satisfactory results when tried on a small scale in a laboratory, it does not of necessity follow that it will prove practicable when applied to the whole sewage of a town; but, on the other hand, it is useless expecting satisfactory results on a scale of any magnitude from a system which does not succeed in the laboratory. For these reasons, then, the first experiments should be made by a chemist, and unless he reports very satisfactorily as to the results it is folly to proceed further. As a matter of fact, it is far easier to ascertain the effect of precipitants and deodorisers when working with small quantities (a few gallons) of sewage, than when experimenting with large quantities. In the former case the character of the raw sewage and of the effluent is readily ascertained; in the latter this is most difficult, the strength of the sewage flowing into the tank varying considerably from hour to hour, and generally it is possible to obtain a sample of effluent which can be relied upon as representing in composition the whole of the contents of the tank. Usually, on the large scale, it is necessary to examine many samples both of the raw and treated sewage, collected at different periods of the day, and in different seasons (wet and dry). The results being reliable, and the cost in chemicals and in labour, within reason; answers can be given to the following questions, which would enable a sound conclusion to be arrived at as to whether the system could safely be adopted.

1. Does the process remove all the suspended matter in the sewage?
2. Does it remove any considerable portion of the dissolved putrescible matter?
3. Does the sludge deposited permit of being readily removed, pressed, and dried, and what is its manurial value?
4. Can the matter added to the sewage possibly be deleterious if ever used slightly in excess of the actual requirements?

A typically perfect process would not only remove all suspended matters, but also all the putrescible soluble impurities, and yield a sludge containing the whole of the constituents of the sewage possessing manurial value. The materials used would also be inexpensive, and destitute of all noxious properties, save to the very lowest forms of animal and vegetable life. We seem as far as ever from discovering a process thus efficient, but no process should be adopted unless, after a fairly-conducted trial, the results allow of answers being given to the above questions which, with regard to our present state of knowledge, can be considered satisfactory.

A paper, published in your issue of the 26th ult., by Mr. Conder, C.E., illustrates, in a striking degree, the fallacious manner in which experiments on sewage purification are frequently conducted, and the very slender basis required by an honest enthusiast whereupon to found statements of an extraordinary character. The paper contains an account of an experiment which he says was "a practical success," demonstrating the "most important results of his new and powerful method of disinfection."

The experiment was made with a sewer in which the flow is said to be "extremely irregular, varying from almost nothing to sixty gallons per minute, the latter volume being in great

part due to the waste water of a large brewery." No statement is made as to the flow during the experiment, nor do samples appear to have been taken from time to time of the untreated sewage. Into this sewer at some distance from its outlet the purifying agent was allowed to flow at a uniform rate. Before commencing the experiment (but how long before is not stated) a sample of sewage was taken from the end of the sewer, and certainly such a sample of water-carried sewage was never heard of before, since on analysis it was found to contain 11.3 per cent. of solid matter, *i.e.*, 7,910 grains per gallon. After allowing the disinfectant to run in for a few hours the effluent was found to be "clear and bright." Now, a worse stream than this with such a varying flow could not possibly have been selected for the experiment, and we know nothing of the quantity or quality of the sewage treated. The sample collected at some time prior to the experiment must have been the mud deposited at the mouth of the sewer during a period when little fluid was flowing through, since ordinary sewage sludge only contains from 10 to 15 per cent. of dry solid matter. If we are to suppose that this was the constitution of the stuff flowing down the sewer, and which by the treatment was rendered "clear and bright," the result certainly appears miraculous. Is it not more likely, however, that, during the experiment, the large brewery flushed the drain? If not, the result is so incredible that it must admit of some other explanation than that of the action of a few grains of ferrous sulphate.

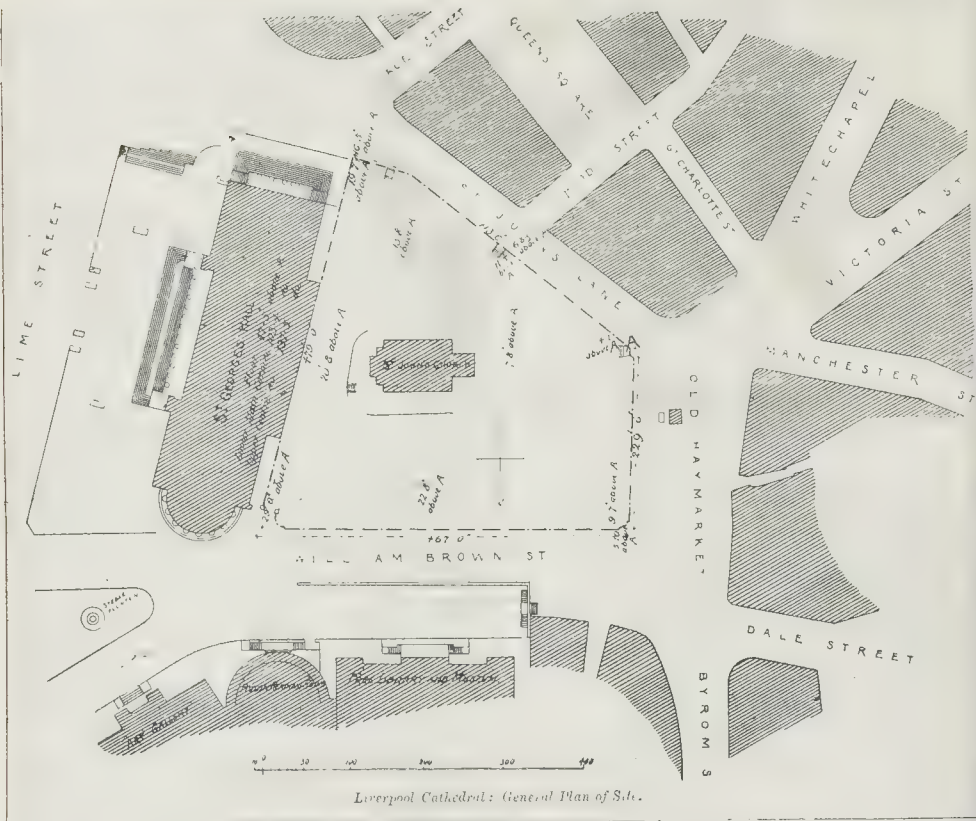
Again, as an example of what may be advanced as a fact, without a shadow of proof being adduced, take the following sentence from the same article:—"The weight of the putrescible matter resolved and escaping as non-combustible gas is a little more than that of the chemicals added." This certainly is a discovery of a marvellous property possessed by the chemicals employed, a property entirely overlooked by the numerous chemists who have investigated the action of salts of iron on sewage waters. Before giving it credence, however, we should like to know the nature of the experiments upon which so startling a statement is based. The climax is, however, reached in the sentence following the one just quoted:—"Thus there is no sludge." Surely such an inference from such premises was never before drawn.

As Mr. Conder has alluded to my correspondence with him through the columns of the *Manchester Guardian*, I may add that in answer to his claim,—that the mere addition of a small quantity of ferrous sulphate to the foulest sewage would cause it to become sweet and clear, dissipate a portion of the organic matter in the form of gas, and precipitate the remainder in a dense pulverulent form,—I showed that such results were diametrically opposed to those of all previous experimenters, and that I had carefully repeated the experiments he described with several different samples of sewage, and in all cases found the results most unsatisfactory, little or no purifying action taking place. I also pointed out the unsatisfactory character of the experiments he then recorded.

Even in experimenting with sewage scientific method cannot safely be ignored; where it is the result can only be disappointment and pecuniary loss.

**Norwood.**—A handsome reredos has been erected in St. Luke's Church, Norwood. The structure, which stands about 18 ft. high, is of richly-carved alabaster and marble. In the centre is a large cross with censuring on either side, the "Agnus Dei" being in the centre of the cross. Above is a large gabled canopy, flanked with pinnacles and supported on corbels and twisted shafts with carved capitals, &c. The style is Gothic, of a Venetian type. The walls of the Sanctuary have also been lined with a dado of alabaster and marble. The work has been executed by Mr. N. Hitch, of Harleyford-road, Kennington, from designs prepared by Mr. Alfred Bickerdike, of Adam-street, Adelphi, W.C. The interior of the church was remodelled some years ago by the late Mr. G. E. Street.





Liverpool Cathedral: General Plan of Site.

## MR. BROOKS'S DESIGN FOR LIVERPOOL CATHEDRAL.

**E** propose in this and the two following numbers of the *Builder* to give in succession the main features of each design in our illustration pages, together with such passages of their authors' reports on them as may be necessary to fully explain their views. In the present number we give reproductions of as many of Mr. James Brooks's numerous drawings as we can find space for at one time. These include the plan of the ground-floor and the triforium plan, the north and south elevations (the west front having been already shown in the view we published last week), and the two large views of the interior, looking east and west respectively. The accompanying block plan shows the site as it now exists, with the small church of St. John standing in the centre of it. The area is at present the old burial-ground or church-yard, a fact which has been adduced against its use as a site for the cathedral, and is the only argument against the site, perhaps, which is at all practically a serious one. The same difficulty has had to be faced before, however, in similar cases, and is not insurmountable, though considerations both of sanitation and sentiment will necessitate great care in the preparation of the site for its intended purpose. The east and north sides of the site, as will be seen from the figures, are the highest portions of the ground, which falls rapidly from east to west. St. George's Hall flanks the east boundary, and opposite to the northern boundary, at the further side of the street, is the group of buildings in Classical style which has gradually risen up there,—the Free Library, the Pictorial Reading-room, and the Walker Art Gallery.

Mr. Brooks places his church at the northern boundary of the site, as shown in his small

block plan subjoined, leaving the ground to the south of it clear, except for the line of subsidiary buildings which skirts a portion of it, and which is commenced from the lower level, the upper story of these buildings being on a level with the cathedral floor, or nearly so. This is a very good position for the subsidiary buildings, which thus form a kind of enclosure to the cathedral precinct, and they are kept as low as possible in order to allow of a view of St. George's Hall from Manchester-street. This object, however, will only be very partially realised, as indeed was evident in the exterior perspective we published last week.

The leading idea in regard to the proportions of the design has been to attain height, combined with a certain degree of horizontality. The site being short and surrounded by large though not very lofty buildings, the object has been to gain distinction and effect by making the cathedral rise above these horizontal-lined buildings, at the same time preserving a certain degree of horizontality by the ranges of windows, string-courses, parapets, &c., so as to harmonise to some extent with the horizontal lines of the adjacent buildings. This is Mr. Brooks's own statement as to his *motif*, and the partial horizontal effect which he describes is no doubt recognisable in the elevations we publish this week; but the geometrical elevation is a little deceptive in this respect, and the mass and projection of the buttresses, when seen in perspective, will cut through these horizontalities to some purpose; and in the west front vertical lines are certainly predominant. Though we think this point has been a little overstated in the report, however, there is no doubt that the choice of an early and severe form of Gothic does render the building a less violent contrast to its Classical surroundings than would otherwise be the case, and this is what is mainly intended. A building in an

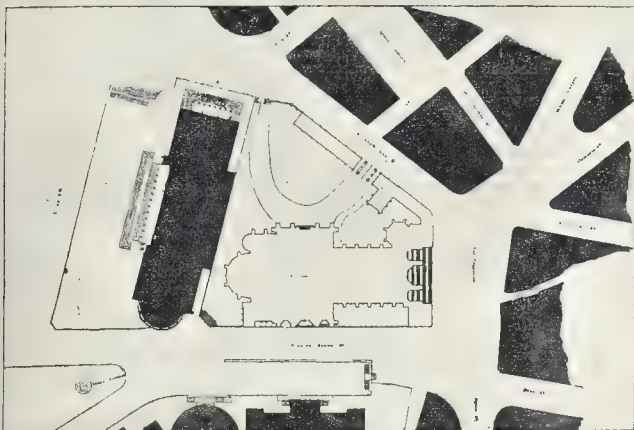
ornate Gothic style would clash curiously with the lines of St. George's Hall. But, after all, one cannot escape the incongruity by much. Look at the plain masses of masonry which constitute Mr. Brooks's buttresses, and compare them with the St. George's Hall Corinthian columns. There is not much use in trying for congruity between features which come, so to speak, from the opposite poles of architectural aesthetics.

In regard to the arrangements of the plan we now proceed to give some extracts from Mr. Brooks's report, omitting some of the points which have already been embodied in our remarks here and in the previous number:—

*Plan (generally).*—I place the cathedral itself on the extreme northern boundary of the site adjoining William Brown-street, having three of its principal entrances on that side. The western end is on the extreme west boundary of the site next the old Haymarket, and in the event of the present block of buildings on the west side of the Haymarket being pulled down for city improvements, a new street, forming a continuation of Dale-street, might be carried up directly to the west front, which will form a magnificent object at the end of this portion of the new street. Gateways are provided in St. John's-lane for entrances to the Cathedral, and thence a carriage-drive communicates with the south doorway of the transept. Opposite these doorways I would suggest the erection of a monument, on the base of which should be inscribed the names, so far as can be ascertained, of deceased persons whose remains have been interred in St. John's Churchyard; the termination of this monument to be in the form of a churchyard cross. By such a monument a record will be preserved of the spot of the names of those once interred there. Provision is made in one of the western towers for a clock-chamber, and in the other for a belfry and ringing-floor. Staircases and passages in the walls give access, as in the old examples, to all parts of the building at different levels. This is a useful provision, as by this means all parts can be approached without ladders, thus affording convenience for ventilation and repairs.

*Ground Plan.*—The principal object which I have





Plan, showing Position of Mr. Brooks's Design on the Site.

kept in view in designing my plan has been to obtain as great a breadth as will secure space for the accommodation of a large congregation, and so contrived that when assembled there shall be as little obstruction as possible to the sight. For this purpose aisles are added to the transepts, as well as to the nave and choir, thereby giving a very large and open space in the centre of the cathedral, and enabling a large body of people to be seated within sight and hearing of the preacher. This large and but little-obstructed space, lighted, as it will be, from a lofty central lantern, will produce, I firmly believe, a great and imposing feature in the building. The nave is intended to be 50 ft. wide, with north and south aisles each 25 ft. 6 in. wide; the north and south transepts, also the choir, will be of the same width as the nave, and each will have aisles corresponding in width with the nave aisles. The great width of the choir,—viz., 50 ft.,—gives an opportunity of providing ample accommodation for bishop, dean, canons, chorists, and congregation, such as is found in Westminster Abbey, St. Paul's Cathedral, London, and most other cathedrals in England. Eastward of the choir-gates are gates provided on the north and south sides for communicants to pass into the aisles on their return from the altar-rails without going through the choir and thus causing confusion. The choir has an apsidal end, as it has been already remarked, and an ambulatory or passage surrounds it, connecting the north and south sides, and giving access to a chapel for occasional services, on the south side, without the necessity of crossing the choir. On the north side of the choir-aisle are vestries for the bishop, dean, canons, and chorists, together with a monument-room for the cathedral archives. Owing to the great fall that exists in the land between the eastern and western boundaries, it has been a matter of much study to fix the level of the nave floor. Considering the importance of the thoroughfare on the north side,—viz., William Brown-street,—I have decided to make one of my chief entrances from it, and to so fix the level of the nave floor that access to the building should be obtained by as few steps as possible; thus, at the easternmost door the floor will be two steps above the pavement; at the central door it will be six steps; and at the westernmost door it will be eight steps above the same level. Having settled the position of the nave floor, my next endeavour was to arrange the approach at the western entrances. To effect this I have brought forward the two western towers to the extreme western boundary of the site, and have placed them wholly outside the nave and aisle walls, by this means gaining a very great breadth for the design, and causing the facade to occupy the whole frontage of the site next the old Haymarket; this arrangement will allow of the towers, if desired, being erected after the main portion of the structure is completed. The steps are disposed within the limits fixed by the towers, and are so divided that there will be an interval of landing between every six or seven steps, and that the ascent will be rendered as easy as possible for so great an elevation; this arrangement is likely to give considerable breadth of effect. A spacious baptistry is provided on the south side at the western end of the building, and entered from the south aisle. It is placed in a semi-detached position, and leaves the western end of the cathedral quite free for worshippers, and from its position it will form a picturesque feature on the outside of the building. The wall-space beneath the windows of the aisles is a part of the structure to which I wish to direct your attention, as it is generally occupied by arcades, which are of no particular use. These I propose to divide into recesses for the reception of memorials of dignitaries of the Church, bene-

factors of the Church, and men of eminence generally.\* I have also designated other parts of the building to receive sculptured memorials, but these will be more fully described with the plan of the triforium.

**Crypt Plan.**—A crypt is rendered necessary in consequence of the very great fall from east to west, and extends from the extreme western boundary of the site to the transept walls. Though permission is given by the instructions to place the chapter-house, Consistory Court, diocesan offices, and choir school in the crypt, I have not thought it desirable to do so, but have provided for all these in another position, and they will be described hereafter, with their respective plans. The appropriation of the crypt to such a purpose as that to which the crypt of St. Paul's Cathedral in London is devoted would seem to be a very suitable employment of it.

**Triforium Plan.**—This plan shows an arrangement for accommodating an additional number of worshippers to that provided on the ground-floor, in a triforium over the aisles of nave, choir, and transepts, which is of the same width as that of the corresponding aisles at ground-floor level; these are all well lighted, as will be seen by a reference to the plan. Particular occasions may arise,—festivals, for instance,—in a large city like Liverpool, when this additional accommodation may be very desirable. Access is obtained by spacious staircases in the angles of transepts, and at the western end of the nave. The external surfaces of the parapets next the nave, choir, and transepts appear to be specially adapted for the reception of sculptured memorials of deceased persons of eminence. The position of the organ in a building of this magnitude is a subject which requires careful consideration. It should be well raised above the floor of the choir, and a vaulted ceiling over it contributes largely to the diffusion of sound from the instrument. As the result, therefore, of a successful experience, I contemplate placing the organ in the triforium on the north side of the choir, some of its pipes being also placed in a bay of the north transept at the same level, and providing a separate staircase for its approach near the vestries.

**Subsidiary Buildings.**—These buildings are intended to form the enclosure of the site next St. John's-lane, and are two stories in height. The lower story, which is on the same level as that of the paving of the crypt, and which is delineated on the crypt plan, consists of the Diocesan offices, Cathedral Surveyor's office, and choir school, together with two large gateways. All these buildings are entered from the public street, and in addition the diocesan offices are connected with the lowest stage of the tower of the cathedral and the vestibule beneath the baptistry at the crypt level. The upper story of these buildings consists of a chapter-house, Consistory Court, private rooms for the bishop and the judge, and monument-room. These floors are on the same level as the paving of the nave, and communicate with the cathedral by means of a cloister terminating with the baptistry.

**North Elevation.**—It will be seen from this drawing that the great central feature is the transept, having three large well-recessed portals, and these I have treated as the chief entrances from a leading thoroughfare. Westward of this transept the lowest range of window is intended to light the crypt, the next tier of windows will light the aisles, the third tier lights the triforium, while the highest are the clerestory windows. These tiers of windows are designed to give the greatest quantity of light to

\* We may remind our readers that an arrangement similar to this is carried out, though not quite with the same continuity and completeness, in Bristol Cathedral, both in the original work, and in the modern nave added by Mr. Street.

the interior, and at the same time to add the feature of horizontality to which I have already referred, and which is intended to harmonise with the horizontal lines of the adjacent Classic buildings. At the north-west angle of the building is one of the large towers, and at the intersection of the nave, choir, and transepts a lantern is placed, rising to a great height, and occupying a prominent central position, as will be seen from the views which illustrate this report. This lantern will throw a very large amount of light on the floor of the cathedral. On the east side of the transept are the vestries, of two stories in height, having a separate external entrance, and communicating directly with the choir aisle.

**South Elevation.**—The whole of this front is within the Cathedral Close, and its main features are the transept, side chapel, and baptistry. The same arrangement of windows, with the same object, has been observed on this front as well as on the north front. The use of the deeply-recessed doorways, such as is employed on the north front, has not been adopted on this front on account of the difference of aspect, and also because of the comparatively private nature of the approach.

**As to the Construction.**—A building of the importance of this now under consideration, and designed for so distinguished a city as Liverpool, should be constructed of materials of the most durable and lasting character, both as regards resistance to the weather and capability of supporting great weight. The materials for the walls should be of wrought or cut stone, both externally and internally; and with regard to the kind of stone, I should recommend the use of Irish limestone, which is as durable a material as could be employed for all parts of the building up to the top of the plinth. I think the same stone should be used for the piers of arcades, as its resisting powers are well known, and when wrought with a finely-picked or sanded face, its colour is most agreeable. For other portions of the building might be used such stones as Darley Dale, Hollington, the stone used at St. George's Hall, and several other stones; but, before deciding on the definite use of any particular stone, it will be well to ascertain if any one quarry could supply the requisite quantity of material for so large a fabric. For the external covering of the roof it is intended to use lead.

The ceilings throughout are to be vaulted and groined in stone. At this place I should like to give reasons why buildings of this nature should be vaulted. (1) With a vaulted ceiling the atmosphere is less affected by the heat of summer or by the cold of winter than by any other construction. (2) With a vaulted ceiling, if from any accident the fittings took fire, the injury would be limited by it, and prevented extending to the roof; or, on the other hand, if the roof were accidentally to take fire, the destruction would be confined to this part of the building alone, as, in fact, was the case a few years ago at Canterbury Cathedral. (3) With a vaulted ceiling, a much more imposing and dignified effect is obtained than is possible with timber construction. (4) Vaulted ceilings constructed as I have designed these are by far the best for acoustic purposes, as, for instance, may be observed in the case of Westminster Abbey, which has an apsidal end. This latter circumstance has also had some influence with me in adopting the apsidal termination for the choir of this building, as an example founded on that of Westminster Abbey whose acoustic properties are so well known, cannot fail to recommend itself.

**As to the Cost.**—Having gone carefully into the cost, and given due consideration to this part of the subject, and having had, moreover, a long experience in church building, many of my churches being of considerable magnitude, I am of opinion that the munificent sum provided for this work will be sufficient for the purpose, and my views are confirmed by the opinions of others who have gone with me into this matter. I have also employed Mr. John Young, a London quantity surveyor, who has for upwards of twenty years prepared quantities for the various churches and other works which I have erected during that period, to take out the quantities of the floor area, and the cubical contents as required by the instructions, and he reports the following result:—The floor area within the walls available for worshippers is 40,610 square feet, and in addition to this area there will be in the triforium 17,070 square feet, making a total of 57,680 square feet. The cubical contents of the building, calculated above the principal floor level, and including walls and projections, such as buttresses, &c., are as follow:—

Nave, aisles, choir, transepts, chapel, vestries, and baptistry	6,242,678 feet.
Towers and spires	1,089,182 "
Subsidiary buildings calculated from the ground level	7,341,860 "
Grand total of cubic feet	434,508 "
	7,776,368 "

Mr. Brooks wishes us to mention that since sending in his report he has added to it a statement pointing out that of the area of 57,580



square feet mentioned above, there is a clear and unobstructed space of 11,500 square feet within 100 ft. of the pulpit, and beyond this 100 ft. there is in the nave, aisles, and triforium, 4,500 square feet, making a total of 15,000 square feet where the congregation can both see and hear the preacher.

In a future number we shall be able to give some further illustrations of this fine design. We may here point out, however, that the lantern which is shown over the crossing is, as will be seen when we have space to give the longitudinal section along with other drawings, entirely open from the church up to the groining immediately at the base of the pyramidal roof. It is divided into stages, in the first of which the square becomes an octagon, with squinches formed on an original principle, the soffits being groined from shafts attached to the face of the walls. The stage immediately above this consists of an arcade, and the two upper stages are divided by shafts carrying groined vaulting, and pierced with two windows in each stage, thus enabling a large flood of light to be thrown down, and to illuminate the whole central area.

The two interior views, that looking westward especially, show very clearly the manner in which, as we have before observed, great height is gained for the main arcade, and its lines towards the nave carried up continuously, while at the same time the intermediate arches carrying the upper aisle (for such it is rather than triforium in the ordinary sense) furnish a system of buttressing in the centre of height of the piers, obviating the necessity for increasing their mass to such a degree as to encumber the floor area too much. The practical gain of space in these upper aisles thus becomes at the same time a constructional advantage; design, convenience, and construction going hand in hand, as in all well-regulated architecture they should do. Granting that the Mediaeval type is to be adopted, we think all will concur with us in thinking that this interior is a very fine example of the style, and, as far as one can shake off the recollection of the difference between Gothic as an original style and Gothic as a reproduced style, it may fairly claim to be equal to some of the finest Mediaeval work. The exterior we do not so unreservedly admire in some points. The outline of the lantern might be improved; the western towers appear to us to need a little more diversification of treatment and a little more spread of outline in the lower portion. They form, to our eyes, rather too straight and vertical a line for a tower which is to culminate in a lofty spire. An Italian campanile on a great scale, which is crowned by a square lantern stage, or by only a small and subsidiary spirelet, gets much of its effect from its severe and almost chimney-like straightness, soaring right up at one bound, as it were, to the cornice. But we always feel that a tower which is crowned by a large and lofty spire should evince pyramidal leanings (if one may thus play on the word) in its own lines; the outline of the tower should seem to suggest the spire composition before the spire is arrived at, and the spire should be a natural and spontaneous fulfilment of a tendency to pyramidal composition from the base. It may be replied that this would not be so well in keeping with the period and style of Gothic adopted; and as a matter of precedent certainly it would not. The question is whether a modern architect should not attempt to make a better precedent. We forget what Roman general, when those nuisances the "augurs" told him a certain day was an unlucky one to fight on, replied, "Then I will make it a lucky one"; but the story has an application to many matters. Is a certain architectural treatment, superior in itself, "not in keeping" with the general precedent of the style adopted? Then make it in keeping. It must be observed, however, that the western towers look much better in perspective than in elevation, as indeed every tower ought to.

In regard to the plan of the church, it appears to us to be as good a compromise between practical requirements and architectural effect as can well be realised if the Mediaeval plan be adopted. This form of plan arose out of con-

ditions and feelings in regard to public worship and church polity totally different from those which now for the most part exist. To make such a plan a really practical one for modern worship is quite impossible. But practicability is not everything in a cathedral. Architectural effect and impressiveness are a very important part of the objects of such a building, and a cathedral which seated all the worshippers in the most commodious manner for hearing and seeing, and left them totally unimpressed by any dignity or effect in the architecture, would have fulfilled only half its purpose. Association, again, is strong in these matters; stronger perhaps than in anything else. We are, as Tennyson perhaps rather bluntly puts it, "the fools of habit" in religious ordinances and surroundings, and the form of building which has impressed on one as a church exercises a certain glamour over us; we cannot feel so fully "at church" in a building of another shape and of other associations; or so at least many of us think. In regard to the position of the organ, in the triforium gallery on the north of the choir, this is the best which Mr. Brooks's plan will give, and a better one than is found in many churches and cathedrals, for the combined purpose of general effect and of supporting the choir. A side position of this kind is not the place to hear a large organ from, however, and nothing will make it so. A large nave organ at the west end, and a smaller one contiguous to the choir, is the ideal arrangement. We certainly concur with Mr. Brooks in what he says about the superior safety, solidity, and architectural completeness of a vaulted roof; a large Mediaeval church is not complete with a timber roof. But we cannot follow Mr. Brooks in his remarks about the acoustic properties of a vaulted roof, or the "well-known acoustic qualities" of Westminster Abbey, any more than we have sometimes been able to follow the sermon in the abbey. The fact is, when you come to build a cathedral of this shape and size and construction, you may as well leave acoustics out of the question, and let people hear as well as they can, and meditate on the architecture if they cannot. The building will produce plenty of echo, no doubt, as Westminster Abbey does; but echoes are not acoustics. A vault, with its broken-up surfaces, however, no doubt returns less concentrated echo than a dome of the same material.

Whether the Liverpool cathedral should be a Mediaeval building or not depends on such a variety of considerations and influences that it is difficult to form any opinion one way or the other. It is easy enough to know what one's own predilection would be,—we have already intimated our own; but it may be reasonably urged that a cathedral should promote the greatest happiness of the greatest number of those who are to use it. Whether a modern Gothic cathedral is the form most likely to effect this end, we should feel it very rash permanently to predict. We confess to a doubt on the subject. But if it is to be supposed that it will do so, there is no doubt that the design before us has very high claims.

#### NOTES.

**T**HE New-Year opens gloomily for our great industries. The Iron Trades' Employers' Association have given notice that, in consequence of the depressed state of trade, and the high cost of production, the wages of all classes of workmen in their employment will be reduced about 7½ per cent. on the rates paid in the early part of 1879. Notices to this effect, to come into operation during the present month, have been given at Manchester, Liverpool, Birkenhead, Glasgow, Barrow-in-Furness, and in the Tyne and the Wear Valleys. The Committee of the Masters' Cotton-spinning Association have decided on another reduction of 5 per cent., following within three months on a similar reduction, only acceded to by the operatives after 25,000 of them had been on strike for twelve weeks. The employers state that trade has not improved since the last reduction. The master shipbuilders on the

Tyne and the Wear gave notice, a month ago, of a reduction of 10 per cent. in time wages, and 12½ per cent. in piecework prices. The notices expired during the past week. The whole of the men engaged in shipbuilding on the Tyne struck work on the 6th, and those on the Wear were expected to follow. Much distress already prevails in the shipbuilding centres, which will be thus intensified. It was announced in a New York paper that a considerable part of the business hitherto carried on by Messrs. Marshall & Co., of Leeds, is to be transferred to the banks of the Connecticut. The flax and hemp hands in Yorkshire are "absolutely dying out," in consequence of the departure of the trade to Lille and Ghent "where there are longer hours and better wages." The wool and woollen trade of Leeds is flagging. The worsted trade of Bradford is fairly prospering. Depression prevails in the building trade at Leeds. The exports of Hull and of Goole have increased since the opening of the Hull and Barnsley Railway, but it is not clear how far this increase is at the expense of other parts. The year opens badly for the trades of Yorkshire, and the greatest distress already prevails in some districts of the county.

**T**HE sinister importance of this week's news from the heart of the iron manufacturing district is not to be disguised. On the 5th of January it transpired that a leading firm at Wolverhampton had lost a good South American order for axes, owing to German underselling. It was further stated, that Wolverhampton merchants are now ordering wire and nail iron and screws of German make at greatly under Birmingham manufacturers' prices. Some little time back it was announced that Messrs. Nettelford were about to abandon works on which they had spent 120,000l., at Wellington, Salop, in order to transfer the scene of their screw-making industry to the neighbourhood of Newport, Monmouthshire. The present news shows that such a movement, intended to save the cost of a railway carriage had a substantial reason; but it is far from evident that the saving thus to be effected will be enough to enable English firms to maintain the command of the market for these articles of produce. On the contrary, it appears that German manufacturing prices are now so low as to be under corresponding English prices, even when the former are weighted by the cost of sea and land transport from the German workshops to the centre English market of Birmingham.

**A** CORRESPONDENT last week raised a question as to the ownership of drawings and plans prepared by an architect. Whether they belong to the architect or the building owner must, however, depend on the terms of the agreement between the two. It is possible for the architect to stipulate that the property in the drawings shall remain his, or for the building owner to require them to belong to him. It would be to the advantage of all parties if this were done in all cases, and the payment varied accordingly. Where no stipulation of this kind is made, we believe that "in the eye of the law" the property in the plans or drawings remains in the building owner. For the architect has been employed to prepare drawings and plans for him, and merely for his temporary use. He may use them or burn them; he may use them immediately or at some future time. Indeed, the more the question is looked at from a practical as distinguished from a purely legal point of view, the more obvious does it appear that the legal is also the practical rule. But that we have stated the legal rule, we have no doubt. If we are not mistaken, this question arose in regard to the Houses of Parliament, with result not favourable to Sir C. Barry's contention.

**SIR B. SAMUELSON'S** recent Report on the railway rates of Germany, Belgium and Holland, as compared with those of this country, is most useful and instructive, and presents many features of interest. The agitation of last year has resulted in more lig



being thrown upon this subject than all the Commissions of the past, and this exhaustive Report, which bears every evidence of careful research and reliability, must rank among the most valuable contributions to it. A large number of comparisons are made and tabulated in a concise and clear form, showing at a glance the difference between the Continental tariffs and our own. It appears that on many classes of traffic we are paying twice as much as the Germans and Dutch, and almost three times as much as the Belgians; though, in a few cases, presumably where our managers have found it quite impossible to maintain excessive rates, there is but little difference. The moral drawn by Sir Bernard is that the Continental rates are founded on intelligible principles, while ours are not. The principle here seems to be "what the traffic will bear," a system necessarily giving rise to many injustices and anomalies. There are insuperable objections to State control for our lines, but the interests of the different companies might be rendered more of a mutual and less of a competitive character by making the management more central; and it is evident that there are many expenses of administration which would be obviated by some such arrangement. But from whatever cause it arises this heavy excess in freightage handicaps our trade so severely in competing with the countries dealt with in this report that it is high time that some alteration should be effected.

It appears from a paragraph in the *Venice Times*, an English paper published in Venice and edited by an English architect,\* that an attempt is about to be made to re-unite the scattered portions of the tomb of the Doge Dandolo. At the present time the sarcophagus which contained the body is lying in the cloister of the Seminario; the arch which formerly covered it remains in the Archivio di Stato, where the monument was originally erected, and the painted spandrel of the arch is now in the sacristy of the Church of La Salute. The tomb will probably be re-erected in the Church of SS. Giovanni e Paolo, which, in return, is to give up the sculptured group belonging to the monument of Vettor Capello, which is also dispersed, but is to be put together and re-erected in some other place.

MR. R. W. CRAWFORD, the Chairman of the East Indian Railway Company, has issued a pamphlet with the motto,—

"... Super et Garamantas et Indos,  
Proferet imperium."

from the *Æneid*, in which he advocates the construction of what he calls a grand chord line from Barrakur, near Calcutta, to Moghal Serai, on the south bank of the Ganges, opposite Benares, a distance of 469 miles. The line was fully surveyed in 1850, and the details were so far worked out as to form the basis of a preliminary contract, but the Government of the day preferred the circuitous line following the valley of the Ganges, which has been carried out, and now forms the East Indian Railway. The proposed line would shorten the journey between Calcutta and Benares, and every place to the westward of the latter city, by about sixty-seven miles, and would reduce the cost of transport by that distance on all goods from all stations in the North-West to Calcutta. The line would pass very near the Kurhurbaree coal-fields, and would shorten the route for coal to the North-West by ninety-two miles, and reduce the cost of transport to the extent of 2s. 8½d. per ton. A short connexion between Gya and Sherghotty would give an alternative route of 364 miles between Patna and Calcutta, via Sherghotty, instead of 338 miles by the direct line and to the extent of an additional run of 26 miles render Patna and its allied stations independent of any mischief that might occur to the exposed portions of the main line near Sukiesera. Mr. Crawford deprecates the carrying out of the design for the docks to be built at Kidderpore at an estimated cost of three millions sterling, which, if the estimates be not exceeded and

the work be successfully completed, will involve an annual charge of 150,000*l.* upon the trade of the port at a time when so much has been done and so much remains to be done in the way of relief in other quarters.

FROM the Report of the Surgeon-General of the United States Navy for 1885 it appears that at the Museum of Hygiene in Washington, in connexion with the Navy Department, a complete system of iron and lead pipes, with fixtures, is being erected on the outside of the building from the ground to the roof, with an observing station at each of the three stories, for an exhaustive series of experiments covering all the topics in dispute pertaining to trap syphonage and the utility of the mechanism of water-closets, traps, water basins, baths, sinks, &c., as well as to numerous ones on which there are no reliable data, together with microscopical and chemical tests of the action of sewer air and different waters on pipes and tanks. These experiments will be conducted by Mr. Glenn Brown, the "American architect" whose account of American sanitary apparatus we have just been publishing, and he will report on the results through the returns of the Navy Medical Department.

A COMMITTEE of the Edinburgh Town Council have had under consideration a proposal by the Lord Provost that steps should be taken for the erection of new municipal buildings for the city, the present buildings having become inadequate to the requirements of the municipality. The Lord Provost appears to be in favour of the present site, in the High-street, with additions thereto from adjoining property. Other members of the Council were in favour of a site in the new town. It was agreed that inquiry should be made and a report obtained as to the capabilities of the present site, and as to the accommodation required by other public bodies located elsewhere in the city which it would be desirable to concentrate in the new buildings. There is no doubt that the present site is admirably fitted for a picturesque and effective public building, but if a Town Hall is to form part of the scheme the site will be found a most inconvenient one. At all events, we trust that wherever they may be placed the new buildings will be worthy of the city.

THE old palace known as the Römer, at Frankfurt, contains in its principal apartment, the Kaisersaal paintings, representing the portraits of all the German emperors from Charlemagne down to the break up of the German Empire in the year 1806. The formerly free and Imperial city of Frankfurt, although shorn of much of its ancient greatness through its annexation to Prussia, still takes the utmost pride in the Römer Palace, and the treasures it contains. The municipal authorities of the city have accordingly determined to continue the practice of former times, and to add to the thousand years' series of Imperial paintings in the Hall of the Emperors, a portrait of the first emperor of the new dynasty. The work of restoring the ancient edifice of the Römer has already been taken in hand, and, as soon as this portion of the work is complete, certain alterations and fresh decorations are contemplated. The pictures already in the palace entirely cover the walls of the Imperial Hall, and, accordingly, it would have been necessary to enlarge the building in order to accommodate the portraits of the monarchs of the New German Empire. Instead, however, of making any addition to the edifice, it has been determined that the new dynasty shall be represented in the Imperial Hall, not by portraits, but by statues. It has been proposed in the Frankfurt Council that the cost of placing the statues of all the German emperors of the future in the Imperial Hall shall be defrayed by the city, and that the statue of the Emperor William shall be erected there without delay.

IN the *Builder* for February 21st of last year we published a review of the new edition of "Tredgold's Carpentry" edited by Mr. Tarn, pointing out some serious, and in some cases

quite inexplicable, inaccuracies in the work. We are glad to say that we have received from Messrs. Crosby Lockwood & Co. a revised copy of the new edition, accompanied by a letter stating that in consequence of our remarks they had had the work most carefully read, and had corrected the errors pointed out by us, as well as some others which were discovered on the second reading, and they have now issued the book afresh, free from these errors. The publishers have taken a very spirited course, and one highly creditable to them, in thus acting.

#### PLUMBING PROBLEMS.\*

SUCH is the title of one out of a batch of books on sanitary subjects which has reached us from across the Atlantic. It is in the main a reprint from the *Sanitary Engineer* of questions addressed to that journal, with the editorial replies and comments thereon. This selection from a multitude of miscellaneous queries is illustrated by diagrams, and it pretty well covers the whole field of sanitary work as applied to domestic wants. The American houses are noticeable for the extent and completeness of their arrangements for warming,—a necessity of the rigorous climate,—and the inventive intellect of our cousins has been exercised in this direction, running into every variety of contrivance and expedient. An American house of the first class is, in this respect, a very complicated piece of engineering, and the provision for its working and the precautions against accident are proportionately numerous. A plumbing specification,—which strikes us as the least excellent portion of the book,—follows the section on water supply, and the whole concludes with reprints of the New York, Brooklyn, and Boston plumbing laws, which have been devised to avoid the employment of incompetent workmen, and framed so as to embody the latest conclusions of the science of sanitation.

The American nomenclature differs slightly from that in use in this country; water-closets, lavatories, &c., are "fixtures," down-pipes are "leaders," and a "back-boiler" is a "water-back,"—the term "boiler" being reserved for what we should call the circulating system. The irrepressible American humour shows itself even in the serious treatment of this dry subject (if we may so describe a subject in which water plays an important part); to a matter-of-fact essay on the emptying of a water-closet trap by capillary attraction, caused by the presence of a "duster," the following "moral" is appended,—"Avoid complicated fixtures, and preserve all textile fabrics for paper stock, instead of putting them down the drains!"

One of the most useful sections of the work is that on what are called "by-passes." It deals with a subject which is, indeed, at the root of all efficient internal drain ventilation. By a by-pass is meant such an arrangement of "fixtures" with a common trap, the attempt to ventilate which provides the foul air with an open path into the room. The rule for the prevention of this defect is given thus:—"Water should never pass through more than one trap in reaching the house-drain." If water, after passing through the trap of its own fixture, then passes through the trap of another fixture, and both traps are ventilated, there is sure to be a by-pass.

The accompanying diagram explains what is meant. It is evident that the plumber has provided, according to his lights, for the due relief of the head of each of the syphons, and if the upcast current were strong and continuous all would be well, for any foul air which might accumulate in the syphons would ascend as shown by the arrows. But alterations in temperature always render a reversal of the direction of upcast currents possible, and it is evident that a strong attraction might induce the currents in the escape-pipes along the lines indicated by the dotted arrows, and thence, by the w.c. apparatus, into the house. An "open path" is provided and would, no doubt, be occasionally followed.

It is obvious that by somewhat similar arrangements of "fixtures" to that shown in the diagram a great variety of "by-passes" are possible, and "as a rule there will be as

\* Plumbing Problems; or, Questions, Answers, and Descriptions relating to House Drainage and Plumbing, from the *Sanitary Engineer*. With 146 illustrations. New York and London: The Sanitary Engineer. 1885.

\* Mr. W. Scott, late Travelling Student of the R.I.B.A.



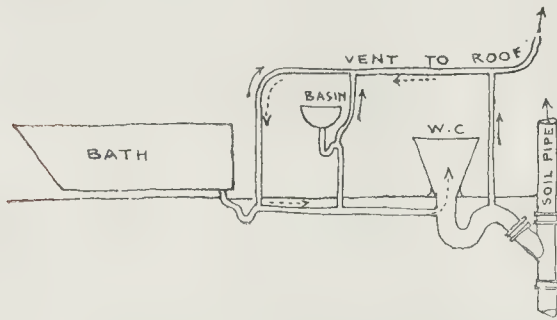
many 'by-passes' less one as there are traps through which one discharge has to pass in reaching the house-drain."

The examples given show that unintelligent and dishonest workmanship are as common in America as with us, and they also show that a desire to do the right thing very often ends in disaster through ignorance of sanitary principles. Much practical editorial wisdom is scattered throughout the book, and finds expression in such apothegms as "it is more important to have intelligent workmen than expensive appliances." In fact, the whole tenor of the work is in the direction of the simplification of appliances and the arrangement of them on scientific principles.

There is truth in the remark that plumbing is not often enough the subject of drawings. It is left to description and to specifications, which are by no means always specific. "Fixtures" are to be properly trapped and ventilated, and joints to be properly made, &c. Modern plumbing, as the writer justly says, is of too much importance to be done, except as all other important

collapse sometimes occurs. The stop cock on the main is closed, and the water drawn off from the boiler, and a collapse is the consequence. But this kind of accident is perhaps inevitable, and must be borne with as beyond cure. It is fortunately not very common, and, by no means disastrous, as is the blowing up of the water-bank.

The New York regulations for plumbing works recommend that all soil and other vertical pipes shall be carried up in a special shaft, which should also serve as a ventilating-shaft. It should be 2 ft. 6 in. square, and be accessible at every story, with a grating at each floor strong enough to be stood upon, and covered at the top by a louvered skylight. It is further recommended that the services should be concentrated as much as possible, and not unnecessarily scattered over the building. Both these points are attended to in English work; and, indeed, it is difficult to see in what respect the American architects have improved upon our home methods. The conditions under which they live have compelled them to adopt more



constructive work is done, viz., in accordance with carefully-prepared detail drawings.

A schedule of the desiderata for the perfect drainage of a house scarcely differs at all from the English practice. It is not, however, provided that the sink and other wastes shall discharge over open trapped gullies outside the house, nor can it be seen from the very numerous diagrams in the book that what is in England now considered an essential of perfect drainage is so regarded in America. On the contrary, the typical specification provides for connecting all such wastes immediately with the house-drain by 2-in. cast-iron pipes with syphon traps under the "fixtures."

The treatment of hot-water circulation in houses is very copious and interesting, and numerous examples are explained and illustrated. The custom of placing the boiler on the same level or near it as the "water-back," which is fast gaining popularity in England, was first attempted in America, and it and its allied appliances have been brought in that country to great perfection.

The elaborate system of warming such palatial residences as those of Mr. W. K. Vanderbilt and Mr. Cornelius Vanderbilt, in New York, are carefully described, and present an evidence of much originality and ingenuity of arrangement, too complicated and various to explain without the help of diagrams. The annual risk to life which we experience from the bursting of kitchen-boilers is not escaped by the Americans, whose "water-backs" have the bad habit of occasionally "blowing up," notwithstanding all the precautions taken to provide against the danger.

Frost is, of course, the cause, and many expedients have been suggested and tried to prevent the consequences of frozen pipes. The Editor of the *Sanitary Engineer* distrusts spring taps and fusible plugs. "People who blow up water-backs," he says, "have very little knowledge, and would not know what to do if told that a water-back was frozen." He recommends one which is too strong to explode at all, or one which will explode at a comparatively low pressure, and so minimise the resulting damage. It is not gratifying to have to record this recommendation as the only practical solution of a question which touches the public safety. There is evidently room for a contriver of safety water-backs.

It is also found that with the vertical boilers, which have superseded our circulating cisterns,

extensive and elaborate measures in certain directions, but, on the whole, the English and the American practice are identical.

It is pleasant to note the *entente* which exists between the sanitarians of the two countries, and the readiness with which the excellence of English sanitary systems and appliances is recognised by our American cousins.

#### CHRISTIAN EMBLEMS IN ARCHITECTURE.

THE cross "carefully imprinted alike on the habitations of the living and the receptacles of the dead" will be uppermost in the minds of all who may glance at this heading.

So much in request was this great emblem of our faith at the Crusades, and so eager was each warrior to bear it on his shield, that the ingenuity of the Herald's was taxed to produce it in forms innumerable, and its varieties are more than two hundred, and some accounts even go up to three hundred, and one old writer laments, "You bring me so many crosses that I be weary of them." The plain Latin cross is the usual form in our churches; that is, with upright limb of greater length than the cross-piece; while the Eastern church uses the Greek form, with all the limbs of same length.

St. Andrew is always accompanied by the X-form of cross on which he was condemned to be crucified. St. Philip carries the T or Tau cross, and sometimes it is represented as a double one, but not often.

We hail St. George by his shield with the red cross, and overcoming the dragon.

We know St. Peter by the inverted cross, calling to mind the form his martyrdom assumed. St. Jude also carries the cross reversed, but of the "Tau" shape.

St. Alban (the youthful martyr) carries a sword in one hand, and a cross "crosset" (or crossed at the ends of the upper limbs) in the other.

We must not forget St. Patrick with the X-cross (or "saltire") in form as St. Andrew's, but with the colours (when shown) reversed, the former red on a white ground, and the latter white on a red ground. We find them in our "Union Jack" with that of St. George.

Occasionally we find the Latin cross upon three steps, known as "Faith, Hope, and Charity," or that of Calvary.

The Patriarchal Cross is less familiar; it is distinguished by having two cross pieces or horizontal bars.

We learn from "The Calendar of the Prayer-Book" that the crucifix was first represented, with Our Saviour's bust at the head or foot of the cross, and the Lamb in the centre, and that, afterwards Christ Himself was represented clothed, but not nailed; and then came the present form, with Our Lord fastened to the cross with the eyes open, and later on (from the tenth to the eleventh century) sometimes dead.

In the Greek Church, and most of the early examples, one nail fastens the feet together. In the modern Roman Church it is usual to place the feet separated, and use four nails. Formerly the figure was robed, and with a rega; crown, but later examples show the crown of thorns, with only a cloth around the loins.

From the same source we gather that "the crucifix soon came to be regarded as an indispensable part of church furniture. Large representations (often with the additional figures of St. Mary and St. John) were placed over the chancel-screen (thence called the rood-loft, a the crucifix was called the rood) as well as over the church doors. The crucifix placed on the altar was generally of gold or silver, and adorned with precious stones."

Another writer observes—"The Latin cross, from its form, speaks more directly of the Atonement, representing more faithfully (probably) the very instrument on which Our Lord suffered. The Greek cross, we read, rather as the emblem of Christianity in general, the religion of the Cross, expressed by its four equal arms, extending its benign influence over all the four quarters of the world."

The emblems of the Trinity are largely represented in ecclesiastical architecture in various forms, such as two triangles interlaced, or three circles intersecting each other, or a triangle within a circle; also the device setting forth its doctrine, which is met with on brasses and now and then in windows. Foreign artists did not scruple to produce representations of the Trinity in person, but such instances are rarely to be seen in England. Three figures interlaced in the form of a triangle is another method of symbolising the "Mystical Three in One."

The emblems of the four Evangelists meet our gaze at every point, and are of great beauty and significance. Matthew is known by the angel, because his writings bear testimony to the human nature of our Lord. Mark, with his winged lion, will be familiar to every one as the "historian of the Resurrection"; the lion is an emblem of this important part of our faith from the old tradition that its young was brought dead into the world, and licked into life a few days after. The winged bull of St. Luke is an emblem of sacrifice, and the apostle speaks chiefly of our Saviour as a priest.

But the eagle of St. John will be the best known of the four emblems, from its constant use as a lectern, for which the outspread wings so admirably adapt it. It is said that as St. John goes beyond all other writers in contemplating the divinity of the Saviour, so the eagle soars far above the range of the feathered tribes, and gazes with undisturbed eyes upon the noonday sun.

The dove is constantly met with, and represents the Holy Ghost, and sometimes it is hovering over the waters; and again we find it with a branch in its mouth, suggesting the return to the ark, and in this conjunction coming to us as an emblem of peace to the world at large.

St. Paul with his sword (the instrument of his martyrdom), St. Peter with his key or keys, and St. Stephen, holding a stone in his hand (some stones in his lap), hardly need referring to, so familiar must they be to all church-goers and we pass on to speak of other saints perhaps less known.

We shall recognise St. Agnes by her lamb; St. Blasius by his iron comb, with which he was tortured, St. Ambrose by his bees (signifying eloquence), St. Augustine by his archbishop's pall charged with crosses, St. John the Baptist by his raiment of camel-hair. St. Martin is never to be mistaken, as he sits on horseback, dividing his cloak to share it with a beggar. St. Swithin "comes home to us," as no other saint can, as the rain falls thickly around him.

St. Margaret stands on a dragon while thrusting a spear into his mouth, and St. Ann is recognised as teaching the Virgin Mary to read. St. Laurence bears the gridiron, the instrument



of his terrible death, and St. Bartholomew the knife with which he was flayed alive.

St. Giles (the patron of cripples) has a fawn leaping up to him, and St. Michael is generally seen in hand overcoming the Evil One. St. Denis carries his head in his left hand (recording the miracle performed at his death) and a pastoral staff in his right; while St. Feith is known by her brazen bed on which she was half roasted before being beheaded. St. Simon generally carries a fish, and St. Jude a boat, in allusion to their callings. St. Leonard bears chains and fetters, and sometimes a book also. St. Hugh of Lincoln caresses a swan with one hand and holds in the other his bishop's staff.

St. Catherine will be readily recognised by the wheel that bears her name, and sometimes she is treading underfoot the Emperor Maximin, and holding a long sword.

St. Lucy carries a pair of eyes on a plate, and bears the palm branch of martyrdom. St. Nicholas is standing by a tub, from which he is bringing back to life some young children, who had been killed and salted down for eating during a dreadful famine.

St. Jerome holds a lion by the paw, and in this instance the animal represents solitude, and must not be taken for that of St. Mark.

Our Saviour is frequently represented as the Good Shepherd and carrying a lamb on His shoulders. The Lamb of God or Agnus Dei bearing a flag is considered the Christian emblem of purity.

The fish (the Greek word for which contains the initials of the names and the titles of Christ) is one of the very earliest of our Christian emblems, and fishes in general represent chastity.

The letters X and P conjoined are very familiar, and form the monogram of the name of Christ in the Greek and are to be found in the catacombs of the early Christians at Rome; the Vesica is also supposed to be typical of the same thing, but the letters I H S are the more usual monogram, being the three first letters of the Greek word for Jesus.

#### LETTER FROM BRUSSELS.

BELGIUM is a country, it seems, favourable to the growth of all kinds of societies; it has been said that three Belgians cannot meet without forming a society, and truly, from what is to be seen here, one might conclude that this joke is nearer the truth than one believed.

In point of associations, Belgium possesses numerous archaeological and historical societies which are scattered through the length and breadth of the land, and which study with ardour its archives, its libraries, and its museums. These studies have hitherto been carried on simultaneously in different parts of the country, without having any common meeting ground to give unity to the work, and to arrange the immense quantity of documents already collected.

The Belgian Academy of Archaeology has found that it would be desirable to group all these separate elements in one federation, modelled upon the French Society for the Preservation of Monuments, founded in 1834 by M. de Caumont. The Belgian societies were therefore invited to meet from the 27th to the 31st of August last at Antwerp, to discuss the basis of the new institution.

The meeting was exceedingly well attended, and ended in the foundation of the federation and the adoption of statutes. We shall therefore have annually in Belgium a congress of archaeology and history which will take place successively in each of the great cities.

As we think, the Congress of Antwerp did not give us all that we had a right to expect from a scientific point of view. The greater part of the session was taken up with the discussion of the statutes of the federation. Several very important essays, however, were read. We may particularly mention that of M. Vandengheyn upon the Aryans, that of Professor Kurth upon the rights and duties of archaeological societies, that of M. Alfred Bequest, Conservateur of the Namur Museum, upon the organisation of provincial museums, and, lastly, that of M. Claes, archaeologist, of Antwerp, who gave an account of his researches in the excavations occasioned by the rebuilding of the quays on the Scheldt at Antwerp. This last gentleman exhibited to the members of the Congress a collection of objects of all kinds

found in the Scheldt and brought to light by the dredgers. He had specimens of the arts and industries of nearly all European nations, from the Middle Ages up to our own time.

Numerous propositions again were made, notably one tending to the acquirement by Government of the ancient Meat Market of Antwerp, dating from the fifteenth century, and the ruins of the Abbey of Villers, which include very remarkable structures of the twelfth and thirteenth centuries. These edifices are at present the property of private persons, who have the right to demolish them without its being in the power of any one to oppose them. The Congress also expressed a wish to see the numerous popular country songs brought together in one collection, as well as a list of the "*noms de lieux*" of different villages. There is really quite a study to be made of this last point, for it involves the bringing to light of the names of fields and of the inclosures which are so plentiful in the villages, an analytical examination of which would be most interesting on account of the comparisons that might be made.

Let us note, in conclusion, that the assembly expressed a wish to see an album published of Flemish objects of art of which the authors and dates of execution are known. This would create a series of typical plates of the highest interest, which would without doubt be received with pleasure by the archaeologists and artists throughout the country. That which had been done in this way in England, particularly the work of the Rev. Fred. Greeny, "*Facsimiles of Monumental Brasses*," was spoken of in eulogistic terms. M. Reuseus, professor at the University of Louvain, was elected president of the congress, assisted by a committee of patronage appointed by the Belgian Government. The next congress will take place at Namur in 1886.

We believe that the new institution is destined to further the progress of the science of archaeology in Belgium, a country of which it may well be said that it is a veritable museum.

#### ACTON SEWAGE AND THE METROPOLITAN BOARD OF WORKS.

THE Metropolitan Board of Works have evidently set their face against all applications from suburban local Boards for connexion with the Metropolitan Sewage System. The Acton Board, for probably the eleventh time, has appealed to the central authority, and to its engineer, Sir Joseph Bazalgette,—who happens to be consulting engineer to the Acton Local Board,—to save the latter from the expenditure of nearly 20,000*l.* in the construction of an effluent-sewer to the River Thames in connexion with that parish's new drainage system. Sir Joseph Bazalgette has once more replied that the sewage or the effluent water from the Acton works cannot be allowed to enter the Metropolitan system; and he can suggest no other means of its disposal than by an independent covered sewer with an outfall into the River Thames. It must be admitted that proximity to the Metropolitan sewerage system has proved a serious disadvantage to some of the outlying suburban districts. Several years before the formation of many of the western district local Boards, the Metropolitan Board of Works issued notices, and laid a sewer of sufficient size apparently,—5 ft. in diameter,—for the extension of their system to Acton and Ealing; but the Metropolitan Board of Works, from some cause which does not seem to have been explained, stopped these works of extension when they came to the borders of the Acton parish. But Acton seems to have lost much more at that time than the advantage of a connexion with the Metropolitan system; the Central Authority quietly diverted to their system the Stamford Brook, which had been, it seems, from time immemorial, the sewage outfall of Acton to the River Thames. This diversion would have been a great benefit to Acton if it had been allowed to continue to run its sewage into the central system; but the Metropolitan Board soon applied for an injunction to restrain the Acton Local Board from discharging sewage into their old outlet. In the case tried, the Metropolitan Board were to a large extent successful, as they obtained an injunction, which, though it did not prohibit the Acton Board from putting the sewage of houses then in existence into the central system, it prevented the Acton authorities from disposing of, in this way, any fresh

sewage which came from houses built subsequently to the issue of the injunction. This was tantamount to complete exclusion; for the Local Board could not frame and carry out a new drainage scheme only for new houses scattered over all parts of the parish. Therefore the construction of a scheme for the whole of the parish with new sewers is proceeding. Through the very large powers of the Metropolitan Board, which can divert and assimilate, as it were, to its own system, the original river outfalls of the outlying suburban districts, the Acton Board is now compelled to construct an effluent sewer through Chiswick to the Thames, and pay, of course, that neighbouring parish and many private owners compensation for doing so. The plight in which the Acton Board now finds itself no doubt warrants the extension of some sympathy towards them; but, as some of the members have remarked, the parish should not have been asleep at the time steps were being taken to deprive it of its ancient outfall to the River Thames. It may be observed, however, that Acton seems to have special claims to the consideration and aid of the Metropolitan Board, not only because of this deprivation of outfall, but because the Acton Board are willing to pay a reasonable sum annually for the privilege of disposing of its sewage by means of the Metropolitan system, and to divert to the Thames a large quantity of the rain-water which passes through the water-course in question into the central system, and which adds unnecessarily to the cost of pumping at Barking.

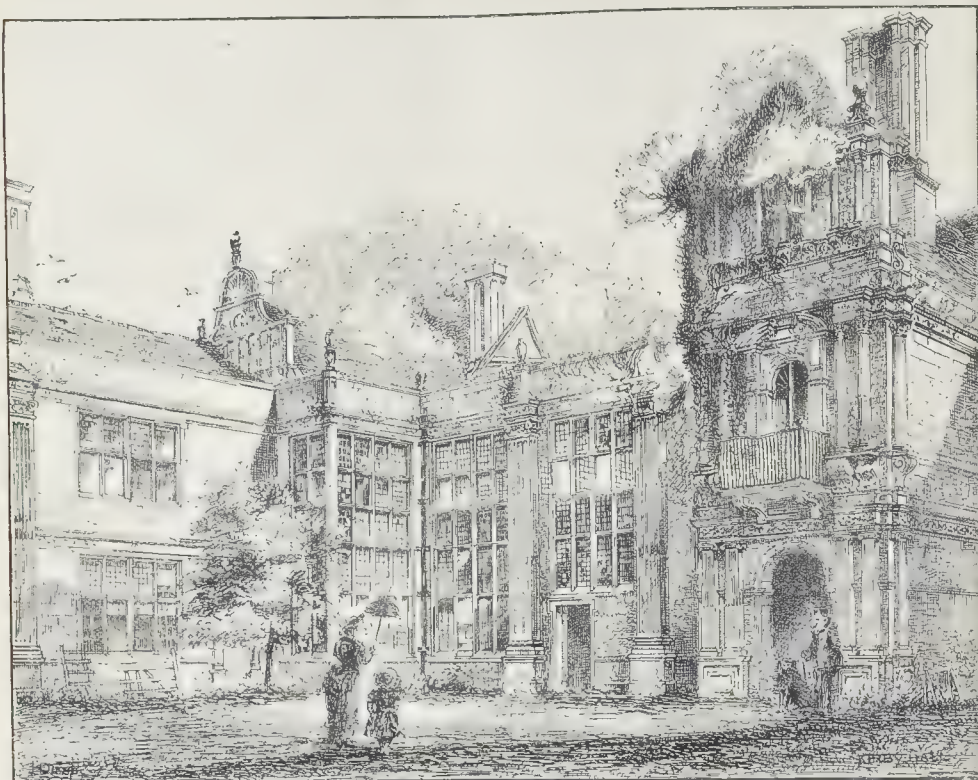
#### OBITUARY.

Mr. James Fergusson, F.R.S.—We announce with much regret the death of this distinguished writer on architecture, which occurred on Saturday last, at his residence, Langham-place, in his seventy-eighth year. In our leading article this week we have referred at some length to the principal points in his remarkable career. The funeral took place on Thursday, at Highgate Cemetery, and was attended by "the Right Hon. Sir A. H. Lyard, G.C.B.; Mr. John Murray, F.S.A., of Albemarle-street; Mr. T. H. Thorp, C.B., C.S.I., and Major-General Sir Frederick Goldsmid, C.B., K.C.S.I., representing the Royal Asiatic Society; Mr. A. B. Mitford, C.B., of H.M. Office of Works; Mr. F. C. Penrose, M.A., Surveyor of the Fabric of St. Paul's Cathedral; and the undermentioned representatives of the Royal Institute of British Architects, viz.:—Mr. Ewan Christian, President; Mr. Alfred Waterhouse, R.A., Vice-President; Mr. Octavius Hansard, Member of Council; Mr. J. Macvicar Anderson, Hon. Secretary; Mr. William H. White, Secretary; Mr. Wyatt Papworth; and Mr. Hugh Stannus. Letters were received from Major-General Sir Henry Rawlinson, K.C.B., Sir Edward Colebrooke, bart., and Sir F. Burton, of the National Gallery, expressing regret at their inability to attend.

Mr. Thomas Albert Waring died on the 6th inst. at his residence, Sutton, Surrey. Originally a pupil of the late Charles Tyrrell, he formed a link between the old and new generation of surveyors. A correspondent writes of him that "though an exquisite draughtsman, colourist, and student of the Royal Academy, increasing practice early led Mr. Waring into prosaic facts. Probably his knowledge of property law generally, and all the details connected with glebes, was unrivalled. No man was more esteemed for his amiability and for his willingness to impart information to the younger race of professional men. Mr. Waring married a daughter of the late Mr. James Brown, of the firm of Boulton & Watt, and leaves no issue; he retired some years ago from the firm of Waring & Nicholson, No. 55, Parliament-street, of which he was the senior partner."

Tickhill, Yorks.—The large west window of Tickhill Church, which consists of ten chief lights and lofty tracery, has just been filled with stained glass through the munificence of the Misses Alderson, of Tickhill. The window is so arranged in design as to illustrate the entire book of Genesis, from the Creation to the death of Joseph, and it has been designed and executed by Messrs. Powell Brothers, of Leeds, who are also the artists of the five-light east window.





Kirby Hall.—South-East Corner of Inner Quadrangle.

## Illustrations.

## MR. JAMES BROOKS'S DESIGN FOR LIVERPOOL CATHEDRAL.

**T**HE whole of our lithographic illustrations are this week devoted to Mr. Brooks's design for the proposed cathedral at Liverpool. For an article on the subject, see p. 116, ante.

## KIRBY HALL.

The accompanying sketch of the courtyard of Kirby Hall has been forwarded to us by Mr. Henry Drury, as an illustration of an old house which will be of interest in connexion with Mr. Goch's paper on "English Houses of the Seventeenth Century," recently read at the Architectural Association, and printed in our columns. Concerning the building, Mr. Drury writes—

"This fine example of English Renaissance was built for Lord Chancellor Hatton by John Thorpe, whose plan (preserved in the Soane collection) bears the quaint inscription 'Kerby whereof I layd ye first stone A.D. 1570.'"

The north side and the outer quadrangle were altered by Inigo Jones about the year 1640 in the Italian style, and compare unfavourably with the delicacy of the earlier work. With the exception of a few rooms inhabited by an old servant the mansion is in ruins, having been dismantled about forty years ago. The sketch represents the south-east corner of the inner quadrangle with the central entrance leading into the large hall, and shows its condition in the autumn of 1861."

**The Architectural Association.**—In view of the proposed Italian excursion, a meeting will be held on Tuesday, the 26th inst., at 9, Conduit-street, at half-past six p.m., when the subject discussed will be "Florence."

## SOCIETY FOR THE ENCOURAGEMENT OF THE FINE ARTS.

The twenty-seventh annual report of this Society congratulates the members upon the continual growth and the unceasing activity of the Society, and expresses a confident hope that the exertions of the Council in the future may both maintain and increase the services of the Society in the cause of art. The main object of the Society is to promote and to increase an intelligent love for the fine arts which adorn and which enoble life. The Society affords a meeting-place for professional artists and for the non-professional but art-loving public. It works chiefly, at present, by means of exhibitions, by means of lectures, and by means of *conversationsi*. The programme for the coming session includes the following items:—Thursday, February 4th, lecture by Professor Kerr on "The Art-Scepticism of the Day"; Thursday, February 18th, lecture by Mr. Geo. C. Haité, on "The Tendencies of Modern Art"; Thursday, March 4th, lecture by Mr. W. Cave Thomas, on "The Proportions of the Human Frame"; Thursday, March 18th, Mr. Herman Merivale, on "The Drama of the Day"; Thursday, April 15th, Mr. E. P. Loftus Brock, F.S.A., on "Old Engravings of the Italian School"; Thursday, May 20th, Mr. G. A. Storey, A.R.A., on "The Moissoniers in Hertford House"; Thursday, June 24th, Mr. T. H. Maguire, on "The Importance of the Fine Arts to Humanity."

## The Indian and Colonial Exhibition.

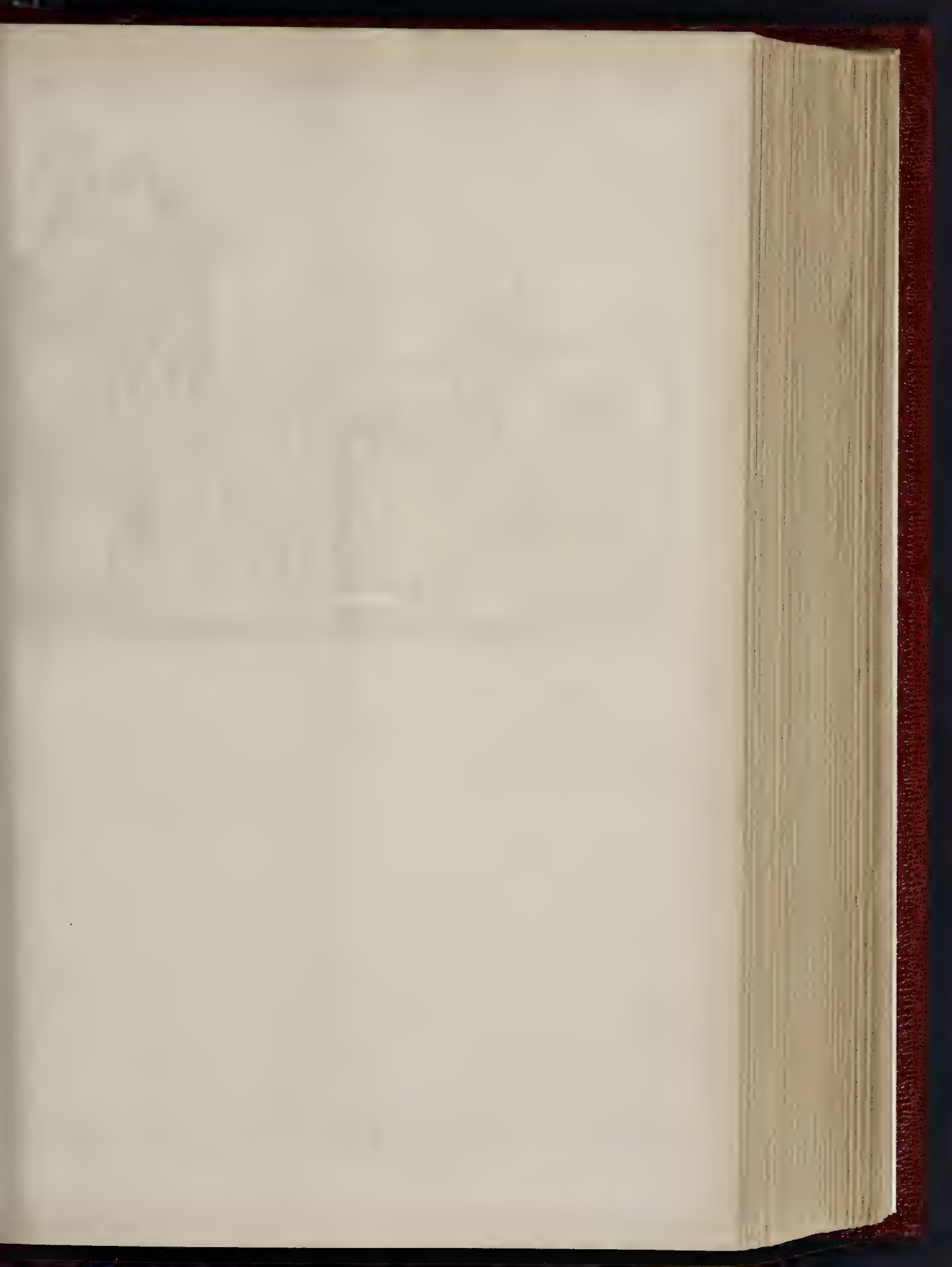
We are informed that Mr. Sam Deards, of Harlow, has secured the contract for glazing the new buildings at the forthcoming Indian and Colonial Exhibition, South Kensington, for Messrs. Lucas Bros., with some 10,000 ft. of the "Patent Victoria Dry Glazing." Mr. Deards has also been commissioned to erect a large conservatory for the Natal Government for their exotic plants and palms.

## THE INSTITUTION OF CIVIL ENGINEERS.

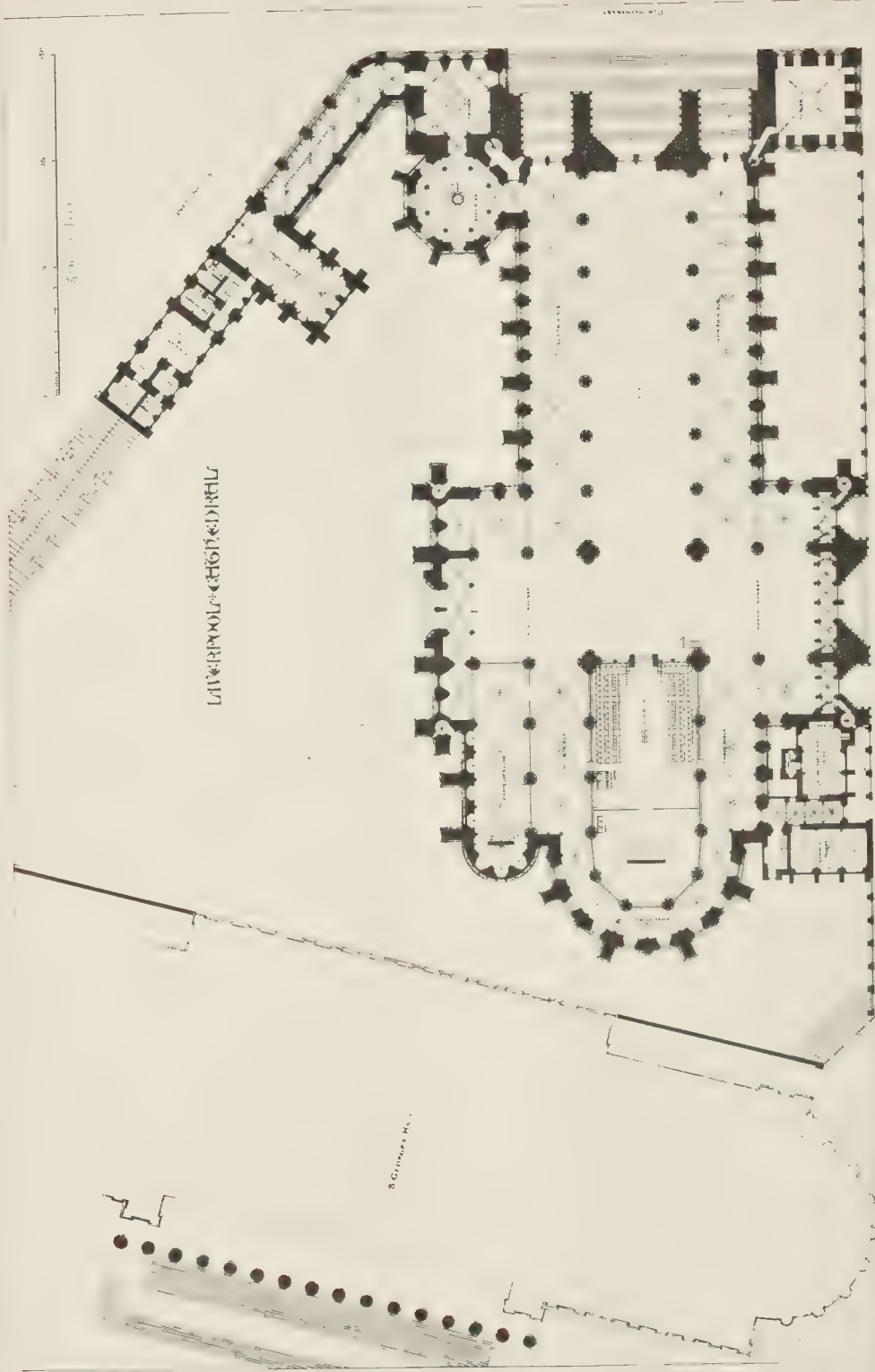
At the ordinary meeting on Tuesday, the 12th of January, Sir Frederick J. Bramwell, F.R.S. (President), in the chair, it was announced that the following nine *Associate Members* had been transferred to the class of *Members*:—William Armitage Brown, Thomas Penn Gaskell, George Andrew Hobson, Walter Pitt, Charles Edward Robinson, William Henry Scott, Henry Francis Sneyd-Kynnersley, William Heron Steel, and Lewis Gordon Tyrrell.

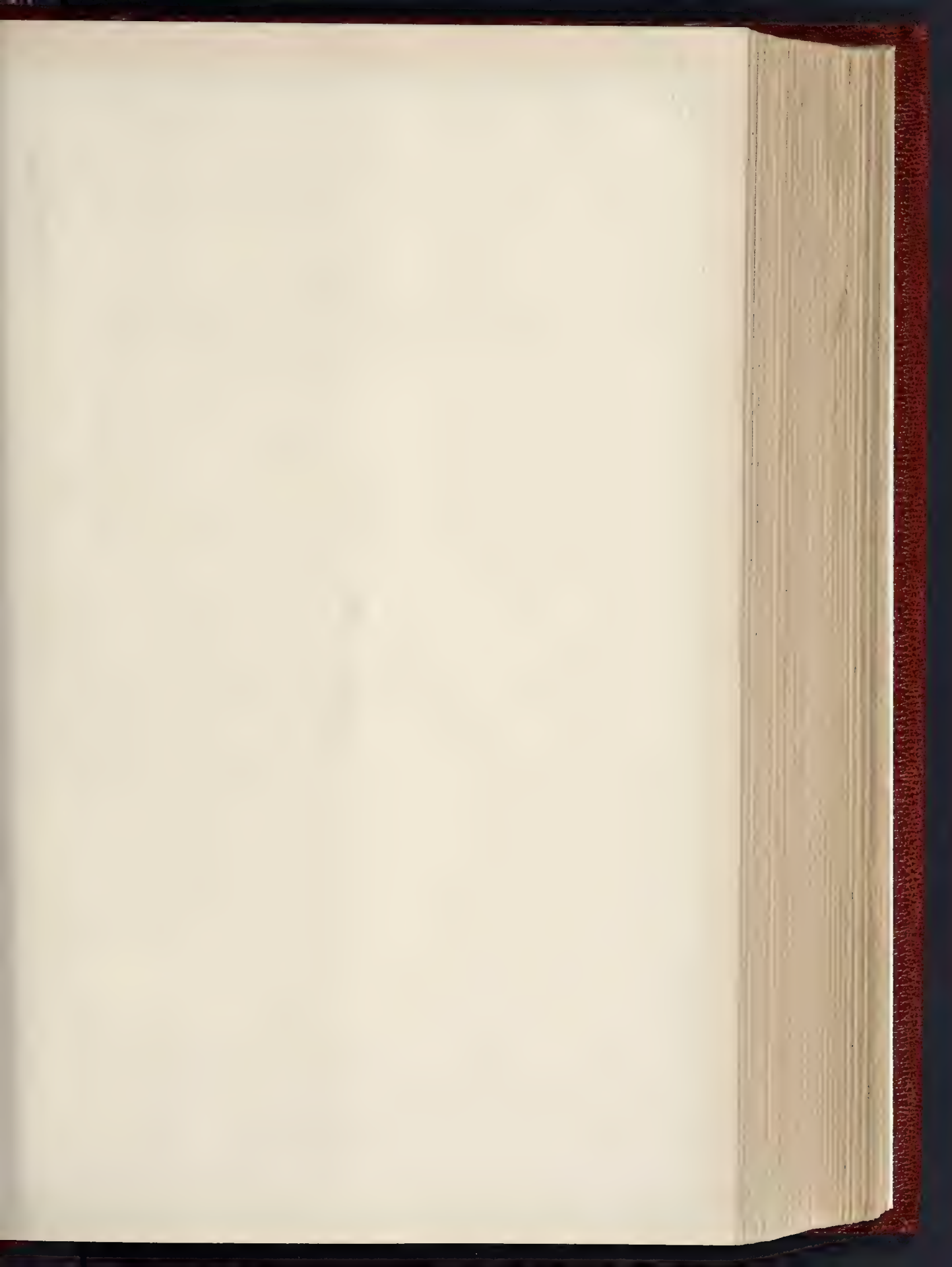
At the same meeting it was reported that the following sixteen candidates have been admitted as *Students*, viz.:—John George Burkle, Arthur Howard Benham, James Bracey, Charles Robert Brady, Ernest Canning, Alfred Chatterton, B.Sc.; Thomas Cecil Daniell, Walter John Easton, Charles Frederick Vernon Ford, John Russell Fears, Arthur Edwin Trevillion Lees, Harold Medway Martin, Wh.Sc.; Walter Edward May, John Clarkson Phillips Maynard, Philip William Rygate, B.A., B.E.; and James Nasmyth Sidebottom.

The monthly ballot resulted in the election of one *Honorary Member*:—Jean Charles Adolphe Alphonse; of three *Members*, viz.:—The Hon. Emmanuel Lewis Galizia, Thomas Monro, and Thomas Forth Rotherham; of thirty-nine *Associate Members*, viz.:—Harvey Bagall, B.A., Valentine John Stuart Blomfield, Harry Blundell, Walter Longley Bourke, William Henry Brickman, S. Inst. C.E., Thomas Canning, Arthur Carey, David George Phillips Davies, William Dawson, S. Inst. C.E., Ernest Augustus Fawcett, John James Constant Fergus, James Glover, B.A., Andrew Paton Gray, William Haller Hutchins, William Hutchinson, Robert Edward Jones, William Kingston, George Maxwell Lawford, John Randall Mann, Harold Morse, George Tod Ogilvie, S. Inst. C.E., Thomas Cassinet Palmer, S. Inst. C.E., William Pennan, Thomas Sydney Price, Henry James Price, Alfred David Campbell Fitzroy, B.Sc., Hugh Savage, George Herbert Shaw, Wh.Sc., S. Inst. C.E., Edward Stables, S. Inst. C.E., George Richardson Street, R. Inst. C.E., Henry T. E. Gilbert Kennedy French, Walter Frederick Winter, B.A., S. Inst. C.E., James William Welch, and Julia Wiborg; and of two *Associates*, viz.:—Henry Doulton, and William Hunter, J.P., F.G.S.





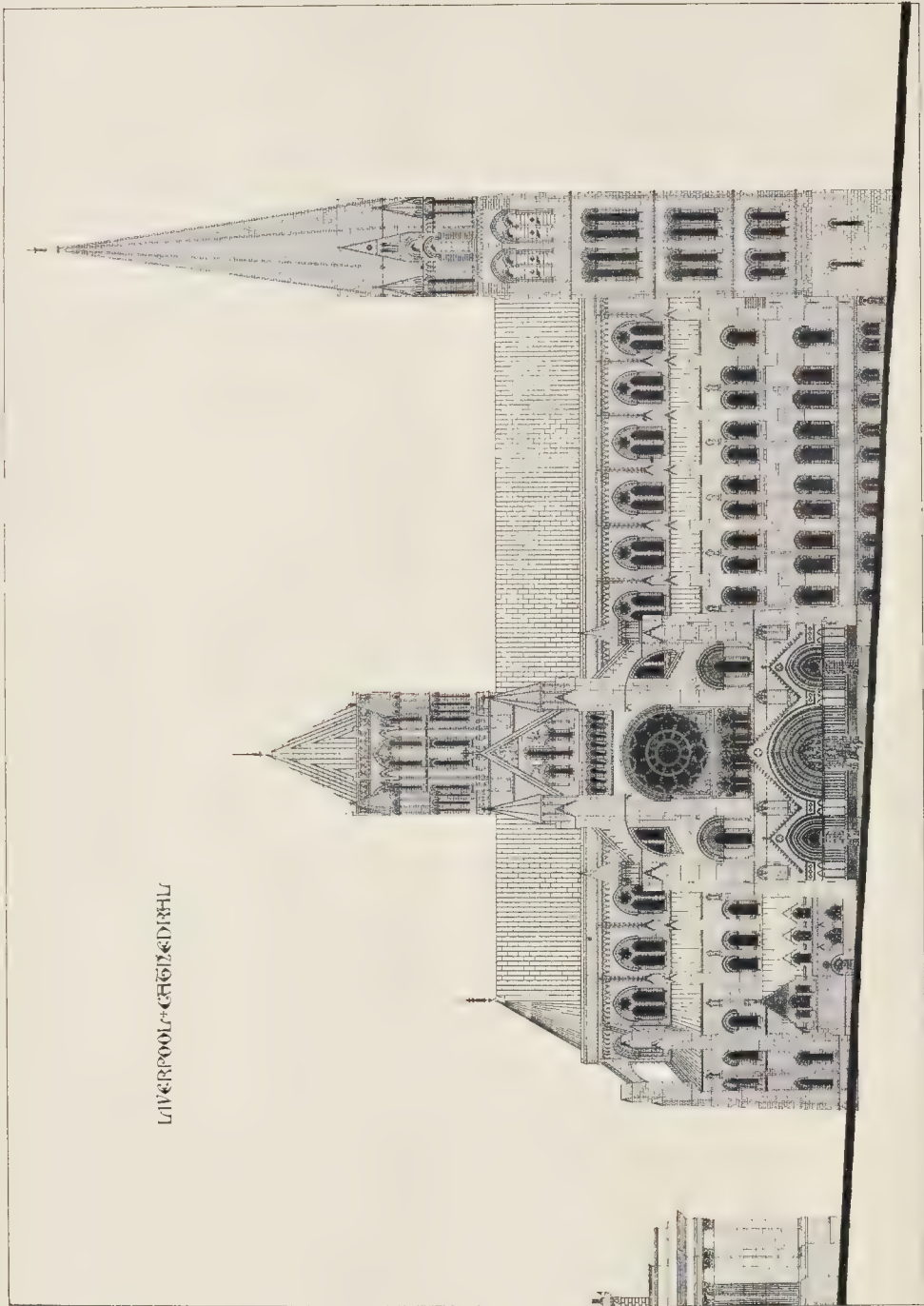


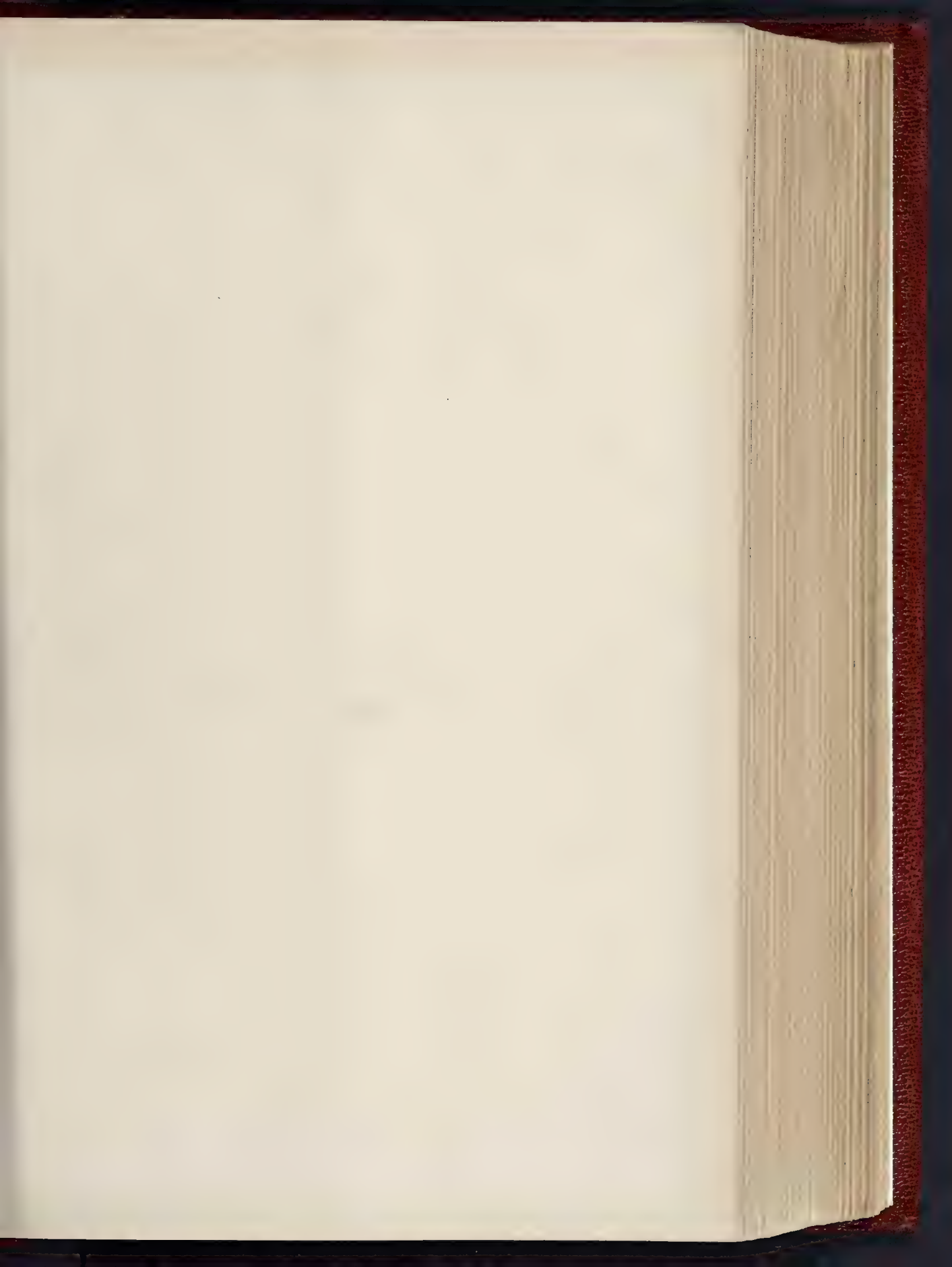




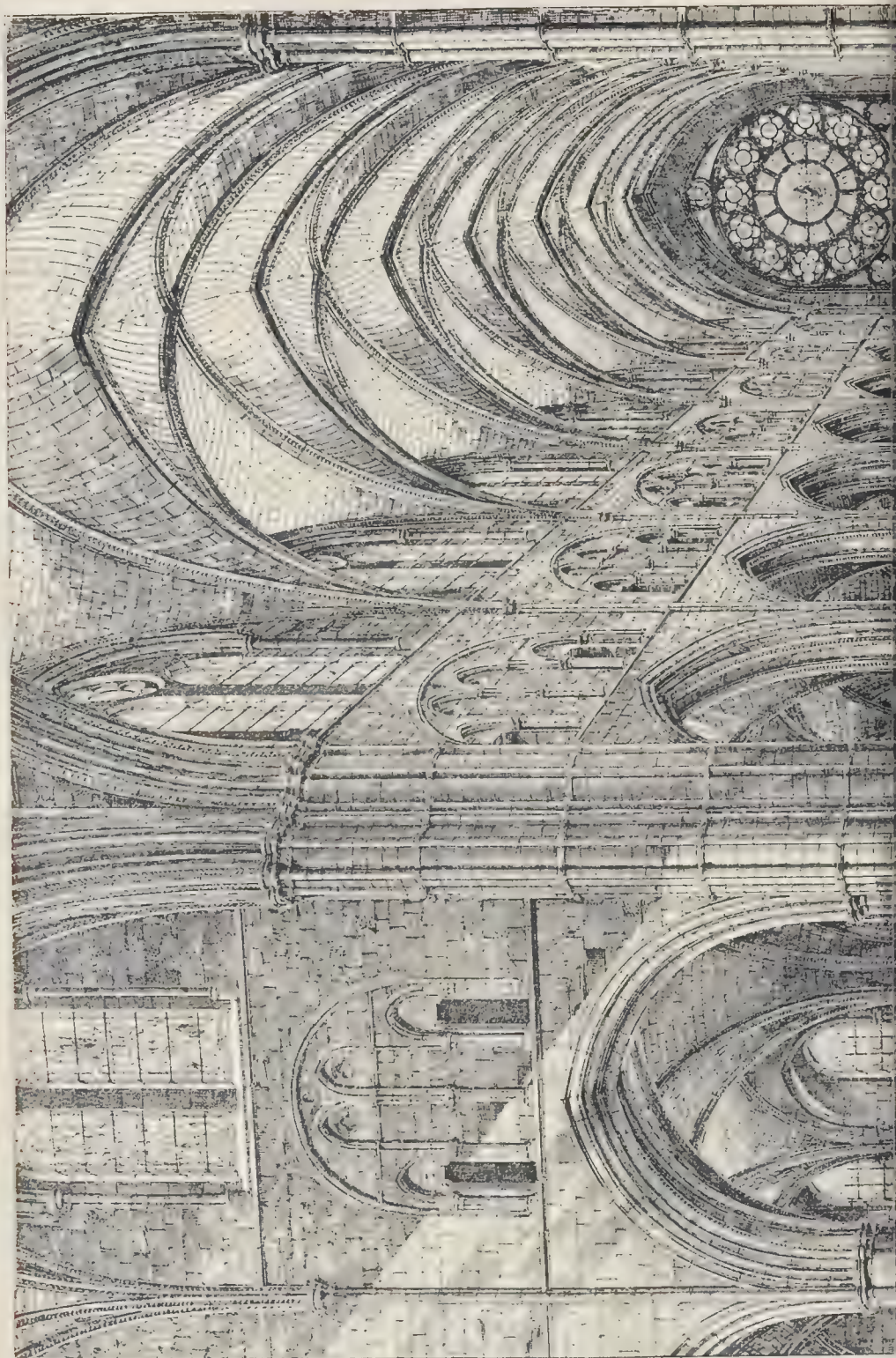
THE BUILDER, JANUARY 16, 1866.

LIVERPOOL CATHEDRAL











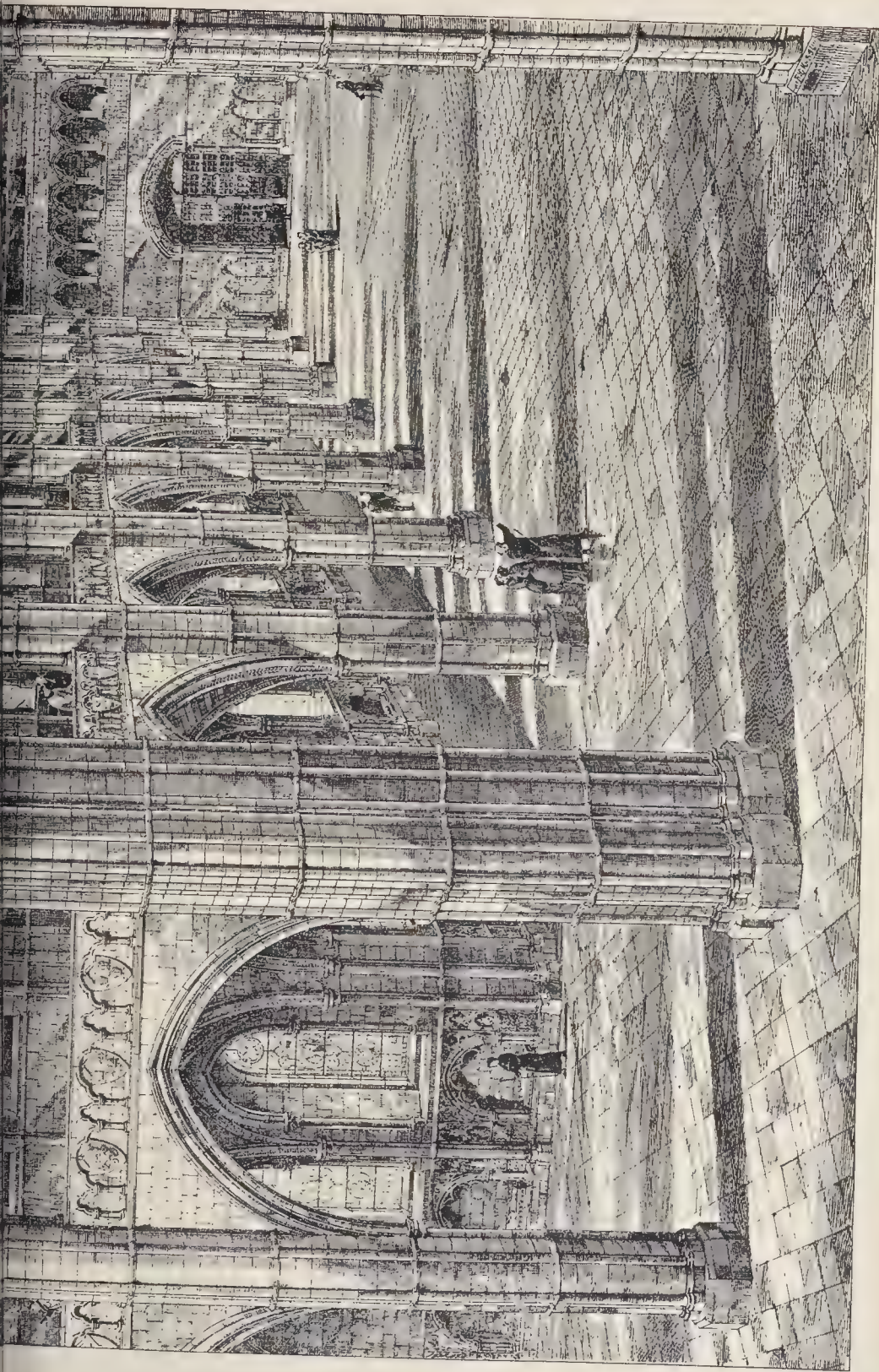
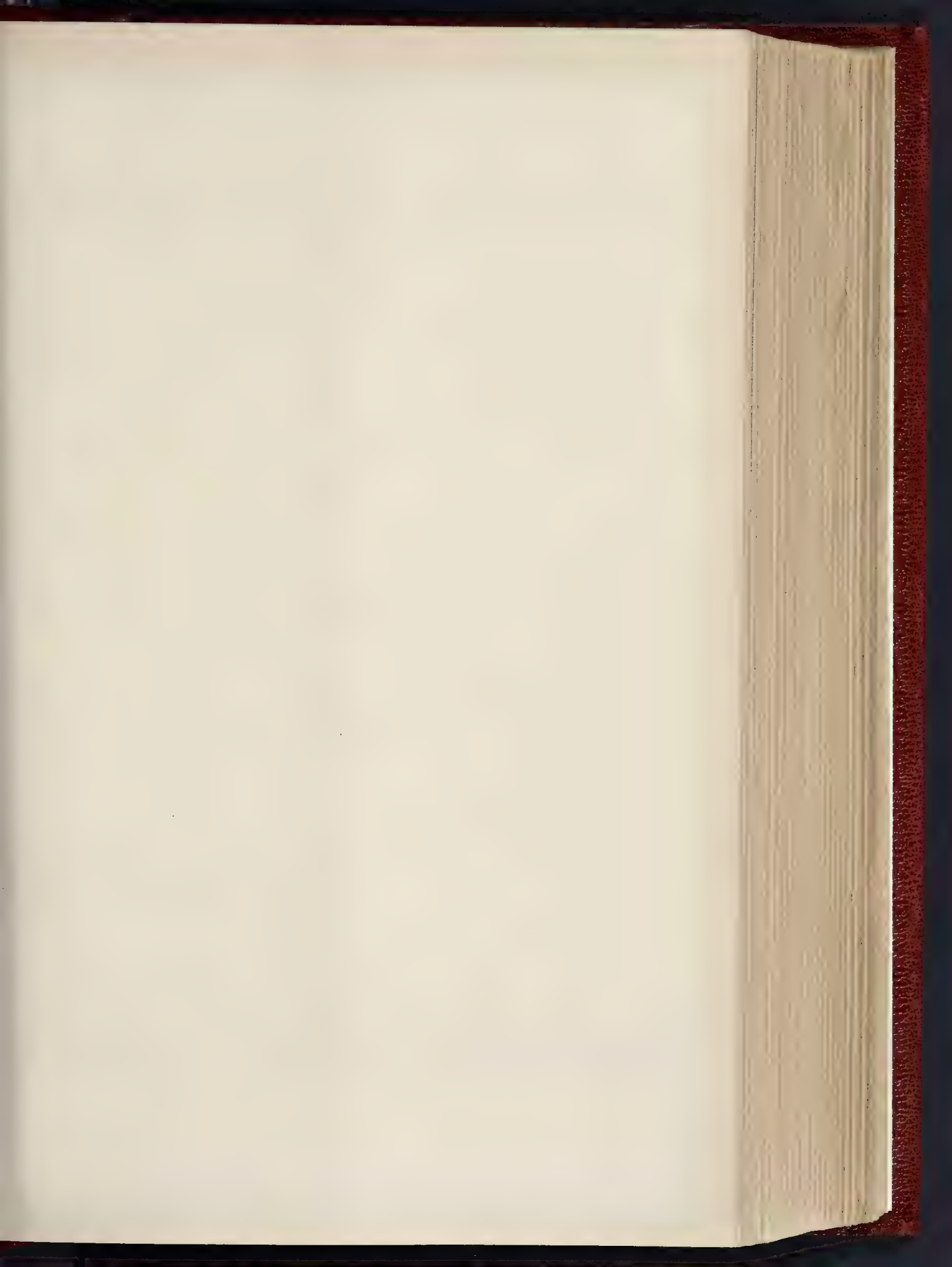


PHOTO LITHO SPRAGUE & CO. 1898

LIVERPOOL CATHEDRAL COMPETITION.—DESIGN BY MR JAS BROOKS F.R.I.B.A.  
INTERIOR VIEW LOOKING WEST.

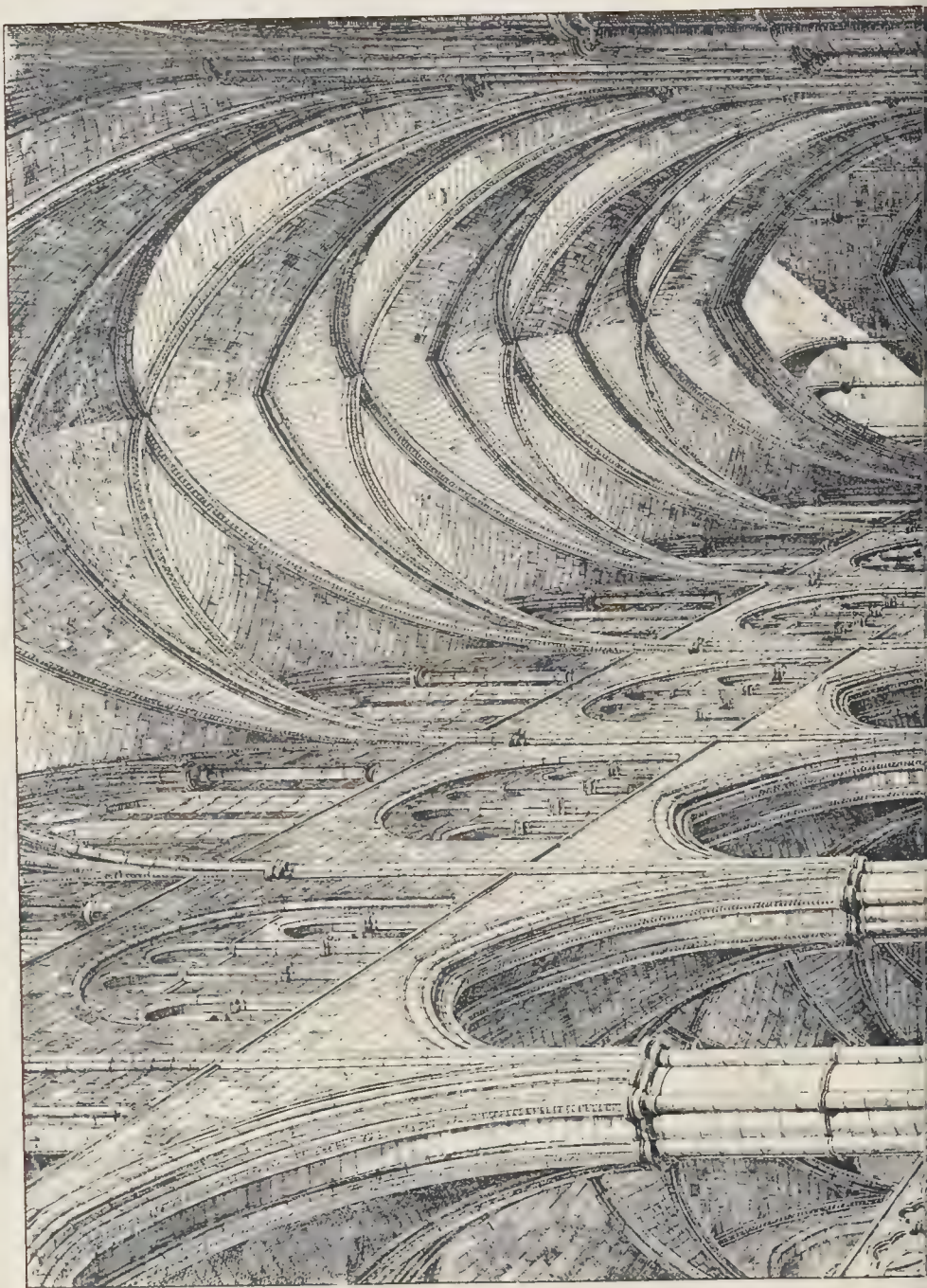








THE BUILDER JANUARY 16 1886





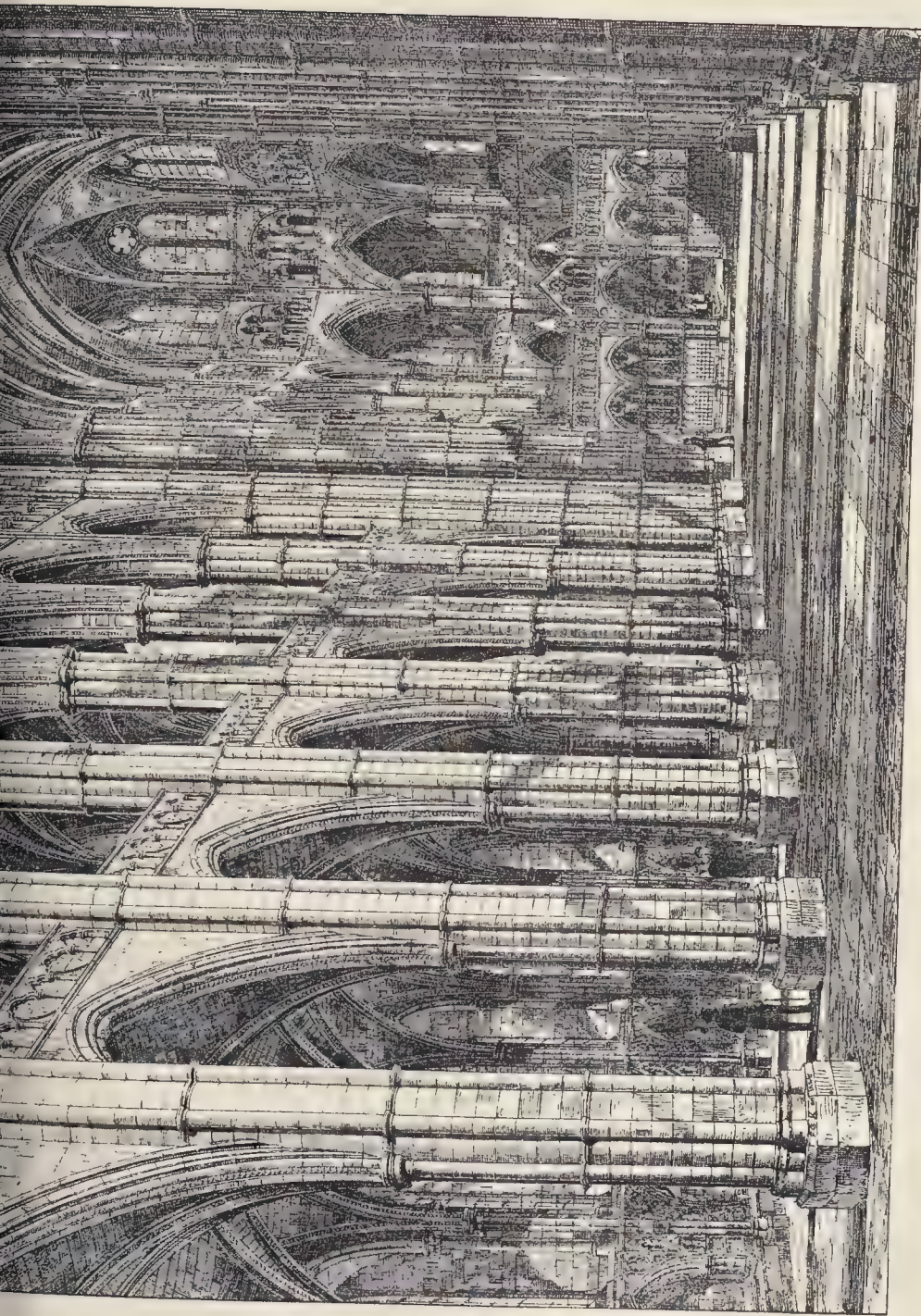


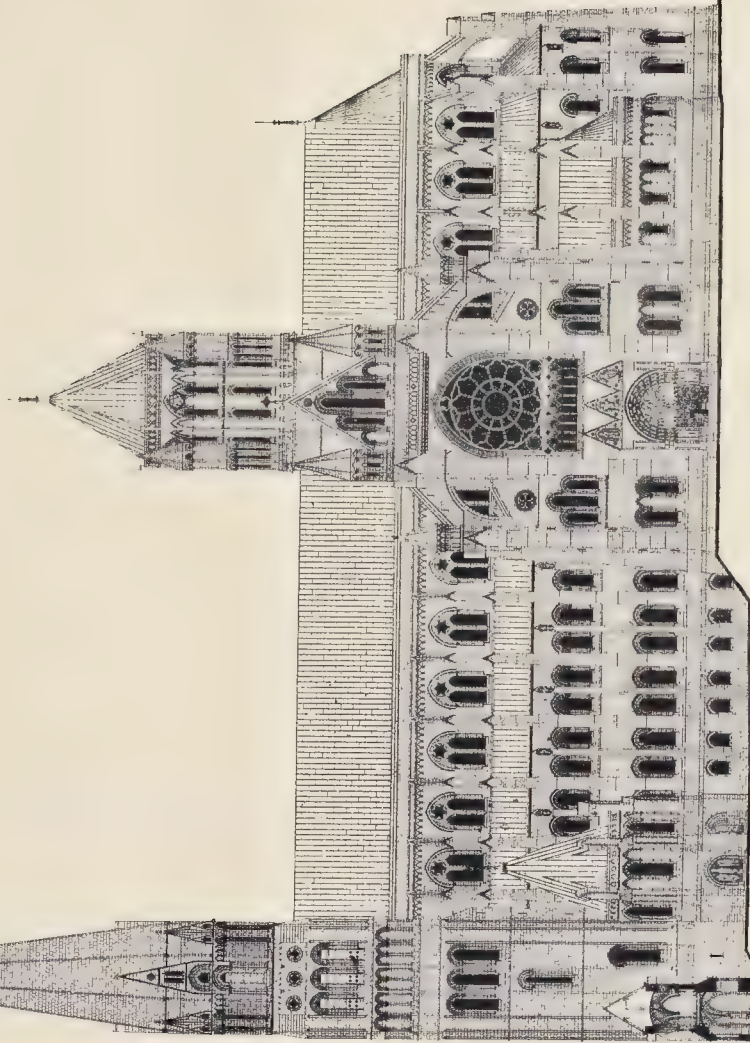
PHOTO BY THE STRAIGHT & CO. LONDON

LIVERPOOL CATHEDRAL. COMPETITION.—DESIGN BY MR JAS BROOKS F.R.I.B.A.  
INTERIOR VIEW LOOKING EAST.





LIVERPOOL CATHEDRAL

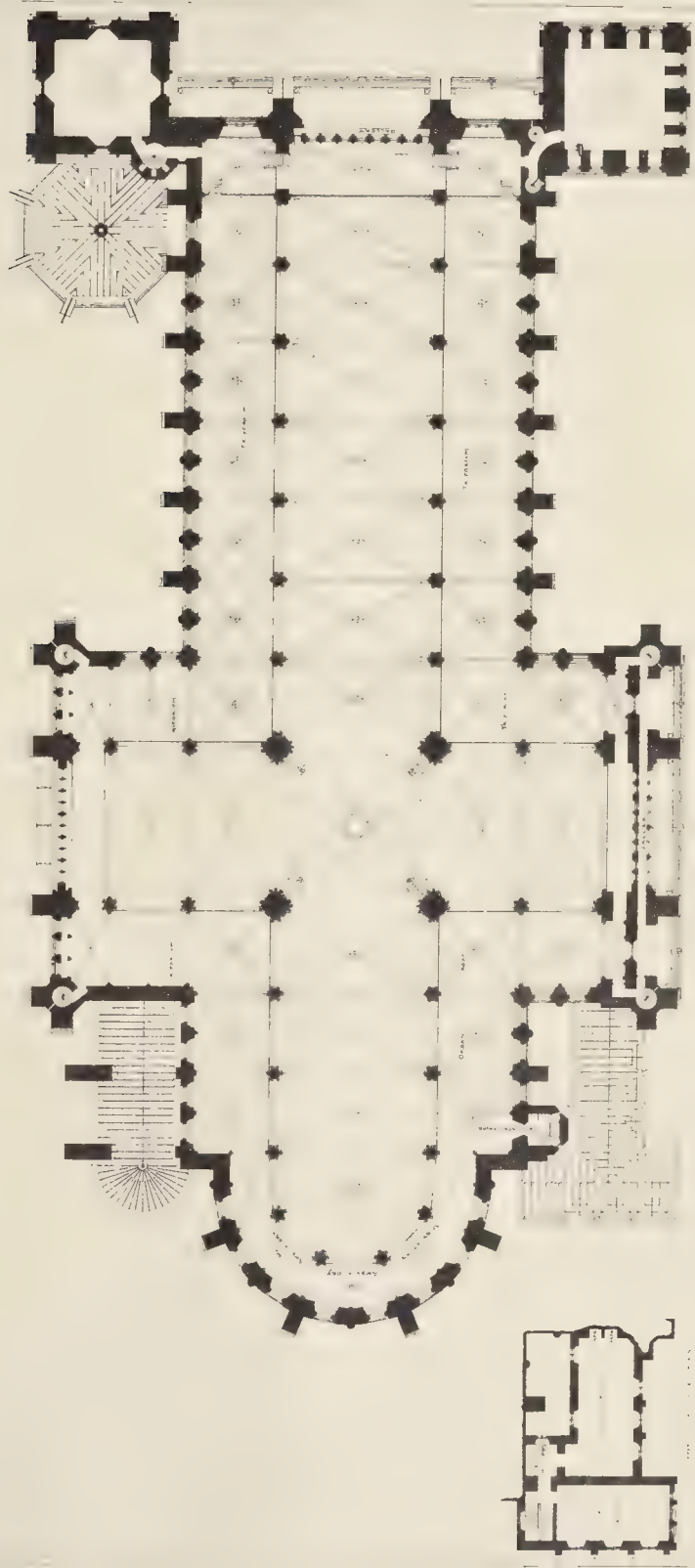
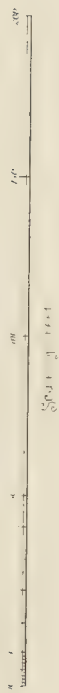


LIVERPOOL CATHEDRAL COMPETITION.—DESIGN BY MR. JAS. BROOKS F.R.I.B.A.  
SOUTH ELEVATION.

PHOTO LITHO SPRAGUE & CO. LONDON







LIVERPOOL CATHEDRAL. COMPETITION. — DESIGN BY MR JAS BROOKS F.R.I.B.A.  
TRIUMPH PLAN





## THE TEMPLE OF SOLOMON.\*

*The Evidence of Josephus.*

BEFORE we turn our attention to the third or Asiatic section of the subject, it may be desirable to notice some of Josephus's exaggerations, because of the use made of them to the prejudice of the simple description given in the sixth chapter of the 1st of Kings.

As already noticed, the Jewish historian affirms that the Temple was not 30 but 60 cubits in height, or twice the height given in Kings; and, not content with that, raises another Temple of equal dimensions above it, and thus the total internal height is made 120 cubits, or 180 ft.

The side chambers he also makes four times the height given in Kings. He speaks of no windows, but he gives the correct height to the pillars, though Chronicles seems to double that given in Kings; but they are three times mentioned as 18 cubits high,—twice in Kings and once in Jeremiah.

I have drawn to scale the description in Josephus. Its incongruity is obvious, and needs no comment.

Mr. Fergusson notices Josephus's propensity to double every dimension he can without detection. I have shown, and proceed further to indicate, where he has quadrupled them, as in the quotation made at the opening of the paper, in reference to the height of the enclosure walls above the valley.

The Book of Kings gives the height of the sanctuary and of the oracle, of the side chambers, and the pillars in the porch, the chapters and the cherubim, the length of each wing, and the distance between their extremities; but the height of the porch itself is not specially stated, but no one has made it less than the sanctuary, though he might very reasonably have done so.

The Book of Chronicles makes no mention of the height of the sanctuary, the oracle, or the cherubim, and the side chambers are omitted altogether; but every height that is mentioned is stated in such a way as to double or quadruple the measures given in Kings. For instance, the pillars are stated to be twice the height given in Kings, but, as suggested by Mr. Fergusson, and by Professor Wilkins before him, it is possible that Chronicles gives their united height in one measure, and I think this highly probable; at all events, let us apply this rule of interpretation to the other apparently exaggerated dimensions, and see the result.

In the 11th verse, 3rd chapter, we read, "And the wings of the cherubim were 20 cubits long." If the description had ended here, it would also have been opposed to the record in Kings, which states them to have been 5 cubits long; but just as the height of the pillars was multiplied by their number, so the length of the wings by their number.

Again, in the 13th verse, it is said that the wings of the cherubim spread themselves forth 20 cubits, or twice the width given in Kings. But in this case the explanation is given, and it is added, "One wing of the one cherub was 5 cubits, reaching to the wall of the house. The other wing was likewise 5 cubits, reaching to the wing of the other cherub," &c.

Thus, when giving the length of the wings of both cherubim, the united length of the whole four wings is given in one dimension,—a peculiar mode of expression, and calculated to mislead, where no explanation is given, as in the case of the pillars. But when taken singly a correct single dimension is given, which, in every case agrees with the Book of Kings, as in the case of the chapters, of which it says, "And the chapter that was upon the top of each of them was 5 cubits," the same as in Kings.

Let us apply the same rule of interpretation to the 3rd verse, 3rd chapter, of Chronicles, "And the porch that was in front of the house, the length of it was according to the breadth of the house 20 cubits, and the height was 120, and he overlaid it with pure gold."

That is to say, the height of each side of the porch which he overlaid with pure gold was 30 cubits. By adding together the height of each side of the porch, just as we added the two pillar heights and the four wing lengths, we get the figure 120 cubits as the result.

\* Continuation of a paper by Mr. Edward Cookworthy Robins, F.S.A., entitled "A Review of the various theories respecting the Form and Style of Architecture of the Temple of Solomon," read before the Architectural Association on January 1st, 1886. See p. 109, ante.

In this way the Book of Chronicles would seem to confirm the Book of Kings, and ought not, therefore, to be quoted in opposition to it.

Now, I think, it is not improbable that Josephus took advantage of this peculiar mode of expression, and invented the upper house, which is nowhere mentioned in the Bible, to elevate it to the height of the porch seemingly given in Chronicles; and as Herod, it is supposed, really did build a talar, or an upper chamber to his Temple, additional plausibility detection decreased in like proportion. We may rest assured that none of the Jews would take the trouble to prove that the Temple of their greatest sovereign was less glorious than he stated it to be.

As a set-off to this exaggeration, he makes the cherubim only half their real height, or five cubits; but this was too much to give up without taking something in return, so while the Bible says they were made of "olive tree," Josephus declares they were of "solid gold!"

The author of the article on Jerusalem in the "Encyclopædia Britannica" has also given too indulgent an ear to the story of Josephus, and in the "Biblical Atlas," published by the Religious Tract Society, the same errors are repeated and circulated.

Adopting the larger cubit measure of 1 ft. 9½ in., it is stated that, "A porch extended along the whole eastern front of the house, which rose to the height of 210 ft. At its entrance were two great pillars, 60 ft. in height."

In fact, it is affirmed that the porch, of which the whole internal depth was 10 cubits, rose to a height exceeding by several feet the ball of fire crowning the Monument of London; and this, be it remembered, was entirely overlaid with pure gold!

It is correctly stated, however, that the Oracle or Holy of Holies of Solomon's Temple, like unto the Tabernacle, had no light, neither windows nor candlestick, and if it had had the one it would also have had the other. But "the Lord had said that he would dwell in thick darkness."

The sanctuary was lighted by ten golden, seven-branched candlesticks during the night. The necessity for windows of some kind during the day is made obvious by the fact that the candlesticks were not lighted till the evening, and remained alight only till the morning.

The command first given in Exodus is repeated in Leviticus as follows:—

"Aaron shall order it from the evening until the morning before the Lord continually," that is, continuously; every successive evening they were "to bring the pure olive oil beaten for the light to cause the lamp to burn."

*Thirdly. The Asiatic.*

Mr. Fergusson, in his "Historical Inquiry into the true Principles of Beauty in Art," published in 1849, makes the following remarks:—

"If we take the whole breadth of Asia, from the Indus to the shore of the Ægean Sea, there does not exist in that vast, and at one time highly civilised, tract, one single remain of an ancient native temple. There are remains of the palaces of Babylon and Nineveh and Persepolis, and tombs in thousands, both cut in the rock and structural. But of temples we only know that a temple or pyramid of Belus existed at Babylon, one dedicated to Hercules at Tyre, and a small temple at Jerusalem, concerning which we are entirely left to the verbal descriptions in the Bible."

The attempt to explain the peculiarities of the Jewish Temple by a reference to Egyptian art, Mr. Fergusson is convinced will be found to be a mistake, for he says, "There is no feature in the whole history of the Jews, ancient or modern, so remarkable as their persistence in their own singular nationality. Nothing can be more strikingly distinct than the difference between the Jewish and the Egyptian institutions."

The former never used a hieroglyph, either as a letter or the representative of a thing; on the contrary, from the very first we find them as alphabetical people, despising symbolism in all its forms, and their religion, so far from being polytheistic, or of admitting of animal worship like that of the Egyptians, was the simple and sublime monotheism of the pure Semitic races from the earliest times to the present day.

There are few things, however, in their Temple and few symbolical expressions in the Bible, which may not be explained by a

reference to the sculptures of Nineveh and Persepolis, or the general modes of art or expression current upon the Euphrates" (see illustrations in last week's number).

In this early work to which I have referred, Mr. Fergusson restored the plan and section of the Temple as he then imagined it, which was not unlike that of Canina's restoration, except that he took the height given for the sanctuary as the external instead of the internal, in which, I think, he was wrong. He also diminished the thickness of the walls, and supposed the side chambers to have been open or closed galleries encircling the house, and continuing on either side in line with its face to the front, at which point he makes the following remarks:—

"When we come to the porch or eastern façade the difficulties are so great that I question if they will ever be quite explained. The width of the porch was 20 cubits, the same as the house, its depth 10 cubits. The height is not given in Kings, but in Chronicles it is called 120 cubits. And the same book makes the height of the two pillars 35 cubits, while the book of Kings says they were only 18 cubits, showing that the one authority used the whole linear dimensions of the two objects instead of giving the height of each, which may also help us to the fact that there were two towers of 60 cubits each."

I have already shown that no real contradiction exists between the two books, but that Chronicles is confirmatory of Kings in every particular.

Mr. Fergusson proceeds to show that the raised platform upon which the Temple stood was remarkably similar to those which supported the buildings at Persepolis and Passargardæ.

At Passargardæ the platform occupied the declivity of a hill, exactly as the platform of Solomon's Temple did, having one bold and broad face rising from the plain, and two lateral ones sloping back till they met the level of the hill. The similarity in area and the remarkable resemblance in the masonry was to be observed, while the perplexing points in connexion with the chambers or cells surrounding the house, seemed to him almost set at rest since the exploration of the Palace of Darius, which brought to light the chambers surrounding the inner room.

But there remains to be noticed one peculiarity, which Mr. Fergusson believes to have existed and to have formed an essential part of the fabric, and here Mr. Fergusson shall speak for himself. He affirms that "The Temple at Jerusalem had an upper story of wood,—a talar, in short,—erected over the lower one in stone. It is true," says he, "the Bible does not mention it, but Josephus does, and with such circumstantial evidence to support it, that I conceive there can be little or no doubt about it. He first mentions it in describing the Temple as built by Solomon, and after saying 'it was 60 cubits long, 20 broad, and 60 high,' he adds, 'on the top of this was another edifice of the same dimensions,' so that the total altitude was 120 cubits." Mr. Fergusson confesses that the object the Jews had in its construction is not very evident, nor the purposes to which they applied it, and I have already exposed the incongruity of Josephus's suggestions. In his concluding remarks in 1849, Mr. Fergusson says that, "All analogies drawn from any Egyptian buildings have failed, and those derived from Classical architecture only serve to show how men may deceive themselves on such a point. An Assyrian Temple would, of course, be the best illustration, but till that is found the Persepolitan may suffice, and indeed leave very little to be desired."

In a subsequent work, entitled "The History of Architecture," Mr. Fergusson gives a plan of Solomon's Temple, which differs from his former one, as illustrated in the "Principles of Beauty." In this new plan he not only adds the chambers, instead of galleries, but places a double row of pillars to support the roof, after the Assyrian and Persepolitan examples. He says nothing about the talar, or the two towers, 75 ft. high, but concerning the internal columns, observes, "No pillars are mentioned as supporting the roof, but every analogy, as well as the constructive necessities of the case, and the fact of the existence of the two pillars in the porch, would lead us to suppose they must have existed,—four in the Holy of Holies and eight in the pronaos." (See illustrations in last week's issue.)

Mr. Fergusson does not say whether these



internal pillars were of bronze or cedar, but he says, "We must recollect that this was the bronze age of architecture. Homer tells us of the brazen house of Priam, and the brazen palace of Alcinoos. The treasures at Mycenæ were covered internally with bronze plates, and in Etruscan tombs of this age metal was far more essentially the material of decoration than carving in stone or any of the modes afterwards so frequently adopted. The altar of the Temple was of brass, and the molten sea supported by twelve brazen oxen. The bases, the lavers, and all the other objects and implements in metalwork were in reality what made the Temple so celebrated, and comparatively little was done to the mere masonry, by which we should judge of a Christian church or any modern building."

The latest opinions of Mr. Fergusson, after studying the subject on the spot, are given with his usual exhaustiveness and fulness of illustration, in that remarkable work published in 1878, entitled "The Temples of the Jews," wherein he treats the whole subject from the Tabernacle in the Wilderness to the glorious Temple at Jerusalem, built by Herod about a century before its final overthrow.

The only illustrated works at all comparable with Mr. Fergusson's are those of Canina and Count de Vogüé. And, while admitting the grandeur of the Herodian Temple by the latter (which requires the whole area of the modern Haram area for its display, and the summit of Mount Moriah for the site of the Sanctuary itself, tempting one to wish it might be true), it is based on conclusions which do not appear to me fairly deducible from the premises, as I have already shown.

Mr. Fergusson states his case very clearly in the new volume, and maintains his view that the Temple of Solomon was the petrification, as it were, of the Tabernacle extended to double the sizes, the total length being 80 cubits by 45, including the stone walls which did not exist in the Tabernacle. The verandah in the Tabernacle becoming the series of small chambers surrounding the Temple three stories in height.

He now thinks there were but five chambers on each side, and three at the end on each story, making thirty-nine in all; the total height of the chambers, including the thickness of the roofs, being about 20 cubits, or about the same height as the Holy of Holies, so that they did not obscure the windows of narrow lights required for the upper portion or clear-story walls of the Holy Place.

Constructional reasons, as well as others, give colour to his addition of internal pillars to support the roof, in the spaces between which the bases, lavers, tables, and candlesticks were placed, five on each side.

Mr. Fergusson now suggests that the pillars were not of bronze, but were the "pillars of almsg trees," which Solomon made for the house, and from which Hezekiah took the golden shields to give to the Assyrians. Mr. Fergusson was not the first, however, to suggest the internal pillars; while reading in the British Museum many years ago I stumbled on an old sketch-book containing a drawing, entitled "Young Wilkins's first Sketch of the Plan of the Temple of Solomon"; it was dated 1805. I have given it among my illustrations, the pillars are shown with the tables between them. In the restoration, as I have imagined it, I have made them take their position in line with the cherubim which stood on either side of the Ark, as indicated in Canina's design, and centering with Jachin and Boaz in the porch (see illustrations in last week's issue.)

Mr. Fergusson still thinks that the 120 cubits given as the height of the porch in Chronicles, was only a duplication of the real height, from which he argues two towers 60 cubits high each, occupied by stairs which project on each side of the porch and give access to the chambers and to a room above the Sanctuary, which he thinks may have existed, and which he calls a talar, similar to that which Josephus describes, and which is so conspicuous a feature in Mr. Fergusson's restoration of the Temple of Herod. But he has only made this upper chamber 15 cubits high, not 60 cubits, as Josephus enjoined.

With reference to the pillars in the porch, called Jachin and Boaz, Mr. Fergusson has hit upon an original interpretation of great ingenuity, which is one of the curiosities of this his latest work; he now thinks it as absurd to imagine that they were huge bronze pillars

with exaggerated capitals, as that they were bronze obelisks, and prefers to consider them as detached from the front of the building, forming a screen or gateway like the vine-bearing screen described by Josephus and the Talmud as existing in front of the Temple of Herod, a design for which he offers, based on the Japanese and Indian toran, like those forming gateways to the Great Tope at Sanchi.

"My impression is," says Mr. Fergusson, "that the frontispiece prepared by Hiram for Solomon's Temple consisted of two pillars of bronze, placed 12 or 14 cubits apart, and probably not more than 1 cubit in diameter, and that they had capitals 3 cubits in height and on them were placed two beams or frames of bronze each 5 cubits in height. The Septuagint calls them 'epithemata,' which cannot be construed as capitals, but may reasonably be applied to such a beam."

In this way Mr. Fergusson finds space for the net-work and chains and pensive work, and the 400 pomegranates, 100 in a row. But, nevertheless, the porch itself is denuded of its columns.

It is curious to observe how the Grecian architect, Wilkins, and the Indian architect Fergusson, respectively interpret the word epithemata, each seeing just what he wants to see and establishing its probability, but neither is supported by King's; and the resolution of the problem is yet to seek. Nevertheless, I must frankly confess that the more I study Mr. Fergusson's arguments in favour of his latest restoration, the more difficult it becomes to resist the logic of his conclusions.

Mr. Lewin takes the Asiatic side, and gives unqualified adhesion to the views expounded by Mr. Fergusson on the point of style of architecture.

#### Personal Conclusions.

For my own part I think with them, that it is to Asia and not to Africa or Europe we must look for the true architectural type. Nor, indeed, for the form and arrangement of the plan, this was emphatically Jewish, but for the style and forms of art adopted in details and accessories.

I think with them, that whatever was the character of the arts in Tyre, the Temple of Solomon partook of that character.

A Tyrian architect and Tyrian artisans were employed in the design and construction of the buildings at Solomon's own request, for he expressly stipulates with Hiram, the contemporary king of Tyre, that Hiram's servants should be with his servants, "For thou knowest," says he, "that there is not among us any that can skill to hew timber like unto the Sidonians."

Thus the style of art prevailing at the period in the capital of Phœnicia would, doubtless, be stamped on every part, and we are interested to know what may have been the style peculiar to Phœnicia, if indeed it was peculiar to it, seeing that there are no remains of native art existing which can be safely depended upon. What, in short, was the type of Phœnician architecture?

I think that they were not indebted to the Egyptians, but rather that they drew their ideas of art from the regions whence they migrated, and with which they held important commercial relations. Their own traditions affirm that they came from the shores of the Persian Gulf, and settled on the eastern shore of the Mediterranean sea, and immediately undertook distant voyages. Their literature has a close affinity with the Hebrew, and to them is attributed the invention of letters and their introduction to Greece.

In the Rev. Mr. Kenrick's work on Phœnicia, published in 1855, he says:—"The recent discoveries at Nineveh have brought to light inscriptions in the Phœnician character, along with others in the Cuneiform, proving an intercourse between Phœnicia and Assyria in the flourishing times of the empire of Nineveh."

Their religion, too, was closely allied to the Sun and Planet worship of the Persians, Assyrians, and Babylonians, and their Temple arrangements must have been very similar. The Jews came from Northern Mesopotamia, and the Phœnicians from Southern Mesopotamia, and both practised the rite of circumcision.

Hiram was ever a lover of David, but Pharaoh was a jealous rival, whose ambition was only temporarily satisfied by the matrimonial alliance with Solomon; and it seems scarcely probable that Hiram would have taken the same interest

in the work, if Solomon's temple had been a mere reproduction of an Egyptian fane. In Solomon's time Tyre and Sidon had reached an unparalleled pitch of commercial greatness, and Mr. Kenrick observes, "The friendship of Hiram was essential to Solomon in carrying out his own commercial enterprises."

On the north, Solomon's reduction of Hamath, his building of Baalath and Tadmor in the Wilderness, considerably increased the facilities of traffic already existing between Damascus and the Euphrates, the Tigris, Nineveh and Babylon.

The artists Hiram furnished to Solomon, for the construction and adornment of his Temple and palace, represented the skill of the nation; it comprehended every branch of art, working in gold and silver, in brass and iron, in purple and blue, in stone and timber, in fine linen and in the engraving of precious stones.

Phœnicia had inexhaustible supplies of cedar and fir. Hence it was natural that wood should be the prevailing material of Phœnician architecture, whilst it was almost banished from that of Egypt. All the internal work of Solomon's Temple, instead of sculpture, was carved work, of olive wood, cedar, and gold."

The characteristic ornaments were of native origin," says Mr. Kenrick. "The pomegranate is not an Egyptian fruit. The gourd, whose swelling fruit supplied the place of the egg-moulding in Greek sculpture, was a native of Palestine. The palm and the lily belong quite as much to Phœnicia as to Egypt. Nevertheless, within the limits of Phœnicia itself the only architectural remains which can be clearly referred to that people are foundations of walls, which from the bevelling of the joints are supposed to be Phœnician."

The closest approximation to what Phœnician art may have been, appears to be realised only in the remains of Assyrian and Persian art. Acting upon this theory, first expounded by Mr. Fergusson, I, many years ago, linked together in the sketches before you various architectural details, gleaned from the examples at Nineveh and Persepolis, adapting them to the requirements of the Temple of Solomon; but, of course, the design is but a suggestive compilation, a sort of inductive solution, yet another example in this study of architectural comparative anatomy, which I have purposely left unaltered, except as regards the internal pillars, the only addition to my original design (see illustration).

The age of the Assyrian palaces has been variously estimated; some of them, however, are admitted to be from six to thirteen centuries before Christ; while the Persepolitan examples arose subsequently to the accession of Cyrus to the Persian throne in 550 B.C.

The points of similarity between Assyrian and Persepolitan art are sufficiently well known, especially since Mr. Fergusson completed his remarkable restorations of the former by the latter, yet I have sketched a sculpture or two to illustrate the fact; for instance, the celebrated four-winged figure of Cyrus at Passargard, with its inscription, "I am Cyrus the Archæmenian," contrasted with one of the four-winged figures of Assyria from the Khorsabad Palace. Also the winged bulls in front of the hall of Xerxes at Persepolis, contrasted with a winged bull from Nimrod. The identity of the style is obvious.

The walls of the Assyrian buildings, however, were not of alabaster slabs, but only the doorposts and lintels, and window openings. The wooden roofs of both Assyrian and Persepolitan palaces have perished, but in the latter the stone pillars sustaining the same remain in great numbers, and of various design, which may reasonably be supposed to have been first employed and brought to perfection in the timber pillars of Assyrian buildings, an adaptation of which I employed in restoring "Jach and Boaz." Hiram may have executed something akin to them in bronze, just as the Persepolitans afterwards did in stone.

The arrangement of these pillars in the porch of the Temple is precisely similar to the Persepolitan, the brazen network and pomegranate encircling the capitals and hanging over the lily-work, being most probably an original device of the Sidonians, so celebrated for their work in brass, unless we accept Mr. Fergusson's ingenious theory of an independent gateway "Toran."

With respect to the side chambers, Jach and Boaz, and the palace of Darius



as restored by Mr. Fergusson, make these cells appear not so singular after all; and possibly they formed a series of strong rooms wherein were stored the various utensils required at the sacrifices and services of the Temple, which must have been stowed away somewhere, and may be referred to by David, when speaking of the "Treasures and upper chambers and inner parlours thereof." Doubtless it was in one of these that Hilkiah found the book of the Lord in the reign of Josiah.

In the construction of the platform upon which the Temple and its courts were reared, the vast number of workmen must have been chiefly engaged. The outer portions of the raised platform being sustained on artificial constructions carried up from the rock at the base of the hill. The similarity in the masonry of the retaining walls of the platform, which is supposed to be visible at the south-eastern angle, and at the Wailing Place and elsewhere, to those existing at Passargardas and Persepolis, and all Assyrian buildings, is very remarkable.

The courts of the Temple, as restored by Canina, cover an area of about 600 ft. by 400 ft. Mr. Fergusson thinks this much more than Scripture warrants as existing at the time of the dedication, at all events, who gives about 450 ft. by 350 ft. only to Solomon's time, but reaching in Herod's time to 600 ft. square. It is very probable that Solomon and his successors made many subsequent additions and improvements, but it is extremely doubtful whether the phrase, "Solomon built Millo," can possess the wide meaning given to it by Mr. Lewin, who claims the whole haram area, 1,500 ft. by 950 ft., as belonging to Solomon's time.

The court of the priests, the middle court before the house, and the great court surrounding them are each described in Chronicles, and seem to indicate no more than Fergusson or Canina have shown.

Mr. Lewin, in his "Siege of Jerusalem," p. 255, says, "The space thus enclosed by Solomon for the outer Temple was a square, each side measuring a stadium. The dimension which the outer temple preserved to the last; within this square was another raised platform, and within that another platform still, upon which was the sacred edifice itself. These successive terraces were in imitation of the Assyrian style of architecture, which, at that time, prevailed more or less over all Syria, and particularly at Tyre."

It is said that Solomon made "a brazen scaffold 5 cubits long and broad, and 3 cubits high, and set it in the midst of the court, and upon it he stood and kneeled down on his knees before all the congregation of Israel." Therefore, the inner courts can only have been then enclosed by low walls, if any at all, else how could he have been seen by "all the congregation."

I have already referred to Canina's restoration of the brazen utensils, which were, doubtless, not dissimilar to those depicted on the arch of Titus.

I have only now to draw your attention to the details of Assyrian and Persepolitan architecture, which I pieced together in composing the design exhibited, which, as I have said, was made by me some twenty-eight years ago, and though it does not solve the problem, it remains as a record of an early attempt to do so.

The doors and windows are from the palaces at Persepolis. The upper and crowning members of the cornice are from the tomb of Darius. The lower members from the Pavillion in the Khorsabad sculptures; the similarity of the arrangement of which with the porch of Solomon's Temple is remarkable. The lower cornice is from the bas-relief El-tell-Armarna, and from the stylobate of the Temple at Khorsabad. The enrichments are from the pavement and other details from ornamental pottery at Kouyunjik. The pillars are from Persepolis, with adapted capitals and network. As complete, *apropos* to which are the lines with I close my paper:—

"Godliness with contentment, these be the pillars of felicity."

Jachin, wherewithal it is established, and Boaz, in the which is strength.

And upon their capitals is lily-work, the lotus fruit and flower.

Those fair and fragrant types of holiness, innocence, and beauty.

Great gain pertaineth to the pillars, nets, and chains of wreathen gold.

And they stand up straight in the Temple porch; the place where glory dwelleth."

The President (Mr. R. Pink) in inviting discussion on the paper said that it was a most interesting one, illustrated as it was by the many drawings on the wall, and it showed evidence of great research and study.

Professor Kerr said that the subject was a very interesting one, and one which every architect of intelligence at some period of his life might be expected to speculate upon. The idea that those in the room had probably derived from Mr. Robins's description of the various designs was that the Temple was a structure of store, more or less ornamental, elegantly designed and covered in with a roof, used as a place of worship, and being surrounded with great courts in which the people assembled. Now in the time of David, the Jews were still almost entirely nomads, but David settled in Jerusalem, where he built a house.

In order to do this, he sent to Tyre, where the arts were in something like an advancing condition, there being no arts amongst the Hebrews. By the help of the Tyrians, therefore, he constructed that house. Now, there were two historical types of house-building.

One was the Gothic hall, which was covered in by a roof, and the other was the Eastern Court, which was primarily an enclosure by a wall. The house which David built was an enclosure of this kind, with timber buildings inside. Although David desired to build a temple for the worship of God, he was not permitted to do so, because he was a man of war, and it was left to his successor to carry out the work. Solomon proceeded to build a temple. He afterwards built a palace for himself, the plan of which they pretty well understood to be a mere court-yard enclosing a Hall of Justice and certain chambers, which, however, were scarcely used for a residence, in the present sense of the term. When Solomon proceeded to build his Temple to God he sent a message to Tyre in something like these terms:—The Tyrians far excel the Hebrews in respect of the hewing of timber. The Temple was, therefore, very much of a timber-structure. It would have been surrounded by a plain wall of stone, or the stonework might merely have been the foundation of the enclosure. It was on a small scale, but it was the best that the people of the time could think of, and more than they could accomplish, because they had to go to their neighbours to get it done, and when it was finished it was no doubt very highly esteemed.

This was about 1,000 years before Christ. When the Temple was built, Solomon built his own house; and then again he went to Tyre, and engaged men who were skilled in the hewing of wood. They collected trees, and converted them into timber, and carved them, but the carving must have been very rude. The Jews were subsequently carried captive to Babylon, where they remained for many years, but they afterwards returned under the command of Zerubbabel, who was a priest,—not a king,—and then the second Temple was built, 500 B.C. That Temple was not now in question, and he did not know that they really understood so much about it as they might do, except that it was merely a sort of reproduction of the old one, but with different dimensions. That Temple was destroyed by the Romans, and a third temple was built called Herod's Temple. That Temple was a piece of Roman architecture, there was no doubt. With regard to Solomon's Temple, one of the drawings on the wall made it a Greek temple, while another drawing gave it as Egyptian. He contended that it was neither the one nor the other. He advised his hearers, when they came to study any science, that they should dismiss from their minds, imperatively and for ever, everything like wonder or surprise, or astonishment or any such emotion, which was in a degree temporary aberration of mind. They must look at the matter perfectly plainly, frankly, dispassionately, and coolly, or they would never arrive at a scientific conclusion.

He would impress upon those present that in dealing with all buildings of remote Asiatic history, they must remember that they were dealing with courts and not with covered huts. In conclusion, he proposed a hearty vote of thanks to Mr. Robins for his paper.

Mr. Rickman seconded the motion, and said one point that had been brought out was that there was much more of timber construction in the Temple than they had been accustomed

to suppose. Those designs showing great masonry columns and magnificent bases of stonework were probably a little beside the mark.

Mr. R. Phené Spiers remarked that there was absolutely nothing remaining of the buildings which those illustrations and restorations were intended to show. The natural tendency in all ages had been to restore buildings to a certain extent in the style with which one was most familiar. It was difficult to imagine how any one could have proposed such restorations for the Temple in question. The style given by Mr. Robins represented a much later style than was supposed to exist in the time of Solomon; he had taken his principal elements from some 500 years B.C. There was no doubt that the first efforts of any nation to make an architecture for themselves must have been of the very simplest and ordinary kind. In his opinion not only workers in wood, but masons were brought from Tyre to construct the Temple, the latter of whom made the sub-structure. At any rate, the architecture of the Temple was of the slightest possible kind, and it must have been in wood covered in metal plates.

Mr. Stannus expressed the interest which all must feel in anything which tended to throw light on the topography, plan, or style of the Jewish temples. Some years ago he had the honour of drawing the plan of Herod's Temple for Mr. Fergusson, for the fine book to which Mr. Robins had referred, and he had then gone through all available authorities on the subject. By taking these three groups, (a) the Bible and the "Wars" for the historical incidents, (b) the Middoth and the "antiquities" for the plan, and (c) the existing site for the topographical facts, he believed it was possible to arrive at a very probable restoration for Herod's Temple.

Then we might work backwards, through Zerubbabel's, to the one under discussion,—Solomon's. Mr. Stannus went through the arguments showing that Herod's Temple enclosure was a square of 600 ft. at the south-west angle of the Haram, and that the "Mosque of Omar" could not have been included in it. Further, he supported Mr. Fergusson's theory that this mosque is the Church of the Holy Sepulchre, erected by Constantine over the burial-place of the Lord; and in reference to the change of its locality from the Haram area to the site of the Church of the Holy Sepulchre, in the town of Jerusalem (for the benefit of pilgrims after the Haram was closed against Christians), he reminded the members of the Association how in Verona the demand of visitors for the tomb of Juliet had created the supply. Another instance of possibility of change was that of the American, who wished that the birthplace of Shakespeare might be "moved up nearer to the metropolis." Having once settled the position of the altar and the Temple walls in Herod's time,—which he thought could be established within very small limits of variation,—he contended that, since these points were identical in the successive rebuildings, it was easy, by working from the central axial line, to plot out the position of Solomon's Temple on the site. As regards the style, while agreeing with Professor Kerr that too much advance in architectural refinement was not to be expected from a people recently emerged from a migratory life, he thought it was clear that the outer walls were of hewn stone, and not merely of wood, as suggested by the learned Professor. From the sixth chapter of Kings we learn the house was built of stone, and wainscoted with cedar panelling, so that no stone was visible inside. The wood was easily carved, and would lend itself to the Assyrian style of decoration, and the lavish use of gold is also more Assyrian than Egyptian. The Phœnicians, who were the carriers for the world, acted as the connecting links. And the Hebrew nation was really of the same family as the Arabs, Chaldees, Phœnicians, and Assyrians, as is seen by analogies of language; hence there was more sympathy and more likelihood to be similarity of style between Jews and Assyrians than with Egyptians. He concluded by thanking Mr. Robins for his exhaustive treatment of the subject, and the very complete collection of illustrative diagrams, and he expressed his regret, in which he was certain all would share, that the serious illness of Mr. Fergusson was likely to prevent his taking any interest in what had been said that evening.

The vote of thanks was then agreed to, and Mr. Robins briefly replied.



## ARCHITECTURAL ETHNOGRAPHY.

The following is a summary of Mr J. Spencer Hodgson's paper on this subject, read before the Manchester Architectural Association on the 5th inst., as briefly mentioned in our last:—

Ethnology, while constituting a complete and most interesting study of itself, is, as applied to Architecture, the means of bringing before us what effect the religious, political, and social influences had upon the development and typical characteristics of architecture by the earlier races of mankind. As the object of introducing this subject is not to write an essay on ethnology, but to render the history of architecture interesting and intelligible, it will be desirable to avoid all speculation as to the origin of mankind. All that is necessary will be to point out the typical features of the four great building races, —the Turanian, the Semitic, the Celtic, and the Aryan. Prehistoric man has been divided and arranged into three great groups or periods. The first was called the Stone age, from the rude race who then peopled Europe having no knowledge of the use of metals. All the cutting parts of their implements were formed of flint or hard stones. The second, the age of Bronze, from the people having a knowledge of the use of copper and tin, from a compound of which their weapons and tools were formed. The third, the Iron age, from the people having a knowledge of the use and properties of this metal. The typical Turanians in the old world were the Egyptians, —in the modern, the Chinese and Japanese; and to these we are, perhaps, justified in adding the Mexicans. No Turanian race ever rose to the idea of a God external to the world; their government was a despotism. This race never distinguished itself in literature. As architects they were unsurpassed, and in Egypt alone have left monuments which are still the world's wonder. From the fact of their gods having been kings, and after death still only considered as influencing the destiny of mankind, their temples were exaggerated palaces. Even more sacred, however, than their temples were their tombs. They possessed an extraordinary passion for coloured decoration, and an instinctive knowledge of the harmony of colour. In sculpture they were not so fortunate; it was not sufficient that a god should be colossal, he must also be symbolical; he must have more arms and legs, or more heads, than common men; he must have wings and attributes of power. In science they most distinguished themselves in engineering, their artificial irrigation works being remarkable. The Semitic races principally developed themselves in the small tract of country between the Tigris, the Mediterranean, and the Red Sea. The great distinguishing tenet of this race, when pure, is and always seems to have been in the unity of God, and his not having been born of man. Their government was never quite republican; when in small nuclei it was what is generally called Patriarchal. In larger aggregations the difficulty of selection made the chieftainship more generally hereditary. Possessing a complete alphabet their literature was far in advance of the Turanians. No Semitic race ever erected a building worthy of the name; neither at Jerusalem nor at Tyre or Sidon, nor at Carthage, is there a vestige of Semitic architecture. When Solomon proposed to build a temple at Jerusalem, though plain externally, and hardly so big as an ordinary parish church, he was forced to have recourse to some Turanian people to do it for him, and by a display of gold, silver, and brass ornaments to make up for the architectural forms he knew not how to apply. Painting and sculpture were absolutely forbidden to the Jews, because they were Turanian arts, and their practice might lead the people to idolatry. Music alone was the one æsthetic art of this race. The Semitic races seem always to have been of too poetical a temperament to excel in mathematics or the mechanical sciences. The Celtic race seem to have crossed the Bosphorus, and following the valley of the Danube, threw off a branch into Italy, where they penetrated as far south as Rome, while the main body settled and occupied Gaul and Belgium, whence they peopled Britain. No Celtic race ever rose to the perfect conception of the unity of the Godhead. Despotism was generally their form of government. Their theology required temples almost as grand as the Egyptians, and without their intervention we should not have possessed in modern times a church worthy of

admiration. In the art of wedding music to verse this race is only equalled by the Semitic. The Aryan race seem to have settled themselves in the country between the Indus and the Jumna, about 3100 B.C. The principal branch migrated westward, and first appeared prominently in Greece, next in Rome, and lastly in Northern Europe. They seem to have believed in the one great ineffable God. From their possessing a complete alphabet their literature was more advanced than that of the earlier races. They excelled in the useful rather than the artistic arts. In pursuing this subject we find the one grand and fundamental principle that guided the earlier races to such a high state of perfection in the architectural art was based upon the golden rule, "Truth," which is such a marked contrast to the present age of shame.

## MESSRS. STEVEN BROS. &amp; CO.'S NEW PREMISES.

MESSRS. STEVEN BROS. & Co., the well-known architectural ironfounders, have recently acquired new and very extensive premises at No. 4, Upper Thames-street, immediately opposite the Times Office. Here, under the direction of their manager, Mr. Ritchie, they have fitted up convenient offices and a number of very large show-rooms, the fittings having been carried out from the designs of Mr. James Weir, architect. The premises extend from Thames-street to the river front, and are provided with lifts worked by hydraulic power supplied from the mains of the Hydraulic Power Company. The passenger-lift is by Messrs. Waygood & Co. The ground-floor and basement are mainly appropriated for warehousing and packing purposes, and contain a very comprehensive and varied stock of rain-water and hot-water fittings, ranges, stable fittings, and other goods of the kind. The first floor contains a large stock of railings, balconies, balusters, &c., in all possible sizes, shapes, and varieties of design. On the second floor is a showroom of large dimensions, where register and other fireplaces are shown fitted with chimneypieces of all styles of design and in all materials, —in marble, stone, wood, and iron, and ranging in price from a few shillings to hundreds of guineas. To the rear of this, on the same floor, is a showroom for goods of a cheaper class, the arrangement here being a series of bays, whereby access to the numerous patterns is easily obtained. On the third floor is an extensive display of kitcheners, cooking-ranges, and other domestic appliances, —several ranges 9 ft. and 12 ft. wide being on view. Behind is a showroom for constructional ironwork, railings, gates, staircases, verandahs, stable fittings, and numerous specimens of ornamental ironwork. Smaller rooms above the showrooms contain brasswork, tiles, and sundries, each department being arranged in the way most suitable to the requirements of the business. To prevent the noise which inevitably accompanies the delivery of goods from affecting the work of the counting-house, a small portion has been separated from the general office, and is styled a "forwarding office." Every part of the premises has been utilised, even to the basement, where excellent arrangements prevail for the storage of cast-iron baths and fittings and other goods, down to tiny elbows and bends in the rain-water goods department. The establishment forms, indeed, an exhibition on no mean scale, and one which will be found well worth visiting by architects, builders, and owners of house property who may be in search of iron goods.

## EMPLOYERS' LIABILITY.

HAINES F. CRACE.

THIS case was tried recently in the Marylebone County Court, and of some importance to builders and others whose work involves the use of such "movable scaffold," as is ordinarily used in house-painting, namely, "steps," ladders, and trestles, which are moved or re-arranged at brief intervals as the work progresses.

The plaintiff, Haines, a journeyman painter, brought an action for a claim of £100 against Mr. J. P. Crace, the decorator, of Whitechapel-street, under the following circumstances. Haines was at work with other painters in the kitchen of a club, and engaged on preparatory work, when the trestles which supported the board on which he stood, slipped off the top of an oven on which they had been

planted, and which proved to be greasy. It was shown in evidence that the plaintiff, another painter, and a labourer had between them arranged the trestles and boards. But the plaintiff contended that it was the duty of the foreman of the job to have seen the risk, and to have had the scaffold altered. He also contended that, although he himself had a hand in the erection, the labourer was responsible, and was the foreman's delegate in the matter. The plaintiff further endeavoured to convince the jury that painters were not expected to move their trestles, but that this was the labourer's duty.

Mr. Crace, as defendant, showed by his own evidence, and by that of independent witnesses, as well as that of painter and painters in his employ, that whereas "fixed scaffolding" of poles, &c., is erected by labourers or "scaffolders," the painters themselves do, as a matter of course, shift their own trestles, &c., with or without labourers, and that a painters' labourer's duty is to wait on and assist, as they may require, the gang of painters to which he may be attached; that, as a matter of fact, painters more often work without labourers than with them if there be no fixed scaffold.

The defendant and witnesses also showed that it was frequently necessary to shift trestles several times in an hour or two, and that no work could progress in a large building if the foreman had to approve each removal of trestles in every room.

The judge, in summing up, put three questions to the jury (stating that it could only be through the foreman that liability could have been incurred):—

1. Was it the foreman's duty to superintend the placing of the trestles?
2. Could the foreman to have discovered that the trestles were not properly placed?
3. Did the foreman exhibit negligence in the matter?

The jury answered all three questions in the negative. Verdict for the defendant (Mr. Crace). The plaintiff subsequently moved for a new trial, but the application was refused.

## STREET IMPROVEMENT CASES.

A CASE of some interest to owners of property came before the Brentford County Court on Friday last, as showing the extent and nature of the liabilities of owners for the payment of the cost of private street improvements incurred by a Local Board.

The Chiswick Local Board sued an owner, Mr. J. H. Hall, for the recovery of 29l. 4d. of the apportioned costs in the making-up of Armadale-road, Chiswick, under the 15th section of the Public Health Act, 1875. The defendant resisted payment on the ground that the Board had actually invited tenders for the work before the expiry of the statutory notice calling upon the owner to make up the road.

His Honour, Deputy Judge Cooper Wylie, held that no matter what preparations or facilities the Board made before the expiry of the notice for the carrying out of the work, they did not deprive the owner of the right to do the work himself before the notice had expired.

The defendant pleaded further that a previous surveyor had led him to understand that since tenders had been invited there was no use in his making up the road.

Mr. Finnis, the solicitor to the Local Board, disputed this, and asserted that, as a matter of fact, the work was not commenced until six weeks after the expiry of the notice.

His Honour gave verdict for the Local Board for the claim, together with interest and costs. The Board also sued the defendant for 13l. in respect of private improvements in Swanscombe-road, Chiswick, in which the old question as to the flank wall was raised.

The defendant contended that an allowance should be made to him in respect of the improvements at a flank wall, asserting that at the same time that the costs in the cases above cited had been allowed among the whole of the owners in the street.

His Honour said that that question had been decided over and over again. The 15th section of the Act was clear enough on the point that a flank wall is held as a frontage in regard to the payment of private street improvements.

## "PLUMBERS AND PARLIAMENT."

SIR,—With reference to the letter of your correspondent "C. A. M. B." in your issue of the 2nd inst. [p. 63], will you grant me space to inform him that the action of this company is not solely directed to securing, as far as may be practicable, greater efficiency in the character of the work done by plumbers in general, and in no sense do the company aim at hedging the trade round with restrictions, as he suggests.

The course which the company have taken throughout has been based upon the resolution of the late Congress of Metropolitan and Provincial Plumbers, as it has been governed as much by consideration for the journeyman as for the masters, who are heartily invited in common desire to check the execution of improper or "scamped" work, as it is called.



in the common interests of honest tradesmen and the public.

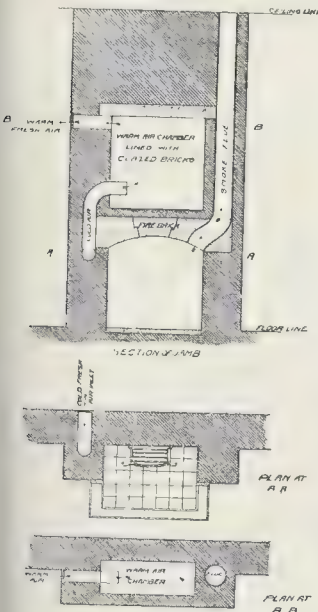
I should add that the company have throughout sought for, and, to a considerable extent, they have secured the cordial sympathy and active co-operation not only of builders, but of architects and others immediately concerned in house-building, who fully recognise the object we have in view is one of vital importance to the health of the community.

I may further add that I have no knowledge of the communication from the Builders' Association being received as mentioned by your correspondent, but I can assure him that we should be very glad to see that Association represented on the General Council, for in no sense do we desire to pursue a policy of exclusiveness, but on the contrary, we court the opinions and desire the co-operation of all who are prepared to take a broad view of the subject, and join their efforts with ours to work out a reform which is admitted on all hands to be one of national importance.

GEORGE SHAW,  
Master of the Worshipful Company  
of Plumbers.

### VENTILATION.

SIR,—The question of ventilating rooms with fresh warmed air has very often of recent years been brought before the public, but I do not think the system shown in the diagram I enclose has been illustrated.



Your readers will notice the arrangement is very simple: the heat, instead of passing up the chimney, impinges on the fire-bricks, and thus the air in the chamber above, which is lined with glazed surface, is warmed, and the outlet for this warmed air into the room is also shown. In summer the air unwarmed could be admitted through the same openings.

I have pleasure, therefore, in sending you this diagram, which, I may mention, has been adopted with success in a few instances. It may interest your readers, and I send it as a suggestion to be improved upon.

BANISTER FLETCHER.

**Weymouth.**—A colossal marble statue was unveiled on Wednesday, the 13th inst., at Weymouth, by Mr. R. N. Howard, the Mayor, in honor of Sir Henry Edwards, one of the representatives of Weymouth in the House of Commons from 1866 to 1885, when the town ceased to be a Parliamentary Borough. The sculptors are Messrs. W. & T. Wills, of London, and the cost of the work is 800 guineas.

### TIMBER MEASUREMENT.

SIR,—In my letter inserted in your last impression (p. 107) I made no comment on the facts of Mr. Wardale, his supposed discovery being a matter of common knowledge among English timber merchants and measurers, but merely answered his inquiry as to the principle on which I presented the tables and scale to which he alluded were based. Your editorial note, however, induces me to trespass a little more on your space than I then thought necessary.

In the days when sheriffs of the City of London were seriously required to count hobnails and verify tallies as a crowning test of arithmetical attainments, it can hardly be wondered at that the rustic "hewers of wood and drawers of water" should fail to perceive what you designate them as blockheads for not perceiving, or that their erroneous but convenient method of measuring round timber, or logs, should have grown into a general custom, which there was not sufficient inducement for the more enlightened dealers in timber of the present century to depart from.

George Cruikshank's fox was misled by a name when he robbed the tailor's workshop instead of the farmyard; but your correspondent can hardly believe that the astute land agents and timber merchants of the last eighty years have been unconsciously fleeced all that time, to the tune of 20 per cent., by a deceptive measure.

Neither the grower nor the first purchaser is deceived, and therefore not injured; and after "conversion" of the staff by the merchant, the string's occupation is gone.

The grower sells by string measure; the merchant estimates and purchases by the same, and, if he sells in the log, sells by the same; so that I fear that the last paragraph in Mr. Wardale's second letter will have no more effect on the trade than will, in time, the information which I now impart (in strict confidence), viz., that that last hamper of '47 which he had from Messrs. Binn & Sellarman, invoiced as in quarts and pints, is quite 25 per cent. short of the nominal quantities, but may he enjoy it none the less!

A word for poor Hoppus. I am not concerned in the *discordia fratrum* between him and Mr. Key; but may I ask of what use would have been a set of tables based on a principle, however correct, which had never obtained since timber became a marketable commodity? He found a "practical" custom in use throughout the land, and framed his tables in accordance therewith.

GODALMING.

SIR,—The general practice in measuring round timber twenty years ago, when I had some experience in the Berkshire woods, was precisely as described by your correspondent "Godalming," and in accordance with the rule given by Hoppus, viz., to gird the tree, and double the line twice for the quarter girth, which may be designated B.

If we take the instance given by Mr. Wardale, of a trunk 15 ft. long and 8 ft. in girth, the above method will be found to supply a happy medium between the other methods mentioned by him. The first of these, which we will call A, "considering it a cylinder, the cubical content of which is 96 ft.," though strictly correct, gives far too much for practical purposes, as, when the tree is cut up into planks or scantling, there must be very considerable waste.

The other method, which may be called C, viz., reckoning only the exact square contained in the circle, giving 81½ ft. cube, errs in the opposite direction; this amount is too little, as the four outside or segments are wrongly treated as if they were wholly useless.

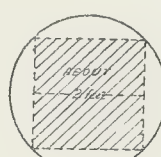
The following diagram illustrates the three methods, and proves that the middle one, B, yields



A.—96 ft. Cube.



B.—75 ft. 11 in. Cube.



C.—61 ft. 6 in. Cube.

a fair result, viz., 75 ft. 11 in. cube; as the small segments make up for the trifling loss at the four corners of the square. When converted into planks or scantling and measured up as such, the net result would prove to be in almost exact accordance therewith.

HENRY STAINES.

\* \* The question brought forward in the previous correspondence was to ascertain actual cubical contents of the trunk. This, and the question of ascertaining roughly the amount of workable timber, have been rather confounded together by the various correspondents.—ED.

### THE CLAPHAM STATUES.

SIR,—I have received the inclosed letter relative to the discovery at Clapham with permission to publish same. I shall feel obliged if you will insert it in your valuable paper.

THOMAS MILBOURN,

Hon. Sec. Surrey Archaeological Society.

"3, Bank Buildings, E.C.  
Jan. 8th, 1886.

SIR,—Much of late in the various papers of the day, in reference to the discovery of monuments at Clapham. I, when a boy, resided there, and about fifty years back, a large boiler was being taken into the chapel, to warm it. On passing over this said vault, the entrance broke in, and I, with two or three other boys, got a wax taper at night, and got into the vault, which was full of coffins, besides the statues, which broke in on touching them. A week or two after, a mason in Manor-street cleaned the sculpture, and it was lighted up with candles, and some hundreds visited the vault; so that your friends there must not think themselves Belmont or Leyard, for I think I was the one; and if our friends look close to the young lady's face, they may find some plaster of Paris there still, for we tried to take a cast, but failed. In Cooke's 'Surrey,' you will find an account of the said marbles.—I am, sir, yours respectfully,

T. BROWNE."

### THE EXAMINATION IN ARCHITECTURE.

SIR,—It has been announced that the next Examination in London to qualify for candidature as an associate of the Institute, will be held at No. 9, Conduit-street, on March 22nd, and the following days of that week.

Notwithstanding the wide circulation which, through the medium of the Architectural Association and provincial societies, has been given to the pamphlet containing the programme of the examination, advice to candidates, and list of books (which pamphlet can be obtained by any student on application to the Secretary of the Institute, and has been printed in full in the calendar issued at the commencement of the session to every member), I hear occasionally that some intending candidates are desirous of obtaining further information for guidance in their studies.

Being most desirous to assist in advancing this examination,—on the success of which much of the future prosperity of the profession and the Institute depends,—I shall be happy to receive here, by previous appointment only, fixed by me, any gentleman who actually intends to offer himself for examination, either in March or at a subsequent period, and to answer his reasonable inquiries, and to give him such advice as my experience as Chairman of the Board of Examiners may enable me to afford.

I earnestly hope that those students who have hesitated to come forward, from any doubt as to the nature of the Examination, will not fail to seek a conference with me.

ARTHUR CATES.  
No. 7, Whitehall-yard, Jan. 13, 1886.

### PROVINCIAL NEWS.

**Barrow-in-Furness.**—The high-level bridge which is being constructed by the Furness Railway Company and the Corporation of Barrow-in-Furness to give better communication between the town of Barrow and the extensive docks and ship-building and other works on Barrow Island is rapidly approaching completion. The corporation portion of the bridge extends from Duke-street to the south

side of Hindpool-road, and has necessitated the purchase and removal of much old property, and as this was also some of the worst in the town its removal is by no means to be regretted. The bridge, with its approaches, extends from Duke-street to Michaelson-road, the total length being about 500 yards. The corporation portion of the work consists of an approach 80 ft. wide and 18½ yards in length, and a skew wrought-iron bridge, 60 ft. in width and of 50 ft. span, over Hindpool-road. A considerable length of the roadway of the approach is carried on segmental brick arches of 24 ft. span, built in



Portland cement mortar to a gauge of one of cement to three of clean sharp sand. The iron bridge has six main wrought-iron plate girders, each 3 ft. 4 in. deep, with cross girders and wrought-iron floor-plates, covered with cement concrete, on which will be laid the wood pavement to form the roadway. The footways are partly carried on brackets springing from the two outside girders. The parapet plates are of cast-iron, on which are cast geometrical patterns, standards being fixed at every 4 ft. 6 in. to receive the plates and divide the parapet into panels. On the centre panels of the parapets are cast the armorial bearings of Mr. John Fell, the Mayor of the Borough at the time the work was commenced. Under each main girder where it rests on the abutments are brackets, those under the outside girders, however, being much larger and of a more striking appearance than are the intermediate ones. The four large brackets have the borough arms cast on them. The general design of the bridge over Hindpool-road has been carefully got out to harmonise as far as possible with the railway company's work designed by Mr. F. Stileman, C.E. The abutments on each side of Hindpool-road are built of white limestone from Stainton Quarry in the immediate neighbourhood, and have been boldly treated, the whole presenting a very substantial and effective appearance. The abutment on the south side has two openings, one giving access to the subway leading to the town wharf, the other to the railway and arches at the back. The abutment on the north side has an opening which forms an entrance from Hindpool-road to the brick arches and interior of the abutment; these it is intended to utilise as stores, for which purpose they are admirably adapted. The corporation approach and bridge have been designed and carried out under the direction of Mr. Fox, Assoc. Mem. Inst., C.E., the Borough Engineer. Mr. John Fell, of Leamington, is the contractor, and has, under the constant and careful supervision of Mr. Cutler, Student I.C.E., assisted by Inspector Shaw on the ironwork, carried out the works in a satisfactory manner. It should be mentioned that the whole of the ironwork was manufactured and erected for Mr. Fell by Messrs. Westray & Copeland, of Barrow.

**Lynnmouth.**—At a meeting of the Lynn Local Board of Health, on December 28th, the Board decided to instruct Messrs. Davison & Davison, civil engineers, of Windsor, to prepare the necessary plans and details for the construction of an esplanade at Lynnmouth, and also certain works with a view to provide a convenient bathing-place.

**Oldham.**—Buildings for the use of the Salvation Army in Oldham are about to be erected in Union-street. The accommodation comprises a large main hall to seat 3,000 persons, and which is approached from the street by a short flight of stone steps on to a corridor which runs at right angles, right and left to two staircases, one on either side. Access is also gained from here to the main floor, constructed with a good fall to the speaker's platform. The staircases are the main public exits from a deep gallery extending round the entire length, thereby intersecting the speaker's platform, which is stepped up from the floor-line. As the site is at the corner of two streets no difficulty has been experienced in providing light and air. By the side of the large hall is a smaller one, intended to be used for week-night services, and capable of accommodating 800 persons. This is approached from Union-street by a wide corridor between the main hall and a large shop which stands in front of the small hall. Behind this hall and connected with the main hall is a large catering room, bandsmen's room, &c. The front of the buildings is of red brick with stone dressings, with a tower running up each side of the main hall, finished with battlements. Tudor-Gothic is the style adopted. The entire block covers an area of 12,250 square feet, and the estimated cost is 4,500l. Mr. E. J. Sherwood, of London, is the architect, and the work will be carried out under his superintendence.

**Dawlish.**—The Local Board of Dawlish have decided to obtain the opinion of Mr. James Lemon, C.E., of Westminster and Southampton, as to the best means of disposing of the sewage of the district.

**Basingstoke School Board.**—We are asked to state that the assessor in this competition was Mr. F. W. Roper, of Adam-street, Adelphi,—not of John-street, as stated last week.

## The Student's Column.

### FOUNDATIONS.—III. ARTIFICIAL FOUNDATIONS.

HE means at the command of the architect for providing a good foundation in the unsatisfactory soils, which have already been mentioned, resolve themselves practically into three classes:—

1. Modes of spreading the weight of a wall over a large area, so as to reduce the load on each superficial foot of ground, as by footings, concrete, &c.

2. Modes of sinking or reaching down through a soft soil to a harder subsoil, on which the weight may be carried, as by piling.

3. Such expedients as ramming the surface of the ground or the bottom of a trench to consolidate it; arching or bridging over bad parts of the foundation; and the utilisation of lateral pressure by means of beds of sand or of sand-piles placed under the wall, &c.

Footings, in one form or another, are amongst the most ancient means used for spreading the weight of a wall, as the large feet of the camel distribute its weight so as to enable it to travel without sinking over the surface of dry sand. In the foundations of ancient stone walls the lower courses often spread considerably with rather high steps of slight projection, finishing at the top of the plinth, which satisfies the eye that some such means of obtaining increased stability exist. The cracked and dangerous condition of many of our old brick buildings is due to the omission of any kind of projections beneath their bases,—a deficiency very poorly made up by the use of ties and bond timber to keep the tendency to fracture within limits. In a brick wall the footings are, in modern practice, and, indeed, by such law as exists, made to project by regular off-sets in each course from the base of the wall downward, so that the bottom of the lowest course is in breadth double the thickness of the wall. Where the soil is at all unsatisfactory, the lowest projection of the footings should be made in two courses, so that the lower course may not be broken or tilted in the way that has been mentioned above. Unless care is exercised in the supervision of the work, the worst and smallest pieces of brick are often put in the lowest course of footings, so as to render that course not merely useless, but a means of breaking up the courses above when weight comes on the wall. Materials of the fullest size should be used in footings, so that the joints in the projecting courses should be as far from the outside as possible. Where concrete cannot be used, the spread of the footings may be increased by putting more off-sets and more courses in each of the off-sets, so as to obtain gradually a sufficient breadth of foundation.

The simplest means for spreading the weight of a wall beyond the extent of the footings is to lay pieces of timber, 4 ft. or 5 ft. long, across the line of the intended wall as the sleepers are laid under a line of rails, but so as to be close together. Upon them planing is fixed, which will carry the footings or the base of the wall. This plan is only suitable for buildings of moderate weight or of temporary character, and if the timber is not put below the level of the water in the soil it will rapidly decay. On a boggy site, where the surface soil is thin, it may be the best material that can be made available. In the case of the tower of a very large church which had shown signs of weakness, it was found that the piers had been built upon trunks of oak trees laid side by side upon a subsoil of soft mud, so as to form a sort of raft. This had decayed in the end, but it had been in that position for 500 years.

Large slabs of hard stone, such as are used for paving, have been used with good results in the worst cases of foundations in made ground that was expected to settle considerably and in an irregular manner. But the use of concrete has in recent times superseded all other means of obtaining wide foundations, at least as regards buildings of any great size and importance.

Concrete in general may be looked upon either as an artificial stone or an indurated gravel. It most resembles rocks of the class called "breccias" or "conglomerates" which consist of gravel or fragments of stone reunited into a solid mass. During the last half-century it has been rapidly superseding other materials and contrivances for obtaining secure foundations, and it may be expected that its employment in the walls, floors, stairs, and roofs of

buildings will become more extensive as the manipulation of it is better understood. In the Student's Column for January 17th, 1885, p. 119, will be found a description of concrete when it has to be used for the most important objects, and under the best conditions.

We have to deal with it here simply as a means of spreading the weight brought down by a wall or pier over a greater area. So used, it may be assumed that it will be placed on a bad subsoil; for there would be no object in placing it upon a good one. In discussing the comparative merits of different materials, we should not forget that in the great majority of cases the worst of the materials in ordinary use would be so great an improvement upon the natural foundations, that they would probably effect the desired object. It becomes, therefore, an important practical question whether, in any particular foundation, the material most readily available will be of ample strength for its purpose rather than whether it is the best conceivable material for walls, floors or roofs. We shall see that gravel or sand placed in trenches, even without any cementing material, may have an important utility.

The materials generally available for concrete are burned clay (known as burned ballast), gravel, slag from iron furnaces, broken flints, broken stone.

Experiments in crushing concretes made of these materials with cement place them in the above order,—the weakest being the first-named. Upon a town site broken bricks form an important item in materials for concrete; clinkers, broken pottery, and any description of "hard core" are also useful when they are easily obtainable. Let us see what are the qualities of a good concrete for use in foundations.

Concrete consists of two things,—the "aggregate," which is of such materials as those just named and the cementing medium. The point of prime importance is that the aggregate shall consist of pieces varying in sizes, from the largest down to the smallest, which should be,—let us say,—a coarse sand. These must be capable of being so packed that they leave no vacant spaces the cementing material combined with the sand filling up all intervals between the pieces and covering each piece with a thin coating. The size of the largest pieces would be of no importance if they could be evenly distributed, but, practically, pieces of 2 in. or 3 in. in diameter, as a maximum, are the best, as we shall see.

The cementing materials may be a lime that is slightly hydraulic so as to "set" in the moisture of a trench, such as the "grey stone" lime used in the London district made from the beds of the "lower chalk" at Dorking and Mersham. "Fat" limes consisting of pure carbonate of lime, such as is made from the bed of the "upper chalk," and is known in London as chalk lime,—very white and useful for plaster—is of no use for concrete or mortar as it will not set when exposed to damp. If the ground is very wet,—but not otherwise,—the blue lias lime which sets best under water, being naturally rendered hydraulic by a slight admixture of clay, may be used with advantage. In cases where quick-setting is important, and in the very rare cases where the greatest strength obtainable is required, Portland cement (which is composed of chalk burned with the mixture of a due proportion of alluvial clay) is the best material that can be employed.

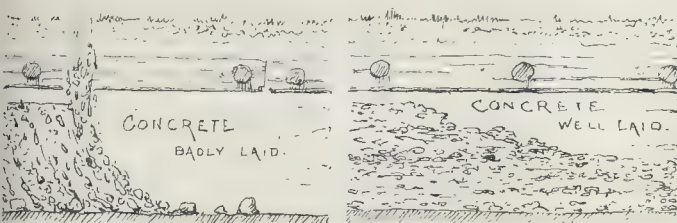
The proportion of cementing material specified is usually one part to six of the aggregate. It is highly improbable that such a strength kept up in practice unless where the ingredients are carefully measured, which they should be in all cases of importance. If one part in eight is specified and used, that will probably be sufficient for all ordinary cases,—and with lime,—but cement, besides being more costly, is more easily "killed" by admixture with dust or dirt and if it is deemed necessary to use it stipulated proportion according to the cleanliness of the aggregate should be kept to with accuracy.

The mixing is generally done on a temporary plank floor. For accuracy, it is best to have a bottomless frame or box, 3 ft. square or 18 in. high, holding half a yard of aggregate. When this is filled level to the rim, a similar box, containing, say, one-sixth of that quantity may be placed on the top of the aggregate and filled with the cementing material. On lifting the small box and then the large one, the whole will lie in a heap ready for mixing.



Having been well turned over dry, water should be added regularly and in moderate quantity, without drenching, so that the whole will form a semi-fluid mass when it has been again turned over and placed in the barrow. If, now, this is dropped into the trench from a height no

needful to judge, and at once to decide whether the composition of concrete is such as to be satisfactory. This can only be done with confidence after a sufficient experience gained by watching the mixture of different materials, seeing that they are properly placed



greater than such as will make it flow by its own weight so as to fill up every part of the trench, without being trimmed or regulated by hand, it will be packed as well as the nature of the particular aggregate can admit of. The filling in must be done regularly, so as not to raise the level of the concrete more than about 18 in. in any one course, following on afterwards with other courses till the required depth is obtained. If the full depth should be much more than 18 in., and the concrete should be thrown in so as to fill it up at once, advancing along the trench with a steep fall at the place where each load is deposited, the larger pieces will roll down the slope, causing an irregular composition, the poorest quality being at the top. If the concrete is thrown down from a considerable height, the larger pieces will sink down and separate from the smaller pieces. All pieces of sizes greatly exceeding the ordinary pieces are likely to separate themselves in this way. Round, smooth pieces, as in gravel, will separate themselves (under such conditions) more easily than angular pieces.

But gravel is the material which, when put in the trench in a proper manner, will flow most easily and become packed so as gradually to fill every part of it without further manipulation, and the stones will so arrange themselves that no pieces are left void. It is, besides, of ample strength for all ordinary purposes, and is, therefore, the most eligible material for use. To judge by inspection, it is necessary to see that there is a large proportion of stones of the full size, a considerable admixture of smaller gravel, and plenty of sand, so that the aggregate shall lie in the mass without hollow places. When the proportion of cementing material is added it will be sufficient to fill up the spaces between the grains of sand that are packed between the pieces of gravel so as to make a coarse mortar, and the larger pieces will be completely surrounded with a composition that will more or less quickly become hard and firm. The adhesion between the cementing material and the gravel will be slight as compared with the case of broken stones where the rough surfaces unite closely by the lime or cement; but in a trench, and subject only to the dead pressure of a wall, this matter is of less importance. If the sand is too abundant in the heap it is easy to sift out a portion for use in mortar. If the larger ones are too few the deficiency may be supplied by broken bricks. Every part of the long process by which gravel has been formed in the river or along the shore has tended to make it flow and pack more closely, a point which is really in favour of a material which is, besides, easily available.

Burned ballast varies very greatly in quality. When hard, with a good proportion of large pieces, and free from much dust, it makes a very good, firm concrete. It should be well settled in the heap before mixing, because of its porous nature and dryness. Broken bricks, broken stone, and other materials not naturally packed with sand, require to have a sufficient proportion of coarse sand and gravel added to them to fill up the voids in the aggregate. It is quite possible to fix the proportions in which the mixtures should be made in order to produce good concrete; but this can only be done by making experiments with each kind of material, and, indeed, with each sample, that it is proposed to use. It is constantly

in the trench, and, when possible, inspecting the same concrete after it has had ample time to become set.

#### RECENT PATENTS.

##### ABSTRACTS OF SPECIFICATIONS.

3,814, Drain Traps. W. H. Tylor.

To carry up the ventilating openings of traps to the surface of the ground, several forms of extension pieces are to be employed, combined together as may be found necessary. In separating traps, a partition rises slightly above the outlet, which outside the trap turns upwards in order to retain a proper level of liquid in the trap. The inlet turns downwards into the liquid, and may be flattened at the end; in front of it is an angle-plate for separating the fat. The trap is provided with a removable cover, and the outlet with a hand hole.

11,247, Excavating Grab. H. J. Coles.

The bucket segments are of the ordinary construction. Their frame is continued upwards in the form of a trunk on which slides the cross-head, and down which the lifting-chains pass. Catches are provided that lock the cross-head to the trunk, when the grab is at rest. These catches have weighted tail-pieces to cause them to fall into slots prepared in the trunk to receive them. Suspended from the crane-jib is a frame with hanging books. These are arranged to hold the flange of the cross-head, so that when the chains are slackened the trunk sinks, and opens the grab. At the moment that the catches fall into their slots, a tapered head on the trunk bears against inclines on the hanging-books, and disconnects them. The grab can then be lowered open. When the buckets reach the ground, the rods press upwards by means of lugs against the tail-pieces, and so release the catches; the segments then close, and the operation is repeated. Two lifting-chains are used attached to the frame of the bucket. They pass round sheaves on the frame, and so up the trunk to the jib.

13,422, Imitating Stained Glass. A. M. F. Caspar.

A suitable design is copied on the surface of a glass sheet of any kind by attaching to it variously shaped cardboard strips coated to imitate gold or lead, &c., with a strong adhesive, which may be white-lead coloured to match the strips. To imitate the solder employed with the lead strips for stained glass, bronze powder is mixed with spirit-varnish (such as copal dissolved in alcohol) dropped on the cracks and brushed slightly over while damp with light bronze powder. After drying the colours are floated or painted on the reverse side of the sheet to the cardboard strips, any superfluous colour being removed by draining, or by a rag dipped in methylated spirits, a coating of mastic varnish and cardboard strips corresponding to those upon the reverse side may be applied over the colours. Some parts of the sheet may be ground to resemble frosted glass by the use of damp sand and a glass muller.

##### NEW APPLICATIONS FOR PATENTS.

Jan. 1.—15, M. Golightly, Turn Button or Fastener for Securing Doors, Window-sashes, and Casements.—19, W. Carr, Apparatus for Preventing Concussion in Water Pipes, &c.—30, E. Jones, Combination Shovel, Riddle, and Sieve.—31, W. Joy, Utilisation of Waste Heat from Cement and Lime Kilns.

Jan. 2.—54, W. Hilder, Lowering and Raising the Upper Halves of Sliding Window Sashes, &c.—59, R. Stevens, Improvement in Dry Glazing.—73, C. Wells, Improved Decorative Material for Walls and Floors.—78, C. Watkins, Improvements in Graining Tools.

Jan. 5.—142, J. Brown, Cross Ventilation of Sewers.—146, J. Ferguson, Improved Material for Fireproofing Internal Surfaces of Buildings.—153, O. Elphick, Apparatus for Discharging Water from Flushing Cisterns.—157, J. Benson, Apparatus for Curing Smoky Chimneys and Preventing Down

Draught.—175, H. Haddon, Improvements in Ventilators, Chimney, and Smoke Stack Cowls.—179, R. Everett, Connecting Door Knobs to the Rosas of same.—189, J. Mackenzie, Improved Method of Securing Metal Sash Bars in Roofs and Other Structures.—201, R. Hellyer, Sewer and Impure Air Burning Apparatus.

Jan. 6.—210, J. Hargreaves, Improvements in Gullies.—215, C. Homer, Improvements in Window Sash Fasteners.—223, G. Hardingham, Improvements in the Construction of Lattice Bridges.—229, J. Hendra and W. Gooding, Improved Construction of Treads of Stairs, Door Steps, Landings, Floors, &c.—235, J. Frazer, Self-adjusting Apparatus for Cleaning Windows.—247, R. Bowman, Improved Water-waste Preventer.

Jan. 7.—255, W. Gallon, Improved Mode of Constructing Stone or Concrete Piers or Breakwaters.—259, J. Barry, Improvements in Pipe Tongs, Wrenches, or Spanners.—274, S. Jackson, Improved Traps or Syphons for Urinals, Wash-basins, Sinks, &c.

##### PROVISIONAL SPECIFICATIONS ACCEPTED.

14,151, A. & J. Childs, Raising and Lowering Window-sashes and Shutters.—14,707, M. Chabod, Improved Stove or Fireplace.—14,866, R. Somers, Improvements in Fireplaces.—14,874, R. Best, Improvements in Central Light Gasoliers.—15,185, T. Carder, Improvements in Kilns.—15,195, E. Coldwell, Apparatus for Burning off Old Paint.—15,228, J. Baldwin, Improvements in Door and other Bolts.—14,042, W. Hulse, Improvements in Planing Machines.—14,313, R. Gregory and H. Harris, Ventilating.—14,484, A. Noble, Improvements in Ventilating and Chimney Cowls.—15,032, J. Armstrong, Improved Laths for Revolving Shutters.—15,233, E. Emanuel, Self-closing Ball Valve.—15,235, W. Macrone, Apparatus for Checking the Time of Arrival of Employees.—15,248, O. Elphick, Improvements in the Joints of Stoneware Pipes.

##### COMPLETE SPECIFICATIONS ACCEPTED.

Open to opposition for two months.

2,247, J. Horne and S. Hollyman, Improved Construction of Chimney-pots to Prevent Down-draught.—14,751, S. and W. Pickering and J. Norton, Improved Door Check and Spring.—14,851, R. Eidsforth and F. Mudford, Improvements in Lightning Conductors.—14,932, J. Vaughan, Improvements in the Handles of Trowels, Spades, &c.—2,412, J. Tulloch, Improved Sash Window.—2,519, M. Brown, Combined Bedstead and Bath.—3,556, F. Rogers, Improved Vane and Indicator.—14,448, A. Lloyd, Combined Electric Bell and Pendulum Indicator.—14,493, W. Lilley, Improvements in Window and Sash Fasteners.—15,016, W. Berridge, Improvements in Domestic and other Stoves or Fire-places.

#### RECENT SALES OF PROPERTY.

##### ESTATE EXCHANGE REPORT.

JAN. 5.

By C. & H. WHITE.  
Kennington—68 and 68, Henry-street, 23 years,  
ground-rent 61. 6s. £130  
Old Kent-road—334 to 340 even, Commercial-road,  
7 years, ground-rent 111. 150

By W. B. HALLETT.

Midford, near Bath—The lease and plant, &c., of  
the Midford Fuller's Earth Works..... 2,600

JAN. 7.

By MESSRS. FOWELL.

Bayswater—25, 29, and 31, Gladhow-gardens, un-  
finished, 87 years, ground-rent 162. 11,250  
36, Miniature-square, 28 years, ground-rent 31. 610

By PHILLIPS, LEA, & DAVIES.

East Ham, Essex—Three Plots of Freehold Land... 150

#### The Japanese Village.—Last week Mr.

James C. Humphreys, of Albert Gate, appeared to a summons to answer the complaint of the Metropolitan Board of Works that he had infringed a section of the Building Acts by keeping open Humphreys' Hall as a place of public resort and entertainment under the authority of the licence granted by the Magistrates without obtaining the certificate that the building was completed in accordance with the requirements of the Board of Works. Mr. Besley, who appeared for the Board, said that penalties were claimed in respect of three days, December 3rd, 14th, and 23rd, on which dates the public were admitted to Humphreys' Hall, and where entertainments were given. Mr. John Hebb produced the regulations made under the Act of 1878. Mr. Humphreys had not been granted a certificate for Humphreys' Hall. Witness showed that the exits provided were altogether different to those shown on the approved plan. In the opinion of witnesses they were insufficient. There was considerable danger from fire. He had seen the Japanese smoking in their shops, and in some of the huts there were braziers of live charcoal. The Magistrate fined the defendant 50l. in respect of each day stated in the summons,—150l. in all. Out of this sum 25l. costs was allowed, on Mr. Besley's application.



## MEETINGS.

MONDAY, JANUARY 18.

*Royal Institute of British Architects.*—Business Meeting (for Members only). 8 p.m.  
*Royal Academy of Arts.*—Mr. J. E. Hodgson, R.A., on "Art in England: Reynolds." 8 p.m.  
*Society of Arts (Cantor Lectures).*—Professor H. B. See Shaw on "Friction." (1.) 8 p.m.  
*Liverpool Architectural Society.*—Mr. J. M. Hay on "St. John's Site: its Fitness for a Great Cathedral." 7 p.m.  
*Architectural Section of the Philosophical Society of Glasgow.*—Mr. Charles Grev, on the "Combined Decorative Arts of Glass and Colour."

TUESDAY, JANUARY 19.

*Institute of Builders.*—Second Ordinary General Meeting. 2 p.m.  
*Institution of Civil Engineers.*—(1) Discussion on Mr. P. J. Rowan's paper on "Gas-Producers." (2) time permitting, Mr. C. E. Stromeier on "The Jealous Effect of a Blue Heat on Steel and Iron." 8 p.m.  
*Statistical Society.*—Dr. Robert Giffen on "The Progress of the Industrial Classes." 7:45 p.m.  
*Manchester Architectural Association.*—Mr. J. Murgatroyd on "Fifteenth and Sixteenth Century Work in the Valley of the Loire." 7:30 p.m.

WEDNESDAY, JANUARY 20.

*Society of Arts.*—Captain Douglas Galton on "Mechanical Motors for Tramways." 8 p.m.  
*British Archaeological Association.*—(1) Mr. H. Syer Cuning on "The Old Traders' Signs in Westminster Hall." (2) "Notes by the Late Rev. D. M. Haigh on Barnack Church," communicated by the Rev. Canon Argles. 8 p.m.  
*Sunday Assurance Association.*—(Parker Museum).—Professor T. Roger Smith on "A Damp House." 8 p.m. (admission free).  
*Royal Meteorological Society.*—Annual Meeting. The President (Mr. B. H. Scott, F.R.S.) will deliver an Address. 7 p.m.  
*Builders' Foremen and Clerks of Works' Institution.*—Annual Meeting of Members. 8:30 p.m.

THURSDAY, JANUARY 21.

*Royal Academy of Arts.*—Mr. J. E. Hodgson, R.A., on "Art in England: Gainsborough and Romney." 8 p.m.  
*Society of Antiquaries.*—Mr. W. H. St. John Hope on "Examples of Medieval Mazers." 8:30 p.m.  
*Parkes Museum.*—Mr. B. F. Grantham on "The Working of the Separate Sewage Systems." 8 p.m.  
*Society for the Encouragement of the Fine Arts.*—Conversations at the Piccadilly Galleries. 8:30 p.m.  
*London Institution.*—Professor John Perry on "The Distribution of Electric Power." 7 p.m.  
*York Architectural Association.*—The Rev. Newton Mant on "Classic Architecture and Modern Church Building." 7:30 p.m.  
*Edinburgh Architectural Association.*—Professor G. Baldwin Brown, B.A., on "Sir Christopher Wren." 8:30 p.m.

FRIDAY, JANUARY 22.

*University College.*—Professor C. T. Newton, C.B., on "Greek Inscriptions." 11. 4 p.m.

## Miscellaneous.

**The Late Dr. Birch.**—The anniversary meeting of the sixteenth session of the Society of Biblical Archaeology was held on Tuesday night at its rooms in Conduit-street, Prof. C. T. Newton, C.B., D.C.L., one of its vice-presidents, being in the chair. In opening the proceedings of the evening the chairman alluded to the great loss which the society had sustained by the death of Dr. Samuel Birch (President of the Society), whose wide acquirements, profound and varied scholarship, and unconquerable industry had been of the highest possible value to its prosperity and usefulness. For forty-six years, Mr. Newton said, he had known Dr. Birch; and during the greater part of that period had been shoulder to shoulder with him at the British Museum. He hoped the society might be able to find a worthy successor, under whom, and under the influence and memory of Dr. Birch's noble example, it might successfully prosecute and amplify the studies upon which it had entered under his guidance. Canon Beechey, who said the Society of Biblical Archaeology was almost exclusively the creation of Dr. Birch, moved that a vote of condolence should be passed to Mrs. Birch on the death of her husband. The motion was passed unanimously. Sir Henry Layard was elected President of the Society.

**Assessment Appeals.**—We understand that Mr. Penfold, Messrs. Fuller & Fuller, and Messrs. Hedley have been instructed by Messrs. Nye, Greenwood, & Moreton, acting as solicitors on behalf of the Assessment Committee of Fulham Union, the Overseers of St. Saviour's, the Overseers of Christchurch, the Governors and Guardians of St. Mary (Newington), the Governors and Directors of St. Mary Magdalene (Bermondsey), and the Overseers of St. George-the-Martyr, to assess the values of various properties in the parish of St. Mary Abbott's, Kensington, in connection with the different appeals by the above bodies against the totals of the gross and rateable values of the valuation list of the parish of St. Mary Abbott's, Kensington.

**British Archaeological Association.**—At the meeting of this Association on the 6th inst., the chair was taken by Mr. S. Tucker (Somerset Herald). Reference was made to the congress to be held in the autumn, under the presidency of the Bishop of Durham, the headquarters to be some town in the diocese. The Rev. Scott Surtees reported some curious discoveries at Dimsdale-on-Tees, where the old ancestral house of the Surtees family is found to be built upon portions of the castle in Norman times, the site being surrounded by earthworks of prehistoric times, although afterwards used by the Romans and Saxons, a paved roadway for the former people having been traced up to a curious underground structure called a blast-furnace for iron ore. A large number of portions of pottery of all ages have been found, also a stone cell, with the cutting-edges still perfect. Mr. Loftus Brock, F.S.A., exhibited a series of rubbings from sixteenth-century brasses, mostly from churches in Hertfordshire and Bucks. A paper was then read by Mr. Romilly Allen, C.B., F.S.A. (Scott), on the "Sculptures of the Norman Doorway at Alne, Yorkshire." This doorway is on the south side of the church, and it consists of two orders of arched stones neatly sculptured, there being figures of animals on the outer order, having Latin names above them. These have been identified by the lecturer as having been taken from a Medieval Bestiary, with spiritual explanations more or less apparent. Thus at Alne we see the fox, who is represented lying as if dead, for the birds to approach him. The fox represents the devil. Caladus is a white bird which can tell whether a sick man will live or die, supposed to be symbolical of Christ. Tero-bolem are two mystical stones which emit fire, found in the East, supposed to symbolise the love of man and woman, or that of Christ for his Church. At Alne, two figures, a man and a woman, are shown surrounded by flames. Aspidio, the whale, acts as destructively to a ship as does the fox to the bird; he also represents the devil. A large number of old MSS. were passed in review by the lecturer, and the analogy of representation at Alne shown to be identical. Mr. De Gray Birch, F.S.A., pointed out the resemblance of one of the figures to the Harpy of the Egyptian monuments. The concluding paper was by Mr. J. W. Grover, F.S.A., on the discovery of the Atkins monumental figures in the mortuary-vault beneath the site of the old church at Clapham. After tracing the history of these works, he referred to his discovery of them, and suggested means for their being brought up to the light of day. Letters were read from General Pitt Rivers and others, and Mr. Atkins spoke as to the great amount of local interest taken in the discovery, of which a full account was given in the *Builder* a fortnight ago (p. 60).

**Electric Lighting at Hatfield House.**—On the occasion of the county ball given by the Marchioness of Salisbury at Hatfield House on the 6th inst., the following arrangements were made for the lighting by electricity of the house and grounds. The principal rooms, galleries, and grand staircase were illuminated by upwards of 900 Swan's 20-candle-power lamps, the principal power for these lamps being derived from two water-wheels on the river Lea, which is a mile and a quarter distant from the house. The machinery used for generating the current consisted of two Siemens alternating machines, one sixteen-light "Brush" and one Siemens direct current machine, the latter being driven by a 16-horse-power Otto gas engine. The terraces and approaches to the house were lighted by six Clark-Bowman arc lamps, the current for these being supplied by an H. Gramme machine, driven by a traction-engine near the house. The lighting was in every respect a thorough success, and gave great satisfaction, there being not the slightest interruption to the working during a period of sixteen hours. The whole installation was carried out by Mr. Shillito. It may be remembered by our readers that the Marquess of Salisbury has been a pioneer in the matter of electric lighting and the use of electricity, and that his lordship has utilised this agent in a variety of novel ways by the transmission of electrical power, such as for grinding corn at farms situated at some distance from the water-power, pumping water, driving the ventilating apparatus at the house, driving the lathes and saws in the workshops, pile-driving, dredging, and cutting weeds in the river, &c.

**Lectures on Sculpture and Architecture at the Royal Academy.**—The following lectures on Sculpture will be delivered by Mr. A. S. Murray to the students of the Royal Academy of Arts on the dates mentioned, viz.:—"Early History of Bas-Relief," Thursday, Jan. 28; "Principles of Bas-Relief as observed in the best age of Greece," Monday, Feb. 1; "Later History of Bas-Relief in Greece," Thursday, Feb. 4; "Bas-Relief in Rome," Monday, Feb. 8; "The School of Pasiteles in Rome," Thursday, Feb. 11; "A Comparison between Polykleitos and Lysippos," Monday, Feb. 15. In Architecture, the following lectures have been arranged for, viz.:—By Mr. G. F. Bodley, A.R.A.:—"English Architecture of the Middle Age," Thursday, Feb. 18. By Mr. G. Aitchison, A.R.A.:—"Architecture Education," Monday, Feb. 22; "Mouldings," Thursday, Feb. 25; "Style and Composition," Monday, March 1. By Mr. W. Watkiss Lloyd:—"On the Theory of Proportion in the Arts generally, and particularly in Architecture," Thursday, March 4; "An Exposition of the Theory of Proportion in Architecture as understood and applied in detail by the Architect of the Parthenon," Monday, March 8.

**Tilbury Docks Arbitration.**—This arbitration, which was commenced in July, 1885, reached its sixty-seventh sitting on Saturday last. The proceedings arose out of the original contract for the construction of the new Tilbury Docks, Sir F. Bramwell, President of the Institution of Civil Engineers, being the arbitrator, assisted by Mr. J. A. Radcliffe, as legal assessor. Messrs. Kirk & Randall, the original contractors, for the works, are the Plaintiffs, and the Eastern and Western Dock Company are the Defendants. The amount claimed by the contractors is over 600,000L. The Attorney-General (Sir H. Webster, Q.C., M.P.), Mr. J. Fletcher Monks, Q.C., M.P., Mr. C. A. Cripps, and Mr. R. Wallis are counsel for the plaintiffs; the Docks Company being represented by Mr. E. H. Pollard, Mr. Kenelm Digby, and Mr. Midway. The plaintiffs concluded their case at the sixty-third sitting, about forty having been occupied by the Dock Company's counsel in cross-examination of the plaintiffs' witnesses. Three of the four days were taken up by the Dock Company's Counsel with arguments on legal points arising out of the plaintiffs' case. The arguments the arbitrator (without calling on the plaintiffs to reply) disposed of on Saturday last by a decision adverse to the Dock Company, the contents upon all the points raised by the counsel, whom he then called upon to proceed with the case. This the Dock Company declined to do, on the ground that they proposed forthwith appealing to the Divisional Court against the arbitrator's ruling, for which application Sir Farrer Herschell, Q.C., is retained.

**Constantinople.**—The church built at Constantinople by the Society for the Propagation of the Gospel in Foreign Parts (the funds of which were raised by contributions from the classes of the British nation), in memory of the British soldiers who fell during the Crimean War, has just had the east wheel-window filled with stained glass. The centre circle contains the head of Christ, after Guido Reni, the outer lights representing the Apostles and the symbols of the four Evangelists. There are two pressed circles under the window, which are filled with mosaics, representing the heads of St. Paul and St. Matthias. The whole has been designed and executed by Messrs. Mayer & Co. at a cost of 250L.

**Messrs. Doulton's New Buildings.**—We understand that Messrs. Doulton & Co., Messrs. Young & Co., after obtaining tenders from several builders for the erection of factories, &c., are carrying out the works themselves.

**Nineteenth Century Art Society.**—Monday, the 25th inst., has been appointed the reception of Works of Art intended for the Spring Exhibition of the Nineteenth Century Art Society, at the Conduit-street Galleries.

**Institute of Builders.**—The Annual General Meeting of the Institute of Builders will be held at the Offices on the 19th inst. at two o'clock p.m.

**AINSTABLE.**—A three-light Munich stained-glass window has just been erected in Ainstable Church, near Castle, representing in the centre light the Ascension, and the side lights containing the scenes of Basilica entertain King David and Maseon lodging the Apostles. The work has been designed and carried out by Messrs. Mayer & Co.



**Table Ware from Slag.**—An American contemporary reports that the slag resulting from the smelting of copper, gold, and silver ores at Argo (Colorado) is now being used for the manufacture of beautiful table ware. The colours, are a kind of spray of onyx and opal flushed in waves throughout the ware. The colours, it is stated, are under perfect control, the slag containing a larger percentage of material necessary than can be found in slag elsewhere. The slag is melted at an intense heat, then poured into vats of agitated water, then re-melted, and poured into moulds either with or after an acid mixture, which causes the metal to flux pretty generally with added materials. The result is said to be a metallic glass with the strength of light cast-iron, which may be moulded into any form of table ware,—bowls, cups, tumblers, &c.,—with the most beautiful sprays of onyx stone colours upon a general background of opal.—*Iron.*

**Royal School of Mines.**—Prof. Warrington Smyth, F.R.S., in continuing his lectures on mining in the Theatre of the Geological Museum, Jernyn-street, considered the various prejudices which have long existed in the minds of miners forming various schools of opinion of a very remarkable kind. Some men considered that lodes are more likely to occur on those hill-sides facing the sun or a large body of water; a few believe that plants and trees have a special liking for particular classes of mineral, and this fact may be considered as being reliable indications of favourable localities; a number place confidence in the manner in which snow lies upon the ground, believing that it will not lie on the backs of the lodes in the same way as in the country around because of a greater temperature in that particular part, owing to the presence of decomposing pyrites; the difference in the colour of grass is considered another indication; and, lastly, there is an opinion held pretty largely in some districts, though not sufficiently appreciated in others, that the position of some classes of lode may be found by a tolerably acute sense of smell, the presence of pyrites giving rise to sulphurous acids and other gases. He had noticed this peculiarity in connexion with lodes in the county of Wicklow, in the west of the county of Cork, and in Cornwall, where the odour is especially noticeable when the sun was shining brightly after a tolerably heavy shower of rain. Further, on the backs of certain lodes, in particular conditions of weather, a series of corrugations of light may be seen playing like a lambent flame. This has led to the discovery of lodes. It was a common thing to see these phenomena on Wheal Buller, thirty or forty years ago, but they have ceased since the lodes were exhausted. The explanation is to be found in the decomposition and recombination which are known to be going on in the surface of these lodes, and especially to the occurrence of phosphates and arsenates. In conclusion, he referred to the popularity which the "divining rod" has obtained in various places, for the discovery of lodes. It is a forked twig, held in a certain position in the hands while walking over the country when the pointer is supposed to go down on the approach of a lode.

### PRICES CURRENT OF MATERIALS.

TIMBER.	£. s. d.	£. s. d.
Greenheart, B.G. .... ton	12 10 0	15 10 0
Teak, E.I. .... load	0 2 6	0 2 8
Saguao, U.S. .... ft. cube	3 0 0	5 0 0
Ash, Canada .... load	3 0 0	4 10 0
Birch " " " " " " " "	3 10 0	5 0 0
Elm " " " " " " " "	1 10 0	4 10 0
Fir, Dantsic, &c. ....	3 0 0	5 0 0
Oak " " " " " " " "	3 0 0	5 0 0
Canada " " " " " " " "	3 0 0	4 10 0
Pine, Canada red " " " "	3 15 0	6 5 0
" " " " " " " " " "	4 10 0	6 0 0
St. Petersburg " " " "	2 15 0	4 10 0
Waincoat, Riga, " " " "	3 12 6	3 15 0
" " " " " " " " " "	7 10 0	8 10 0
Deal, Finland, 2nd and 1st, std. 100	6 0 0	7 0 0
" " " " " " " " " "	6 0 0	8 0 0
Biga " " " " " " " " " "	9 0 0	15 0 0
St. Petersburg, 1st yel. ....	7 0 0	8 15 0
" " " " " " " " " "	6 0 0	7 0 0
Swedish " " " " " " " " " "	6 0 0	15 10 0
White Sea " " " " " " " " " "	8 0 0	15 0 0
Canada, Pine 1st " " " "	17 0 0	31 10 0
" " " " " " " " " "	12 0 0	17 10 0
" " " " " " " " " "	7 0 0	10 0 0
" " " " " " " " " "	9 0 0	12 0 0
" " " " " " " " " "	8 0 0	8 0 0
New Brunswick, &c. ....	5 0 0	7 0 0
Battens, all kinds " " " "	4 0 0	12 0 0
Flooring boards, sq. 1 in.—Pre-	0 9 0	0 13 0
pared, first " " " " " "	0 7 6	0 8 0
Second " " " " " " " "	0 5 0	0 7 0
Other qualities " " " " " "	0 5 0	0 7 0

TIMBER (continued).	£. s. d.	£. s. d.
Cedar, Cuba, .... foot	0 0 3	0 0 4
Honduras, &c. ....	0 0 3	0 0 4
Australian " " " "	0 0 3	0 0 4
Mahogany, Cuba " " " "	0 0 5	0 0 7
St. Domingo cargo av. ....	0 0 5	0 0 7
Mexican " " " " " "	0 0 4	0 0 6
Tobacco cargo av. ....	0 0 4	0 0 6
Honduras cargo av. ....	0 0 4	0 0 6
Maple, Bird's eye " " " "	0 0 3	0 0 6
Rosa, Rio " " " " " "	7 0 0	18 0 0
Bahia " " " " " " " "	6 0 0	14 0 0
Box, Turkey " " " " " "	5 0 0	18 0 0
Satin, St. Domingo " " " "	0 0 0	0 0 0
Porto Rico " " " " " "	0 0 0	0 0 0
Walnut, Italian " " " "	0 0 4	0 0 5

METALS.	£. s. d.	£. s. d.
Iron—Pig in Scotland .... ton	3 2 6	0 0 0
Bar, Welsh, in London ....	4 15 0	5 0 0
" " " " " " " " " "	4 7 6	4 10 0
" " " " " " " " " "	5 15 0	7 0 0
Sheets, single, in London ....	7 10 0	9 0 0
Hoops " " " " " " " "	6 5 0	7 5 0
Nail-roads " " " " " "	5 15 0	7 0 0
Copper—		
British, cks. and ingts. .... ton	43 0 0	44 0 0
Best selected " " " " " "	45 0 0	46 0 0
Sheets, strong " " " " " "	52 0 0	0 0 0
" " " " " " " " " "	48 0 0	48 0 0
Australian, Best Cash " " " "	0 0 0	0 0 0
Chili, bars " " " " " "	40 2 6	40 10 0
YELLOW METAL " " " " " "	0 0 4	0 0 4

METALS (continued).	£. s. d.	£. s. d.
Lead—Pig, Spanish .... ton	12 10 0	0 0 0
English, com. brands " " "	12 17 6	0 0 0
Sheet, English " " " "	12 16 0	13 0 0
Spruce—		
Silesian, special " " " " ton	15 2 6	15 3 0
Ordinary brands " " " "	14 17 6	15 0 0
Tin—		
Banca " " " " " " " "	96 0 0	0 0 0
Belliton " " " " " " " "	94 0 0	0 0 0
Strait " " " " " " " "	92 2 6	92 12 6
Australian " " " " " " "	92 2 6	92 12 6
English ingots " " " " " "	97 0 0	0 0 0
Zinc—		
English sheet " " " " " "	0 0 0	0 0 0

OILS.	£. s. d.	£. s. d.
Linseed " " " " " " " "	19 5 0	19 15 0
Cocunut, Cochin " " " " "	29 10 0	30 0 0
Ceylon " " " " " " " "	28 0 0	0 0 0
Copra " " " " " " " "	28 10 0	0 0 0
Palm, Lagos " " " " " "	25 0 0	0 0 0
Palm-out Kernel " " " " "	23 0 0	0 0 0
Rapeseed, English pale " " "	21 5 0	21 10 0
" " " " " " " " " "	17 10 0	19 0 0
Tallow and Oleine " " " "	25 0 0	40 0 0
Lubricating, U.S. " " " "	7 0 0	10 0 0
" " " " " " " " " "	4 0 0	12 0 0
TURKISH—		
American, in cks. .... cwt.	1 6 8	1 7 9
Tar—Stockholm " " " " bbl.	0 19 0	0 19 8
Ar. bangel " " " " " "	0 12 0	0 12 6

## CONTRACTS AND PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

### CONTRACTS.

Nature of Work, or Materials.	By whom required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Steam Roller " " " " " "	Chiswick Local Board	Official	Jan. 20th	ii.
Rebuilding, &c., Old Palace, Lincoln	Plymouth U.S.A.	Evans & Crispin	Jan. 21st	iii.
Wharf, New Dock, Wall and Sewage Works	Belfast Town Council	G. D. Delany	Jan. 23rd	ii.
Earthware Sewer Pipes, &c.	Leeds Cor. Waters	J. C. Bretland	Jan. 28th	ii.
Construction of Tunnel	Tottenham Local Board	— De Pape	do.	iii.
Repairing, &c., Street Lamps	Lewisham Bd. of Wcs.	Official	do.	iii.
Keating, T. & Co., &c., Work	Walthamstow St. Bd.	do.	do.	iii.
Drainage Works	Guardians St. Leonard	do.	do.	iii.
Rebuilding External Wall	Shoreditch " " "	F. J. Smith	Jan. 27th	ii.
Articles and Works	Chelsea Vestry	G. R. Strachan	Jan. 28th	ii.
New Lunatic Asylum	B. S. Jacobs	Official	Jan. 30th	ii.
Watering and Cleansing	Com. of H.M. Works	Official	Feb. 1st	ii.
Sewerage Works	Bethill Local Board	H. B. Nichols	do.	iii.
Construction and Extension of Reservoirs	Stockton, &c., Water Bd.	J. Mansergh	Feb. 2nd	ii.
Boundary Walls, Abutments, &c., for Bridge	do.	H. Bat roff	do.	ii.
Ironwork for Bridge	do.	do.	do.	ii.
New Pat. Bridge, Cornforth	Com. of H.M. Works	Official	Feb. 5th	ii.
Ironwork for Bridge	Midland Railway Co.	A. A. Langley	do.	ii.
Waterworks	Northampton Cor.	T. & C. Hawksley	Feb. 19th	iii.

### PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom A.D.	Salary.	Applications to be in.	Page.
District Surveyor	Met. Board of Works	Not stated	Jan. 2th	xvi.
Surveyor	Ulverston Local Board	20 l.	Jan. 25th	xvi.

### TENDERS.

<b>BRISTOL.</b> —For Castle School, Bristol, for the Bristol School Board. Mr. Stuart Colman, architect, Chancery-lane, London:—	
J. Wilkins	£8,700 0 0
T. Brown	8,000 0 0
W. Williams	7,978 0 0
J. E. Davies	7,875 0 0
H. A. Forde	7,538 0 0
Perrott	7,795 0 0
R. Wilkins	7,780 0 0
T. R. Lewis	7,745 0 0
W. Corbin & Son	7,700 0 0
E. C. Howell	7,650 0 0
H. J. Rosseter	7,470 0 0
G. Humphreys	7,375 0 0
Stephens & Bastow	7,180 0 0
W. Church	7,150 0 0
A. J. Bevan (accepted)	6,985 0 0

<b>EXETER.</b> —For alterations and additions to premises lately occupied by Post-office Authorities, for Messrs. Peters & Hamlin, merchants, Messrs. Wilkinson & Warren, architects and surveyors:—	
W. Gibson	£1,003 0 0
Holmes & Pomeroy	925 0 0
J. R. Gibbard	727 0 0
Vicary & Son	725 0 0
H. Phillips	653 0 0
Seadding & Son (accepted)	650 0 0
[All of Exeter.]	

Stonework.  
R. Mitchell (accepted). No competition.

<b>EXETER.</b> —For alterations and additions to 139, Fore-street, Exeter, for Mr. J. Lethbridge. Messrs. Wilkinson & Warren, architects and surveyors, Exeter:—	
Seadding & Son	£300 0 0
J. G. Stephens	257 0 0
J. R. Gibbard	270 0 0
W. Gibson	255 0 0
Vicary & Son	269 0 0
W. R. Cummings	243 0 0
W. H. Gooding	242 0 0
[All of Exeter.]	

"B."—Alternative estimate for boarding to walls in lieu of plaster.

<b>GREENWICH.</b> —For alterations to the Mitre Tavern, London-road, Greenwich, for Mr. Burgess:—	
Jas. A. Taylor (accepted)	£235 0 0

<b>LAMBETH.</b> —For alterations and additions at Lambeth Workhouse, Renshaw-road, for the Guardians of the Poor of the Parish of Lambeth. Mr. Thos. W. Aldwinckle, architect, East India-avenue, Leadenhall-street. Quantities supplied:—	
Edie, Francis, & Son	£11,387 0 0
Wm. Davies	6,747 0 0
Wm. Smith	6,711 0 0
Kirk & Randall	6,685 0 0
Mark Gentry	6,450 0 0
J. & B. Mills	6,338 0 0
W. G. Wyatt & Co.	6,298 0 0
Oliver	6,155 0 0

<b>LAMBETH.</b> —For alterations and repairs at Lambeth Workhouse, Renshaw-road, for the Guardians of the Poor of the Parish of Lambeth. Mr. Thos. W. Aldwinckle, architect:—	
Norris & Luke	£678 0 0
R. Cox	597 0 0
Wood, Harris, & Co.	570 0 0
Bandon	555 0 0
Wm. Smith	548 0 0
Seed	540 0 0
W. G. Wyatt & Co.	527 0 0
Calnan & Co.	514 0 0
Neave & Neave	450 0 0

<b>LONDON.</b> —For shops and chambers, Mount-street, London. Messrs. George & Peto, architects. Quantities supplied by Messrs. Storer & Sons:—	
Ashby Bros.	£10,750 0 0
Smith & Co.	10,741 0 0
Prestige & Co.	10,587 0 0
Boyes	10,570 0 0
Bywater	10,357 0 0
Hall, Beddall, & Co.	10,143 0 0
Simpson	9,898 0 0
Peto Bros.	9,843 0 0
Brass	9,594 0 0
Nightingale	9,580 0 0
Stephens & Bastow (accepted)	9,390 0 0

<b>LONDON.</b> —For alteration and repairs to the "Victory" Trafalgar-road, S.E.:—	
Mackey	£238 0 0
Parker	230 0 0
Bright & Co.	270 0 0
Beal	260 0 0
Rodwell	240 0 0
Wood, Harris, & Co., Rural Works, Clapham-road	250 0 0



LONDON.—For repairs to nineteen small houses at Camberwell, for Mr. Wm. Porter. Mr. R. Bennett, surveyor.

Contt. & Co.	£265 0 0
Bras.	200 0 0
Major	168 0 0
Eds & Son	138 14 0
Wos.	135 0 0
Cattell	132 0 0
Langrid	128 0 0
Mar-shen	125 0 0
King	123 0 0
Parsons	119 10 0
Chen-all	117 0 0
J. Aldridge	108 0 0
Doughty	93 0 0
Stephens	87 0 0
Wilkinson	85 0 0
Cram	80 0 0
Blake	75 0 0
Riley Br. & Co.	72 12 0
Riches	70 0 0
Waters	73 0 0
R. Seed	70 0 0
Roth	70 0 0
Walker (accepted)	64 0 0

LONDON.—For alterations to 3, Park Prospect, Great Queen-street, Westminster, for Mr. C. B. Hurter. Mr. H. I. Newton, architect, Queen Anne's-gate.

Hearsh, South Kensington	£543 0 0
Bywaters, Regent-street	430 0 0
Burman & Sons, Kensington	392 0 0
Marke, Paddington	350 0 0
Golden, Upper George-street, Brynstone-square (accepted)	315 0 0

OLDHAM.—For the erection of "Salvation Army" Barracks, in Union-street, Oldham, for the Oldham Salvation Army Barracks Building Company, Limited, Mr. E. J. Shawford, architect and surveyor, Queen Victoria-street, London. Quantities by the architect.

Jackson & Randall, Oldham	£5,126 0 0
J. & S. Whitehead, Oldham	5,700 0 0
William Lees, Oldham	4,827 0 0
John Dryden & Sons, Oldham	4,784 0 0
Whitehead Whitaker, Oldham	4,760 0 0
R. W. Bird, Bradford, Manchester	4,740 0 0
Edward Stephenson, Oldham	4,730 0 0
Manuel Whitaker, Oldham	4,710 0 0
C. Schofield & Co., Oldham	4,551 0 0
J. Whitehead, Failsworth, Manchester	4,452 0 0
R. Whitell, Blackley, Manchester	4,380 0 0
M. Holt, Cheetham, Manchester	4,331 0 0

[Architect's estimate, 4,316.]

OXFORD.—For the erection of a temporary bridge over the Thames, near Osney Bridge, for the Oxford Local Board. Mr. W. H. White, M. Inst. C.E., engineer.

C. Bosson, Oxford (accepted)	£277 14 6
------------------------------	-----------

[There were three other Tenders.]

READING.—For the erection of a factory, Mill-lane, Reading, for Mr. E. Gibbons. Mr. W. Ravenscroft, architect. Quantities supplied by Messrs. H. Cooper & Sons, Maidenhead and Reading.

J. Winter	£1,370 0 0
Strong Bros.	2,181 0 0
H. G. Lewis	2,103 0 0
G. Seale	2,063 0 0
J. H. Margrett	2,059 10 0
W. H. Woodroffe	2,049 10 0
J. C. Cook	2,025 0 0
J. Bottrell	1,987 0 0
Higgs & Sons	1,799 0 0

[All of Reading.]

STANSTEAD (Essex).—For new brewery at Stanstead, Essex, for Messrs. Rogers & Co. Mr. Arthur Kinder, architect, Lawrence Pountney-hill. Quantities supplied.

	With Office.	Without Office.
Levey, Bishops Stortford	£281 0	£282 15
Sanders, Stanstead	974 15	927 15
Conwell, Bishops Stortford	869 0	858 0
Glascow & Son, Bishops Stortford	884 10	848 0
Dix, Saffron Walden	873 0	827 0
J. & A. Franklin, Bishops Stortford and Dunmow	818 8	772 10
Bunting, St. Ives	760 0	707 0
Harbrow, London	741 0	710 0

TOTTENHAM.—For constructing a 3-ft. 6-in. by 2-ft. 4-in. sewer, from High road along Lorpship lane to Jolly Butcher's-hill, Wood-green, for the Tottenham Local Board of Health. Mr. W. A. H. De Pape, engineer.

L. Bottom, Battersea	£15,644 0 0
J. Pizze, Horsey	13,300 0 0
W. Nicholls, Wood-green	11,879 0 0
J. W. & J. Neave, Leytonstone	11,684 10 3
W. Gaudin, Berling	11,554 0 0
C. Dickinson, Loughborough Junction	11,336 12 8
John Oliver, Colindale Avenue	11,125 0 0
B. Cooke & Co., Battersea	10,978 0 0
C. Killingsback, Camden Town	10,485 0 0
G. Bell, Tottenham Wharf	10,410 3 6
G. Neal, Wandsworth common	10,168 0 0
J. Edmondson, Lower Edmonton	10,040 1 3
Wilkinson Bros., Finsbury Park	9,907 0 0
Thos. Adams, Moorgate-street	9,295 10 8
J. Bloomfield, Tottenham	8,164 18 8

[Engineer's estimate, 10,122.]

SPECIAL NOTICE.—Lists of Tenders frequently reach us too late for insertion. They should be delivered at our office, 46, Catherine-street, W.C., not later than Four p.m. on THURSDAYS.

## TO CORRESPONDENTS.

Registered Telegraphic Address, "THE BUILDER, LONDON."

R. R. E. (next week).—W. and W. (one of the Tenders must be below our task. We published a notice in 1885, and a 3 ft. 6 in. by 2 ft. 4 in. sewer. A. E. & W. M. E. & E. C. Co. cannot but see. W. E. (two late).—H. B. & Co. (one of the Tenders, &c., must be accompanied by the name and address of the maker, not necessarily for publication.

We are compelled to decline printing ad books and giving addresses.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications that are not sent to the Editor will be destroyed.

Advertisements and other notices are NOT DESIRED.

All communications should be sent to the Editor, and not to the Publisher.

Advertisements and other notices are NOT DESIRED.

All communications should be sent to the Editor, and not to the Publisher.

Advertisements and other notices are NOT DESIRED.

All communications should be sent to the Editor, and not to the Publisher.

Advertisements and other notices are NOT DESIRED.

All communications should be sent to the Editor, and not to the Publisher.

Advertisements and other notices are NOT DESIRED.

All communications should be sent to the Editor, and not to the Publisher.

Advertisements and other notices are NOT DESIRED.

All communications should be sent to the Editor, and not to the Publisher.

Advertisements and other notices are NOT DESIRED.

All communications should be sent to the Editor, and not to the Publisher.

Advertisements and other notices are NOT DESIRED.

All communications should be sent to the Editor, and not to the Publisher.

Advertisements and other notices are NOT DESIRED.

All communications should be sent to the Editor, and not to the Publisher.

Advertisements and other notices are NOT DESIRED.

All communications should be sent to the Editor, and not to the Publisher.

Advertisements and other notices are NOT DESIRED.

All communications should be sent to the Editor, and not to the Publisher.

Advertisements and other notices are NOT DESIRED.

All communications should be sent to the Editor, and not to the Publisher.

Advertisements and other notices are NOT DESIRED.

All communications should be sent to the Editor, and not to the Publisher.

Advertisements and other notices are NOT DESIRED.

All communications should be sent to the Editor, and not to the Publisher.

Advertisements and other notices are NOT DESIRED.

All communications should be sent to the Editor, and not to the Publisher.

Advertisements and other notices are NOT DESIRED.

All communications should be sent to the Editor, and not to the Publisher.

Advertisements and other notices are NOT DESIRED.

All communications should be sent to the Editor, and not to the Publisher.

Advertisements and other notices are NOT DESIRED.

All communications should be sent to the Editor, and not to the Publisher.

Advertisements and other notices are NOT DESIRED.

All communications should be sent to the Editor, and not to the Publisher.

Advertisements and other notices are NOT DESIRED.

All communications should be sent to the Editor, and not to the Publisher.

Advertisements and other notices are NOT DESIRED.

All communications should be sent to the Editor, and not to the Publisher.

Advertisements and other notices are NOT DESIRED.

All communications should be sent to the Editor, and not to the Publisher.

Advertisements and other notices are NOT DESIRED.

All communications should be sent to the Editor, and not to the Publisher.

Advertisements and other notices are NOT DESIRED.

All communications should be sent to the Editor, and not to the Publisher.

Advertisements and other notices are NOT DESIRED.

All communications should be sent to the Editor, and not to the Publisher.

Advertisements and other notices are NOT DESIRED.

All communications should be sent to the Editor, and not to the Publisher.

Advertisements and other notices are NOT DESIRED.

All communications should be sent to the Editor, and not to the Publisher.

Advertisements and other notices are NOT DESIRED.

All communications should be sent to the Editor, and not to the Publisher.

Advertisements and other notices are NOT DESIRED.

All communications should be sent to the Editor, and not to the Publisher.

Advertisements and other notices are NOT DESIRED.

All communications should be sent to the Editor, and not to the Publisher.

Advertisements and other notices are NOT DESIRED.

All communications should be sent to the Editor, and not to the Publisher.

Advertisements and other notices are NOT DESIRED.

All communications should be sent to the Editor, and not to the Publisher.

Advertisements and other notices are NOT DESIRED.

All communications should be sent to the Editor, and not to the Publisher.

Advertisements and other notices are NOT DESIRED.

All communications should be sent to the Editor, and not to the Publisher.

## TERMS OF SUBSCRIPTION.

"THE BUILDER" is published on Thursday, at the rate of 4s. per annum in advance. It is sent free to all parts of the Empire. Advertisers are charged 2s. per line, 10 lines per week. To India, China, Japan, &c., 30s. per annum. Remittances payable to DOUGLAS FOURDRINER, Publisher, No. 46, Catherine-street, W.C.

## Best Bath Stone, for Winter use.

WISTWOOD GROUND,  
Box Ground,  
Combe Down,  
Corsham Down, & Summer  
Farleigh Down, & Dried.  
RANDELL, SAUNDERS, & CO., Limited,  
Corsham, Wilts. [ADVT.]

## Box Ground Stone

is the best for use in all exposed positions being a well-known and tried Weather Stone.

50,000 ft. cube in stock.

PICTOR & SONS,

BOX, SO., WILTS. [ADVT.]

## Doubling Freestone.

The stone of these quarries is known as the "Weather Bed," and is of a very crystalline nature, and undoubtedly one of the most durable in England. It is of the same crystalline nature as the Cheltenham Stone, but finer in texture, and more suitable for the moulded work.

## HAM HILL STONE.

Greater facilities have been provided for working these quarries, and the stone can be supplied in large quantities at short notice.

Prices, and every information given, or application to CHARLES TRASK & SONS, Norton-sub-Hamdon, near Ilminster, Somerset.

London Agent.—Mr. B. WILLIAMS,

16, Craven-street, Strand, W.C. [ADVT.]

## Doubling Free Stone

For prices, &c., address S. J. STAPLE

Quarry Owners, Stone

and Lime Merchant

Stoke - under - Han

(Ground or Lump), Ilminster. [ADVT.]

## Ham Hill Stone! Ham Hill Stone!

For Ham Hill Stone of best quality and workmanship, apply to JOHN HANN & SON, Quarry Owners, Montacute, Ilminster. Establishes

1837. Agents, MATTHEWS & GEARD, Albion

Wharf, Regent's Park Basin, N.W. [ADVT.]

## Asphalte.—The Seyssel and Metallic Lava

Asphalte Company (Mr. H. Glenn), Office, 9

Poultry, E.C.—The best and cheapest material

for damp courses, railway arches, warehouse

floors, flat roofs, stables, cow-sheds, and mil

rooms, granaries, gun-rooms, and terraces. [ADVT.]

## Asphalte.

Seyssel, Patent Metallic Lava, and

White Asphaltes.

M. STODART & CO.

Office:

No. 90, Cannon-street, E.C. [ADVT.]

## EVERY DESCRIPTION OF

SEASONED WOODS AND VENEERS

EXTENSIVE QUANTITIES.

## B. J. HUDSON & SONS,

Millbank Sawmills, Grosvenor-road, S.W.

Whitefield-street, W.C.

And Store-street, London, W.C.

Telephone No. 3,152, and Private Wire

connecting Business Premises.

# BANNER EXHAUST VENTILATORS.

The Strongest Exhaust Ventilators for all Buildings, Public Halls, Churches, Billiard-Rooms, &

HIGHEST PRIZES at all the most important Exhibitions

BANNER SYSTEM OF SANITATION AND SANITARY APPLIANCE

WERE AWARDED AT THE

International Health Exhibition, 1884, One Gold Medal, Three Silver Medals, and One Bronze.

For further Particulars and Prices apply to

BANNER BROS. & CO. Sanitary and Ventilating Engineer

11, BILLITER SQUARE, LONDON, E.C.



## ILLUSTRATIONS.

Liverpool Cathedral Competition: Interior View.—Design by Mr. Wm. Emerson, Architect .....	160-161
Liverpool Cathedral Competition: Perspective View from the South-West.—Design by Mr. Wm. Emerson, Architect .....	164-165
South Elevation of Mr. Wm. Emerson's Design for the Liverpool Cathedral .....	168-169
Mr. Emerson's Design for the Liverpool Cathedral: Longitudinal Section, looking North .....	172-173
Designs illustrative of Mr. Lewis Day's Paper on Stained Glass .....	176, 177

## CONTENTS.

Malmesbury .....	149	Architectural Societies .....	180	The Snowstorm and the Vestries .....	183
Mr. Emerson's Design for the Liverpool Cathedral .....	150	Competitions .....	180	Provincial News .....	183
Notes .....	153	Institute of Builders .....	181	Church-Building News .....	183
The Last of Tavistock Row; or, New Flowers in an Old Garden .....	155	The Progress of the Working Classes in the last Half-Century .....	181	The Student's Column: Foundations.—IV. ....	184
Some Lessons from Old Glass .....	156	The Cleansing and Ventilation of Sewers .....	181	Books: How to Select Property before Purchasing (Wainman, Liverpool); Houses and Building Societies (Simpkin, Marshall, & Co.); The Suburban Cottage (Coastock, New York) .....	184
Sewage Purification .....	158	The Liverpool Cathedral: A New Suggestion (with Plan) .....	182	Recent Patents .....	185
Designs for Stained Glass .....	158	Projections beyond the Building Line: Greenwich District .....	182	Recent Sales of Property .....	185
"What is a Bill of Quantities?" .....	158	Board of Works v. Holle .....	182	Meetings .....	185
St. Saviour's, Southwark, Fenchurch Street, and the Dismal .....	160	The Examination in Architecture (Institute) .....	182	Miscellaneous .....	187
Burial Grounds Act, 1864 .....	160	"Plumbers and Parliament" .....	182	Prices Current of Building Materials .....	187
The Late Mr. Ferguson .....	180	Lifts at No. 4, Upper Thames-street .....	182		
Obituary .....	180	"Two Doomed London Churches" .....	183		

### Malmesbury.



N the course of his "Laborious Journey and Serche for Englandes Antiquities," Mr. John Leland went from Cirencester to Malmesbury. He went all by "cham-payne grounde," through corn and grass, till he came to the stone bridge over Newnton Water, where the cattle love to cool their feet and drink deep draughts of the bright stream, and so up the narrow road between its high banks, and through the East Gate into the town. He was much impressed with its strong natural position, standing on the top of a great slaty rock and almost surrounded by water. "For Newton Water cummith a 2-miles from North to the town: and Avon water cummith by Weste of the town from Lukington Village a 4 miles of, and meate aboute a Bridge at South East part of town, and so goith Avon by South awhile, and than turneth flat West toward Bristow." Some time before the two streams actually join they seem inclined to do so and approach each other within a "burbolt-shot," but then recede again to enclose the hill upon which Malmesbury is built. "Nature," says Leland, "hath dikid the town strongly." Man took advantage of the work begun by Nature, and already in very early times pitched upon this spot as a stronghold. Legend says that a certain British king, Dunwallo, surnamed Molmutius, first built a castle here, 642 years before Christ, which castle was called Caer Bladon. But this tremendous antiquity cannot be authenticated. The place, however, seems to have been known by its British name of Caer Bladon, and charters announce themselves as "dated publicly on the river Badon." Presently the name became Ingelburne, and remained so for a long time, till a certain Scottish (or, as some say, Irish) monk, Maildolph, being too closely beset with thieves and robbers in his own land, set out, as many of his compatriots have since, to seek his fortunes in England. He wandered about the country, "thinking where God would dispose of him," and at length was attracted by the pleasantness of the wood under the hill on which the ancient castle of Ingelburne stood. He asked and received permission to establish himself in it as a hermit. Presently, "being here destitute of necessaries, he chose to himself scholars to instruct, to improve the meanness of his subsistence by their liberality." The school grew famous, and with it its founder, Maildolph: so much so

that the town of Ingelburne gradually ceased to be so called, and was known as Maildulfesburg, or the city of Maildolph, and this, philologists tell us, became contracted into Malmesbury.

Among Maildolph's scholars the most noted was Aldhelm, one of the great men of his age. He founded the monastery at Malmesbury, as well as one at Bradford on the same Avon that flows half round Malmesbury. Of this latter monastery there still remains the Saxon church, one of the few authentic examples of that ungainly style. St. Aldhelm's fame was not posthumous merely. His epistles to the students at Cologne, Paris, and other distant places established his reputation as a holy man, though they have long disappeared. He was, too, the first Englishman who wrote in Latin and taught his countrymen to write Latin verses. Here we may behold dimly, through the mist of centuries, by the side of Newton Water, the *fons et origo* of many a schoolboy's misery. After a long and laborious life the pious Aldhelm died, Bishop of Sherborne in Dorset, in the year 709, and with him was quenched one of the few bright lights that helped to illumine the Dark Ages. His memory was long preserved by a great fair, held on the Feast of St. Aldhelm, which brought together such great crowds that it was one of "the bragges of the town," says Leland, "that the toun kepith a band of harnessid men to se peace kept."

The monastery was by this time fully established and in possession of a church, in one of the chapels of which, or in a small adjoining church, according to Leland, occurred one of the most remarkable events in scholastic history. One John Scot, who taught Greek to the youth of Malmesbury, was actually A.D. 883 slain by his scholars with their pen-knives or "table pointelles"—surely the most tragic fate that ever overtook a pedagogue. There is still a school taught in part of the ancient abbey, but it is marked neither by the lofty learning nor the startling episodes of John Scot's time. Over the south porch, and approached by the old corkscrew staircase, is a parvise in which a score or two of little children imbibe the rudiments of knowledge, and rise with true rustic awe when the sound of their shrill voices floating through the narrow window leads the wondering stranger into their midst.

In course of time, the possessions of the monastery or abbey grew enormously, one of its most notable benefactors being King Athelstan, who, in addition to valuable mundane gifts, bestowed on it "several presents far exceeding all human treasure," namely, a piece of the true Cross and of the Crown of Thorns. So much did the monks revere this

monarch's memory, that a feast was established in his honour, which is observed to this day. His tomb is also pointed out in the abbey,—the only one that has survived the ruin of the Dissolution; but the merest tyro can tell at a glance that the tomb is centuries later than the king it commemorates.

All these celebrities had passed away long before any part of the existing building had been begun. It is generally supposed that Roger, Bishop of Sarum, caused the church to be built,—the same Roger who beautified the old cathedral, long demolished, which stood in the fortress of Old Sarum. Malmesbury Abbey was, in its prime, a large and magnificent place; one of those which, perhaps, from their very vagueness, best convey an impression of the enormous wealth and splendour of the Church before the Dissolution. When we recollect the number and beauty of the cathedrals and abbeys still remaining, and remember that quite as many, and those of equal pretensions, were destroyed at the dissolution of the monasteries, we begin to realise what the country must have looked like at the beginning of the sixteenth century. Malmesbury Abbey Church was cruciform on plan, with a great tower at the crossing. Only part of the nave is left now, six bays out of the nine being roofed, and used as a parish church. They are in the solemn and majestic style of the earlier half of the twelfth century. The grim and relentless lines of true Norman work had softened a little. There is still the rugged strength and the massive construction, but graced by something of the suppleness of Early English. It is all allied to the majesty of barbarism, and the savage tooth still grins out from some of the arches. The splendour and the barbarism culminate in the south porch,—one of the finest things of its kind in all England. The doorway is rather over 7 ft. wide, recessed in an arch of eight bold orders, spreading on either side to a distance nearly as great as the width of the door itself. Three of the orders are carved with historical subjects, the rest with the formal interlacing patterns characteristic of the period. The historical subjects embrace the customary events from the Bible, treated with the customary realism and the usual stiffness of pose and drapery. There is no ingenuity of light and shade, none but the most elementary rhythm, but it is magnificent, with the magnificence of the time when kings lived in splendid squalor, and the mightiest barons could neither write their own names nor read any one else's.

Leland was struck with the aspect of the church, "a right magnificent thing," with a steeple,—a "mighty high pyramis,"—that stood at the crossing, and was a mark to all



he country about. It had fallen, as we gather, within memory, at the time he wrote. Already then, in 1540, the king's commissioners had condemned the church to ruin. The abbot's lodgings were occupied by the looms of one Stumpe, a wealthy clothier; nay, his weavers were at work in the very chapel where John Soot was stabbed to death by his pupils, but the six bays of the nave that were still entire he had secured and caused to be made into the parish church. He had bought the abbey church and its precincts as well as Charlton and other of the monastery's lands from the king, who soon afterwards, being in the neighbourhood hunting, paid Mr. Stumpe a visit. That gentleman, hardly accustomed to such honours, was caught by the monarch and his hungry retinue with an empty larder. But he was equal to the occasion, and ordered his many weavers to fast for the rest of the day, and send in their dinners to him. With this homely fare, of which the quantity was more commendable than the quality, he gave his royal highness a satisfying meal, and the whole party left much pleased with their entertainment. Mr. Stumpe, the wealthy clothier, affords an example, of which there are many others, of the alliances formed in old times between families devoted to trade and those boasting a lofty descent. His son, who married a daughter of Sir Edward Baynton, became the progenitor of many of the earls of Suffolk and Berkshire, the family which still retains Charlton and its beautiful mansion, built some sixty or seventy years after Stumpe first bought the property. If noble families did not then actually engage in trade themselves, they very frequently allied themselves to those who did, and we must look to later years for evidence of the scorn supposed to be felt by "blood" for trade.

Stumpe deserves to be gratefully remembered, if only for preserving so much of the abbey church. The six bays that are left are enough to show how fine a building it must have been. In addition to the great central "pyramis" of a steeple, Leland mentions a square tower at the west end, but it may reasonably be doubted whether, from its great height, he did not mistake the square ruined corner of the church itself for this tower. It seems difficult to reconcile his statement with the actual state of the ruins at the west end. There are remains of a great Perpendicular west window, over a west door of the same character as that to the south porch, but not so fine, and many of the existing windows are of the Decorated era, as well as the vaulting over the nave, which shows that great works must have been undertaken in the fourteenth and fifteenth centuries; but the principal claim of Malmesbury Abbey to the high place it holds lies in its Norman nave. The church seems to have fallen to ruin very rapidly after being condemned by Henry VIII.'s commissioners. Leland describes it as ruinous, though many of the domestic buildings still existed then, and were occupied by Mr. Stumpe's looms. A very bad drawing in Dugdale's "Monasticon," of 1682, shows hardly anything more than we see now; but since its publication the foundation has sadly dwindled. In the churchyard once stood a castle, built by Roger of Sarum; but this was soon pulled down, to allow the monastery to extend. Leland says there were three churches in the churchyard,—the abbey church, the old parish church (St. Paul), and the little church in which John Soot was slain. The latter has quite disappeared, while of the old parish church only the tower and spire remain, the body having been taken down before Leland's visit. The tower is now the campanile to the remnant of the abbey church, so that it is observed that the parish church is in one parish and its bells are in another. They are not, however, the old bells of the abbey, of which there are said to have been ten in the central tower and two in the western, if it ever existed. One of the ten was called St. Aldhelm's bell, and was rung during thunderstorms, in order to scare away the evil spirits who brought the lightning and thunder. Alas! for those picturesque old times. How much more hold must storms have had on men's


imaginings when they believed them to be the work of devils actually at that moment careering through the sky, scared, it was to be hoped, by the sonorous tones of the St. Aldhelm's bell, which boomed out through the lulls of the tempest.

Truly, of all the glories of the great abbey, not many are left to-day. The six bays of the nave roofed in and preserved; the south porch, with its wonderful doorway; remains of the three ruined bays at the west end; one of the arches of the central tower; and a fragment of the south transept. All the choir, all the north transept, all the cloisters, all the abbot's dwelling and domestic offices, are gone, save what may have been worked into the house standing a little way from the east end, built in Elizabeth's times, out of the old materials, and covering cellars of the early work of the abbey. The two subsidiary churches are gone, as also are several chapels and hospitals in various parts of the little town, which once made Malmesbury rich in architectural interest. Its walls, too, are gone, and its gates; but at the south-east end of the town are the Corporation Almshouses, which form part of the ancient hospital of St. John of Jerusalem. It was here that Stumpe entertained Henry VIII. with his weavers' victuals. A doorway walled up serves to attract the notice of the seeker after antiquity, but there is little else to see.

One feature there is in Malmesbury that deserves investigation as well as the abbey, and that is the market cross, "made all of stone and curiously vouldid for poore market folkes to stande dry when rayne cummith." It is octagonal on plan, with a great pier at each angle, and from pier to pier an arch. The vaulting is carried by a central column, which is taken up above the roof to receive a flying buttress from every pier. Eight canopied niches surmount the junction of the flying buttresses, and above them the structure terminates in a crocketed cupola, the whole forming one of the best and most perfect specimens of a market cross still extant.

Some two miles away from the town is Charlton House, an interesting specimen of Jacobean architecture, built by the wife of the Earl of Suffolk who caused the mighty mansion of Audley End to be erected. But apart from the special attractions of this house, Malmesbury offers, on its own account, much to interest the traveller. Its ruined abbey, its market cross, and the tower of St. Paul's, exhaust the list of its notable features, but the whole appearance of the place is quaint, built as it is on a hill sloping away on every side, and on some sides so steeply as to give, without the need of any architectural effort, a vigour and piquancy to its cottages seldom met with among the easy undulations of England.

#### MR. EMERSON'S DESIGN FOR THE LIVERPOOL CATHEDRAL.

 I give this week views of the interior of Mr. Emerson's design for the proposed Cathedral at Liverpool, and of the exterior from the south west, showing the design of the western façade. The south-east view is given in our publication of the 9th of this month. To these are added the longitudinal section, the south elevation, and the plan. We have some further illustrations to give in a future number; but the selection here made, combined with the view we published on the 9th, is sufficient to convey a full idea of the main aspect, arrangement, and character of the design.

As will be seen, the design differs much in style and composition from the usual ideal of an English church or cathedral. The able report which accompanies it deals at considerable length with the reasons for the special features in plan and design. The report deserves special mention before we proceed to consider the design itself, for it goes into the whole question of the relations of a modern cathedral design to its site and surroundings and its objects, commencing from the question of the general impression to be produced by the cathedral as a portion of the *coup-d'œil* of the

city in which it is erected. Mr. Emerson's remarks on this subject, and also on some points connected with the internal treatment, and the relative effects and proportions of parts resulting from different arrangements of plan, are very suitably and pointedly illustrated by small views reproduced from photographs of Florence, Rome, London, Rouen, &c., with their cathedrals forming central objects in the view, and similarly produced views of the interiors of some existing cathedrals. The whole report shows that the author has gone into the project from almost every point of view, and given the most careful and thoughtful consideration to it.

We proceed to sum up or reprint from this report such passages as are most necessary in order to fully explain the author's own views, our object being to give each competitor's statement of his own case in his own words, before offering any independent comments on the design and on the views embodied in the report. Some portions of the report, however, it will be sufficient to give the substance of in a *résumé*, without quoting the text in full, as architectural readers will sufficiently understand what is aimed at without all the detail of explanation which it is desirable to lay before a mixed committee.

In regard to the style to be adopted, Mr. Emerson expresses the opinion which we have already expressed, that the long Mediaeval type of church cannot be adequately carried out for a first-class cathedral within the limits of the site selected; but he adds to this the argument, that in a large city the mediaeval type of church does not present sufficient mass to hold its own in the general view of the town. He illustrates this from distant views of London and Paris:—"Westminster and Notre Dame stand out with no special prominence, while St. Paul's and the Pantheon impress the eye at once. In Edinburgh the new cathedral, even where one can command a full view of it, looks unimportant, not to say unimposing, and from the city it is scarcely seen at all." It should be remembered, however, that this last, though bearing the title of cathedral, is not on the usual cathedral scale; it is only a large parish church.

"To secure the effect of mass, a treatment differing from the long and narrow Mediaeval one is necessary, and is imperatively called for in the case of the Liverpool Cathedral."

I consider the pyramidal form of grouping, with the grand domical central feature, to be the best:—

1st. Because its mass, in combination with its height, gives the greatest attainable grandeur and impressiveness.

2nd. Because it best ensures the execution of a plan essentially adapted to the modern requirements of the cathedral service.

Liverpool itself, indeed, may be said to have no distinctive cathedral associations; but the people are English, and have memories which connect themselves with the beautiful Mediaeval churches of the country. Accordingly, while, to suit the city and the requirements of our modern service, a new departure is desirable, and should be made, the architecture, out of respect to the sentiment of the people, should follow the principles and express the feeling of our grand old Gothic cathedrals.

To effect this combination, and design a cathedral which shall be worthy of the second city in the British Empire, has been my aim in the plan I have submitted.

*Style of Architecture.*—Some might think that the surroundings demand a Classical or Renaissance treatment. To my mind a style of building based on this idea would be a great mistake artistically. The scale of St. George's Hall is enormous; and a cathedral of similar architecture, holding its own in respect of detail, would require to rival St. Peter's at Rome in magnitude; and this would only overwhelm the Hall, a building which the cathedral should enhance and not extinguish. A further and cogent reason why a Classical architecture should not be adopted is, that it is pagan and un-English in its origin, while Gothic is Christian, and, moreover, our national style of architecture; and, whatever may be done in the matter of our civil or municipal buildings, surely our religious edifices ought to preserve the Christian character that they have borne for ages. The style to be adopted should be a harmonious contrast with the surroundings, an edifying, not annihilating. It should be broad, simple, and dignified. Such a style is to be found in a very early phase of the Gothic, when it had just shaken itself free from the trammels of Classic art. The east end of Canterbury Cathedral may be referred to as a notable example out of many. This, accordingly, is the style which I have adopted. It will be found at once good for a simple broad exterior, suited to the atmosphere of Liverpool, and



capable of a rich interior in keeping with its magnitude; and that it may be made to vie with the best work of the Greek artist is shown by the detail, as Arles, Leclercq, Fontaine, Perigieux, Angoulême, Toulouse, &c., where we have the nearest approach to the Classic feeling found in Gothic work, and which is exceedingly beautiful. The contrast of the early Pointed arches and the detail with the surroundings, would be the most harmonious and the best, and by reason of the difference in character would do away with any sense of competition with the adjacent buildings, such as another Classical erection alongside of them could not fail to suggest.

**Plan.**—As the mystery affected by the religious bodies in the Middle Ages, and which enforced their separation from the congregation and partial concealment by choir-screens, &c., no longer exists, and modern feeling demands that the largest number shall be admitted to see and hear the services that are specially intended for their benefit, without being impeded by large piers, it is necessary that the construction be such as to ensure an extensive unbroken area in the interior. Respect, on the part of the architect, for this demand is not only in accordance with all that has been written and said during the last few years on the necessity for churches being suited to modern requirements, but also with the fact that on the Continent within the last two centuries over 1,000 churches have, for this reason, been erected on this principle and surmounted by domes. I have, therefore, added to the nave and transepts, of the great width of 53 ft. from centre to centre of the arcade walls, an open space in front of the choir and pulpit of about 9,000 superficial feet, exclusive of the accommodation in three galleries, containing 1,200 superficial feet. This is after the plan at Ely. Some might think that this wider area, say, 70 ft. span, would be better than this present central area. It would certainly not, for three reasons:—1st. By the plan submitted, nearly 1,400 persons can be accommodated in the unbroken area within 100 ft. in front of the pulpit, exclusive of the gallery accommodation; whereas in a nave of the Basilica type, say, 70 ft. wide, only 1,000 could be accommodated within 100 ft. of the pulpit; and, in a nave of 50 ft. wide of the same type, only about 710 could be accommodated within the same range, —a calculation which, of itself, clearly shows the enormous advantage of the open area. 2nd. The best proportion for height and stateliness is that the height should be about twice the width; more gives a contracted effect, while less is unimposing. Thus, a nave of 70 ft. span would require to be 140 ft. high, which is too much; whereas, if of only the ordinary height of, say, 90 ft., or 100 ft., it would be oppressive. 3rd. If so great a height and width as 70 ft. and 140 ft. were maintained, the constructional difficulties would be disproportionately increased. The abutments necessary to resist the thrust of such high and enormous vaults would be too cumbersome and costly. The remarks just made in reference to proportion of height and constructional difficulty apply with as much force to this open space as to the nave. A Gothic vault over such an area of, say, about 100 ft. diameter, and of proportionate height, would require abutments out of all proportion, and be excessively expensive. If, in order to take advantage of the external walls for abutment, it were vaulted at about the same height as nave and transepts, the effect would be crushing and oppressive in effect on account of its lowness, and besides, it would be very bad for acoustics. A Gothic dome, on the other hand, properly constructed, is self-supporting, and has no thrust, and but little tensile strain. It can, moreover, —an important point in regard to economy,—be erected without centering, which a vault cannot. Again, were such an area roofed by a ribbed vault, its chief internal charm, viz., the impression of vastness, would disappear, as the divisions would render it easily measurable to the eye, and therefore unimposing. This is apparent at Ely. A dome is impressive internally in proportion to the inability of the eye to measure it, as, e.g., in the Pantheon, in St. Peter's, in St. Maria del Fiore, in St. Sophia, and in the Gol Gomuz. This property gives it vastness; and grandeur is unattainable without a sense of vastness. For decorative purposes, also, the unbroken surface of a dome is more susceptible of a majestic treatment than the cells of a ribbed vault. A dome, therefore, internally, is the best artistically. If a precedent be required for the introduction of a dome to Gothic architecture, the magnificent examples of St. Maria del Fiore, and the Baptistries at Pisa and Florence may suffice, without mentioning inferior instances in Italy, Germany, France, and Spain. Moreover, the beautiful Mohammedan domes so common in the East are practically Gothic. They are so in principle and feeling, and are supported on Pointed arches.

#### DETAILS OF THE ARRANGEMENT OF THE PLAN, AND THEIR REASONS.

Four points in the plan call for especial remark:—1st. The reasons for the octagon, and the relation of the dome to the nave. 2nd. The triapical arrangement at the east end. 3rd. The western porch and the position of the western towers. 4th. The apsidal ends to transepts.

#### 1. The Reasons for the Octagon, and the Relation

of the Dome to the Nave.—One charm of Gothic cathedrals is found to lie in the aisles; the vista in many of them is delightful. In a cathedral church, moreover, meant to accommodate thousands, aisles are a necessity. They are necessary, not only for congregational purposes, but to give ample passage to the service, as well as to yield artistic effect, and to supply space for tombs and monuments. In a domical church, however, when the dome is over a square space and on four legs, aisles become impossible without great expense and waste of room. The piers necessarily become so large that they block the aisles. The waste of room that results when aisles are added outside the piers is shown notably in the Pantheon at Paris, where two rows of columns occupy the useless space behind the large piers; although this blocking of the aisles with the waste of room is less important in a Roman Catholic church, the recesses behind the large piers being utilizable as chapels, or as at the Oratory, Brompton, St. Paul's, London, notwithstanding its stately dignity and beauty, is somewhat marred by two causes:—1st. The nave is too narrow in proportion to the dome; and, 2nd, the circular arches to the pendentives under the dome spring uncomfortably and unconstructionally. This is because, circular arches being necessitated by Italian architecture, a regular octagon under the dome was unavoidable; and this reduced the width of the nave. By a Gothic treatment these faults are avoided. In the plan submitted, by reason of the irregular octagon, a wider nave than St. Paul's is obtained, and one in proper proportion to the dome, which is less than St. Paul's; while all the arches of the octagon under the dome spring properly. The octagon is 103 ft. across diagonally. Though a large open area and grand central feature, at the crossing somewhat approaches on the length of the actual nave, the vista from west to east remains the same, and has the advantage of increasing the general picturesqueness. Externally, for a pyramidal group (in favour of which I have before given my reasons), the shorter nave is advantageous; and under any circumstances the one bay extra length shown on Plan B, No. 6, is all that is desirable to lengthen a church of this plan, either for congregational purposes or for artistic effect. The system of cross-pendentive arches under the dome has, apart from its picturesque and varied lines, several other great advantages:—1st. It has acoustic advantages. 2nd. The dome and its pendentives are brought well into scale with the nave. To effect this has always been a difficulty in domed churches. It is generally overcome, as at St. Peter's, by making the nave enormous in width, height, and detail. But this is fatal to impressiveness as having a dwarfing effect on the church, the eye being thereby deceived as to the size. This is notorious at St. Peter's. In St. Sophia, scale is obtained by the juxtaposition and contrast of the smaller arches. This is one reason why galleries are introduced in the alternate sides of the octagon. They have three small arches each, and can be utilised to accommodate the organ and extra musicians, or for seats on extraordinary occasions. These galleries are not necessary constructionally, and, if thought desirable, only those on each side of the choir for accommodation of the organ need be retained. 3rd. By the pendentive system adopted, the principle of construction of hanging the weight inside renders a less cumbersome external abutment necessary. 4th. The angle of the sloping face of the vault is most advantageous for decorative purposes, by bringing the subjects without distortion within an easy angle of vision. Internally the subdivisions of the octagon and cupola become smaller as they ascend, till in the cupola they cease altogether, and the cupola offers simply a grand surface for decoration. This prevents the eye from easily measuring it, and gives a sense of vastness. The nave shown is 53 ft. from centre to centre of arcade, and 97 ft. high. This is somewhat wider than that of any of our English cathedrals. The width of the nave and the space at crossing makes the plan at first glance look short; and, were the octagon regular and the nave only 40 ft. wide, the church would, on paper, look rather longer; but for the acoustics, convenience of seating, and general effect of spaciousness, there could be no comparison. A narrow nave, moreover, is unsuited to modern services. Referring to the mourning service in Westminster Abbey to General Gordon, the *Pall Mall* said:—"The Dean gave a suitable address, but the greater number of those present could not join in the services."

**The Triforium.**—This is so arranged that a passage-way is provided all round the church, and that to the nave and choir is an actual gallery, which might be of use on special occasions, access being obtained from the staircases in the large piers to the dome. It is also well lighted, and gives access to a shallow gallery over the west entrance. It is carried round the recesses above the galleries at the alternate sides of the octagon.

**II. Reasons for the Triapical Arrangement at the East End.**—An apsidal east end is necessitated by the proximity of St. George's Hall. Internally, with the usual form of apsidal-ended choir, the bays and arcade arches become attenuated; they look small, unimportant, and wanting in dignity, compared with those of the nave. This is most apparent when they are viewed from the extreme

west end of the church. The perspective diminished them still more. Witness the effect in Westminster Abbey, Notre Dame, Amiens, Cologne, Chartres, and Bayeux. Externally, a forest of flying buttresses and pinnacles is entailed by the plan of the vaulting consequent on the narrowness of the arcade arches. The result is a want of repose and breadth; but the triapical arrangement adopted avoids these faults. Internally, three stately main arches or bays are obtained in scale with those of the nave, and the smaller arches become subsidiary. They do not clash with the main arcade, and they give scale to the larger parts. Externally, only four large flying buttresses and turrets are needed, as all the weight is brought to only four points of support. One advantage of this arrangement, on this particular site, also is, that it enables the ambulatory to be lessened in width with perfect harmony. This gives the greatest possible internal length from the west wall to the altar. Another point is that greater variety of effect is obtained than in the somewhat monotonous ordinary apsidal plan. Externally also the circular lines harmonise well with the round ends of St. George's Hall and the Picton Reading-room. This will be obvious from the perspective view.

**III. Reasons for the West Porch and the Position of the Western Towers.**—It has been said that the entrances to most Gothic cathedrals resemble holes into beehives. This is true of the English cathedrals, excepting Peterborough and Lincoln. This feature cannot fail to strike those who are acquainted with the magnificent lofty entrances to Oriental buildings. I have adopted the idea of the Peterborough porch:—1st. For the sake of grandeur. 2nd. Because the more elaborate doorways are thus protected from the weather. 3rd. Because, as the site slopes from east to west, there must be flights of steps either at the corners, as on Plan A, No. 5, or on the west front, as on Plan B, No. 6 [the plan published in this number]. In either case a porch or narthex is necessary. For, in the first arrangement, a passage of some sort is needed to obtain entrances into the centres of the nave and aisles at the west of the church, and, in the other, the steps landing close to the doorways without a porch would have a very poor effect. By the arrangement shown on Plan B, carriages could drive through on state occasions to the west door. The reason of placing the towers outside instead of at the ends of the aisles is threefold:—1st. To avoid the painfully contracted effect produced by two tall towers immediately flanking the nave, as in the case of the cathedrals at Cologne, Chartres, Rouen, Brussels, Lichfield, York, the abbey at Westminster, and numbers of others. 2nd. To obtain a grand spreading west elevation with the dome well visible to the rear. 3rd. Because in the view from either side of St. George's Hall, as in Perspective A, No. 19, the whole length of the nave is seen, whereas one bay would be hidden by the towers if they immediately adjoined the nave. The greatest effect of length is thus obtained. The cathedral of Cologne is a notorious example of how a long church can be spoiled both on the west facade and side views by the towers immediately flanking the nave.

**IV. Reason for the Apsidal Ends to Transepts.**—This arrangement has been adopted for acoustical reasons, and also to obtain the full effect of the length of the nave externally. Square transepts would hide more of the nave in the side view. Abnormally wide transepts arranged to supply an accommodation equivalent to that of a large central area, would be disastrous on this site to the external effect in shortening the length of the church. A further reason for the apsidal ends to transepts is that the roof-vaulting works in so much more happily than it does with square ends.

**The Choir and Sacramentum.**—The general arrangement of the choir and sacramentum speaks for itself. The altar is placed a little in advance of the arch over the centre apse. It is 6 ft. 6 in. above the floor of the nave, and more steps might easily be added at the entrance to the choir, if thought desirable. Gates on either side near the altar rails provide exit for the communicants. The Bishop's throne is situated on the south side, in the centre of the bay. The choir accommodates eighty men and boys, including clergy stalls. A simple choir, with only a few figures round the sacramentum, and an iron screen, is shown in Section A, Nos. 17 and 12. An alternative arrangement, enriched with sculptured screen separating the ambulatory from the sacramentum, and with canopied figures on the large piers, is shown in Drawings B, No. 17a, and B, No. 18, and by the perspective view of the interior. [The section which we publish shows this more enriched design.] This richness in a church of such magnitude seems necessary as a focus, and gives scale to the interior views.

**Morning Chapel.**—This is provided on the north side of the choir, and will seat about 130 persons. It has a side door for early services.

**The Organs.**—Fine organs are often spoiled for want of proper accommodation being at first arranged on the plan. Space for the large organ is provided in the gallery on the north side of the choir; or it might be divided and occupy the galleries on either side. The organist and clavier would be placed between the large piers on the north side, immediately behind the choir-men. The modern appliances in relation to organ-building



render connexion between the keys and sound-producing portions of the organ a matter of the greatest ease, and that without the introduction of any very visible construction or casing extending from one to the other. The position of the organ here, with the circular form of recessed gallery behind it, and the great height and curved vault above it, would most advantageously throw the sound well out into the nave. The organ would be placed opposite the Bishop's throne in the choir, also connected with the general clavier by pneumatic or electric action. This arrangement, by which both organs could be played from one console, would render the effect which is so highly appreciated in many large Continental churches, possible for the first time in this country, namely, the possibility of accompanying the choir with the soft choir-organ, and the responses by the congregation on the grand organ under the dome.

**The Font.**—This is placed on the south side of the nave, between the first two piers of the arcade. A baptistry has not been provided, as it seems hardly needed in an English cathedral; moreover, modern feeling seems to demand that the rite should be celebrated in view of the whole congregation. Nevertheless, were a baptistry desired, it could easily be arranged, as shown by the dotted lines on the plan, where it would occupy the width of one bay of the nave, and a depth equal to the width of the tower.

**The Pulpit.**—This is placed under the dome, adjacent to the large pier on the north side of choir-steps.

**Lighting.**—The windows are all wide and high, and the lower windows are kept free from tracery. Most are provided with a walking rail and the building at the level of the sills of the aisle and clear-story windows, so that repairs, &c., may be effected without trouble or expensive scaffolding. Gas or electric light might be used for artificial lighting, and might, for the most part, be effected by an arrangement of hanging lamps.

**The Vestries.**—The Bishop's, Dean's, Canon's, and Choir-men's vestries are situated on the south side of the ambulatory. The choir-boys' vestry is below at the crypt level. It is well lighted, and also forms a choir-school. It is approached by two staircases; one near the priest's entrance from the cloister; the other from the aisle on the east side of the south transept. The boys would join the men in their vestry by means of these stairs before entering the church. Ample space for presses to accommodate the vestments is supplied, and also for church plate. Lavatories are provided for the clergy and the choir; for the former at the upper level; for the latter at the crypt level. Above the Dean's and Canon's vestries a large room is supplied, which might form a library or a supplementary vestry, and might also afford extra space for vestments, &c. It is connected with the chapter-house, to which it might form an ante-room. It helps the scale of the church, and makes the west side of St. George's Hall; but its omission would not affect the general aspect of the design.

**The Chapter-house.**—This is provided over the Bishop's and choir-men's vestries, and is approached by a grand staircase from the east side of the south transept aisle. It is also, as before stated, in connexion with the room available for a library over the Dean's vestry, and may be approached from the priest's staircase. This is a convenient position and arrangement for both private and public or professional meetings.

**The Crypts.**—The crypt proper follows the general plan of the church. It is lighted by windows on all sides. There are also windows under the east dwarf walls between the sacrum and ambulatory below the choir-floor level, and circular lights are obtained in the floor of the church. These would be Hyatt's lens lights, masked by ornamental bronze or iron grilles flush with the surface of floor. A large opening under the centre of dome, also filled with a movable grille and glass, would allow for the lowering of biers. An entrance is obtained under the west porch by an unobtrusive door.

**The Consistory Court, the Diocesan Office, and the Muniment Room.**—These are placed on the south side of crypt, near each other, though with separate entrances, and also with access from the church. All have good direct light. The open space by the consistory court would answer as a waiting-room at elections of prebends or other meetings. On the north side under the transept the heating apparatus is placed. The heating would be by high pressure and small pipes, in channels formed in the thickness of vaults over crypts. Also space is provided for a hollows-room for organ. The hollows would be worked by either gas or hydraulic engines.

**Sub-Crypt.**—A sub-crypt is supplied under the nave only.—1st. To place in it the human remains found in the churchyard, which might be perfectly sealed up in brickwork set in cement. 2nd. Because, at the west end, 1st part of it would be above ground, so that very little excavation is needed, and the stone obtained would possibly be used.

**Seating.**—This church will seat 3,000 persons, exclusive of the aisles, and the seating would presumably be chairs. The aisles would accommodate about 430 extra.

#### CONSTRUCTION.

**The Walls.**—The church would be faced with stone externally and internally. The walls would be hearted with cement concrete, the facings being

bonded together by frequent through stones and courses of solid masonry.

**The Roofs.**—Nearly all the churches that have been destroyed by fire have been so in consequence of their having timber roofs. I therefore propose fireproof roofs; and, indeed, no other covering would be foundation to final. The outer covering would be formed of a plain concrete barrel vault, strengthened with brick arches over each pier. In the lower parts of the vaults the concrete would be composed of an aggregate of considerable weight. Approaching the apex it would be of much lighter specific gravity. The thick portions would be lightened by voids formed by the introduction of light earthenware pipes. These vaults would, in the lighter parts, be of no great thickness, and would obtain extra tenacity and fibre by embedding a network of copper wire in the concrete. I have before me of the largest modern public buildings in India I arranged the roofs entirely with vaults to the exclusion of timber. These barrel vaults might be covered externally with either lead or copper, or thin terra-cotta tiles fitting into grooves formed in the upper face of the vaults. Concrete being in slightly porous, a covering would be needed. In respect to this is a simple adaptation of the Roman method of forming stone roofs. The lower vaults, viz., those seen from the interior, are of ordinary construction, and might be filled in with either bricks, stone, or chalk. If these were likely to be decorated with mosaics, bricks would be better. It is easier to fix mosaics more securely to brickwork than to the others. If it should be decided that mosaics are not to be used, then either stone or chalk would answer the purpose. The crypts would be vaulted with bricks and concrete. The double vault is necessitated partly for external effect of height and partly for constructional reasons. It places so much material on the haunches of the lower vaults that their oblique thrust becomes a vertical weight, and, by the weight on the haunches of the superior barrel-vault, the thrust on the flying buttresses is reduced to a minimum.

**The Dome.**—The pendentives and drum and thick lower parts of the dome, to about one-third of the height, would be constructed of masonry and concrete. Above this, it would be of purposely made bricks of light specific gravity, and of such a form that the dome would be erected without any centering. These need for the outer surface of the dome would be grooved so as to fix the light terra-cotta tiles with which I would propose to cover the dome. The proportion, construction, curves, weight, and thicknesses of this dome have been carefully arranged and determined, and the accurate calculation of weights, thrusts, and strains have been made, in conjunction with one of the most eminent dynamic authorities in England. Access is arranged to all parts of the building, viz., windows, roofs, galleries, domes, and spires, for surveying purposes and repairs. The floors of the church generally would be of stone, and with marble pattern under the dome, but wood blocks might be used for the flooring if desired.

**Acoustics.**—This subject is of the greatest importance in connexion with a large church suited to modern requirements, but unhappily very little is really known concerning it. This, however, is certain, that echo and reverberation are caused by sound being reflected from flat surfaces, such as the confined spaces. In churches these effects mostly result from bald unbroken wall spaces, bad proportions, piers with flat surface, horizontal ceilings, and square-ended transepts, unless the transepts be of such length that the voice, decaying before reaching the end walls, is not strong enough to be unpleasantly reflected. It has been unjustly said that domes are always bad for sound, and St. Paul's is frequently instanced as an example. I maintain that a dome is not necessarily bad for sound, and many Gothic churches have more reverberation and echo than many Italian churches with cupolas. The acoustic qualities depend upon the arrangement. Domes of no great height, on square piers, or over spaces confined by flat walls and without large voids like a nave or transept, into which sound may escape, are undoubtedly bad as far as echo and reverberation are concerned. This is notably shown in the Pantheon at Rome, the Reading-room at the British Museum, London, the Pictou Reading-room, Liverpool, Napoleon's Tomb at Paris, the Taj Mahal at Agra, and numbers of the Italian and Indian domes. In these the voice cannot escape, and is reflected backwards and forwards from the flat surfaces. That a low dome is worse in its acoustic results than a high one, is proved by the fact that the reverberation in the first gallery of St. Paul's is much greater than on the floor level, while in the Whispering Gallery the echo is extraordinary, as the name denotes. The Pictou Reading-room is also a local example of this. In fact, to avoid reflection (i.e., echo and reverberation), sound must be either lost in a void or absorbed by drapery, or deflected and shattered on the confining surfaces. In the plan submitted, to give practical effect to the principles above stated,

\* The low domical surface of the ceilings of many theatres does well enough because its resonance is great by reflecting sound quickly, while at the same time echo is prevented by the draperies and numerous tiers of boxes and galleries all round, reaching to the ceiling, and the large audiences at different levels. These adjuncts evidently cannot be introduced into churches.

all lengthened plain surfaces of wall have been avoided, the dome is of great height, and the nave and transepts form large voids in which sound can escape. The large piers supporting the dome are circular on plan, by which means the direction of sound would simply be changed without reflection. The alternate sides of the octagon have semicircular recesses behind the arches, broken by galleries, by deeply-recessed windows, and by double tracery. The pendentives are constructed with a great variety of curved surfaces at different angles, and broken by projecting arches and ribs. Above the pendentives two galleries break the height, also a traceries arcade in front of the deeply-splayed windows. The dome itself is of such a height, that any reflection of sound taking place, in spite of the arading to the drum and the projecting galleries, would practically be lost, and could not affect either the preacher or the audience. The transepts are as deep as the site will allow, are octagonal on plan, instead of flat, and have recesses at the angles. The aisles are broken by deep recesses formed by bringing the necessary buttresses inside. The surface of the west wall is broken by projecting columns and a gallery. The roofs too are groined.

In regard to the question of decoration, Mr. Emerson observes that there may be one of two systems adopted: first, the church may be treated as a stone interior, with only some carved enrichments, stone figures and canopy work, and stained glass; or, secondly, it may be decorated with colour and mosaics, to which end, "which is far grander and nobler," the surfaces suitable for decoration, such as the spandrels of arches, the soffits of vaults, the pendentives, the large arches, and the cupols are left plain to receive mosaics; but in that case coloured marbles and alabaster, &c., should be introduced in the lower portion of the interior; and the author points out that any such scheme, if contemplated, should be considered and arranged for from the first. "It was the omission, at the beginning, of the consideration of the character of the decoration to be adopted in St. Paul's that has rendered the decorative treatment as difficult a problem now; and, however this may be treated, it will always cause the lower part of the building to bear a somewhat unsatisfactory relation to the future mosaics of the dome and roof." Mr. Emerson adds that he has thought out the internal architecture in such a way that it might form either a simple monotone church, or be suitable for an elaborate scheme of coloured decoration.

In regard to the cost, Mr. Emerson has commissioned Messrs. Welch & Atkinson, surveyors, to take out the quantities and make an approximate valuation. They find the cubic contents above the nave floor to be 7,394,107 ft. and estimate the cost, including the necessary approaches but exclusive of the residences, at £67,000.

We must not omit to mention an important modification of the site which is proposed by Mr. Emerson. The site on the northern side forms a platform above the steep slope of William Brown-street, the Free Library standing on a similar platform to the north of the said street, which slopes down between the two retaining walls. Mr. Emerson's suggestion is to raise the street to the level of these platforms, making one area of the whole, and carrying down the line of street from this raised area on a gently-sloped bridge to a point in Dale-street, further westward. In conjunction with this alteration, the old buildings of the triangular space facing the west front of the cathedral to be cleared away, and a greater space formed in front of the cathedral, which would be reached by a grand series of steps from the lower level. This would also admit, if desired, of the whole cathedral being moved further west, so as not to be in such close contiguity to St. George's Hall. Something like this idea, we may observe, appears to have been already suggested by a Liverpool architect, Mr. L. F. G. Evans, in a letter to the *Liverpool Advertiser* of November 1, 1884, a copy of which has been sent to us. It would undoubtedly be a very fine improvement to the site, but it would cost a good deal of money, though not more, from an architectural point of view, than it would be worth.

We have omitted from the text of Mr. Emerson's report (from considerations of space) such portions only as seemed rather necessary for fuller explanation to the committee than for enabling our readers to under-



stand and appreciate his views. The full and thoughtful manner in which he has gone into the subject will be quite apparent from a perusal of the foregoing columns. The design as a whole is unquestionably a remarkably bold and original one; it has the merit, so unhappily rare in modern architecture, of being a departure from mere precedent, an effort to think out a design in a form suitable to the special circumstances of the case, and to combine into one whole hints derived from various buildings of various styles. This departure from ecclesiastical precedent has already, we observe, been made the subject of local attacks emanating from the Medieval church party, who apparently think it the greatest merit of a modern cathedral that it should resemble an ancient one. The reasonableness of this view, as we have before suggested, depends on whether the cathedral is to be regarded as built for a church which is to remain established on Medieval lines of thought and sentiment, and ritual, or whether it is to be regarded as the abode of a modified modern worship, suited to the spirit of the present day. Both views are held strongly by many persons on the two sides of the question, and it is not within our scope to express an opinion as to what ought to be, or is likely to be, the course of the English Church in the immediate future. All we wish to point out is that objections to this design for not being on the orthodox Medieval pattern only hold good on the theory that the church is to remain on the orthodox Medieval pattern. In regard to the purely architectural view of the matter, the design appears to us to be a striking, grand, and original one in its main idea and composition. Where we think it partially fails is in a want of homogeneous effect when considered in detail. Externally the whole impression (leaving detail out of consideration) is rather Classic than Gothic. Internally, Gothic feeling is predominant to an extent which the exterior hardly prepares us to expect, except when we confine our attention to special details. The author refers to Peterborough, but he does not realise anything like the massive unity of effect of that unique façade, and the minaret-looking turrets do not combine happily with some other features of the front. The treatment of the buttresses round the dome, on the other hand, is very fine in effect; it is the Gothic buttress and pinnacle cast into a form suited to combine with and support the broad mass of the dome-form. The style of a good deal of the more Gothic detail strikes us as rather heavy. We cannot help feeling that the architect might have done more justice to his very bold conception if he had treated what is in reality a Classic composition with a more Classic form of detail; in fact, that it means to be a Classic design, but somehow or other has worked itself out Gothic.

Referring to one or two special points in Mr. Emerson's report, we fully agree with him that a pyramidal composition is the best for the site. The objections to adopting a fully Classic style we do not think entirely to the point. To say that it is "un-English" might be met by the reply that so is the author's own design, but this objection is only of force in regard to the unsuitability of Classic detail to this climate. It requires modifying for our atmosphere, an experiment which has not been made as often as it might and ought to have been. That Classic is "Pagan," and Gothic "Christian" is an argument that has often been urged, apparently in forgetfulness as to the respective dates of Christianity and Gothic architecture. The earliest Christian Church architecture was Classic, or put together out of Classic materials. If "Christianity" means the Medieval church, the statement is correct, but only on that understanding. Putting aside the question of climate and its effect upon detail, Classic forms of architecture are more in harmony with modern Christianity, and modern English life and sentiment, than Gothic. In all that is said under the head of plan in Mr. Emerson's report we entirely concur, as well as in what follows in regard to "the reasons for the

octagon, and the relation of the dome to the nave," and especially in the opinion that a narrow nave is unsuited to modern services. The reason for the triapsal arrangement of the east end also appear to us to be, architecturally, perfectly sound: the increased dignity of effect from the larger and wider main arches thus obtained round the apse is evident enough in the interior view which we publish to-day. The author gives the same reason for planting out the western towers beyond the line of the aisles which Mr. Brooks gave for his similar treatment; to obtain a spreading west front, and avoid cramping the church up between the towers, as at Cologne—a crucial example, where the west end seems all towers. The proposal for an entirely fireproof roofing over the vault is much to be commended. We ought long before this to have adopted in modern vaulted buildings, with all the new resources of mechanical means and material, something more monumental and homogeneous than placing a wooden bonnet over a vaulted roof to preserve its surface. In regard to the question of acoustics, Mr. Emerson has seized upon the most important point when he observes that echoes are really and most prominently felt from unbroken surfaces which are comparatively near; but it must be observed that distant surfaces, though echoing less strongly, have the compensating disadvantage that they return the sound at a longer interval after its origination, and, therefore, cause more confusion so far as they are heard; nor do we think domes at a considerable height are quite so harmless in this respect as Mr. Emerson maintains. But, as we have said before, cathedrals are not built for acoustics; all we can do is to make them as little objectionable in this respect as possible. It may be laid down as a general truth that architecture in the highest sense and acoustics in the highest sense are things incompatible. One or the other must give way.

We can easily understand that Mr. Emerson's design may be something of a trial to the architecturally as well as to the ecclesiastically orthodox mind. It is not what they expect or are used to. It may be admitted that the design is not so coherent nor so refined in detail as it might be. But it has the great merit of force and originality, for which many defects of detail might be forgiven; and it is very ably planned for the site and for what we take to be the real requirements of a modern cathedral.

## NOTES.

**T**HE Report on the iron trade of 1885, by Messrs. Bolling and Lowe, states that prices and wages are now at the lowest point known for five-and-twenty years. The exports of all kinds of iron and steel, which in 1874 were 2,487,162 tons, rose to 3,496,352 tons in 1884. But only 24 millions sterling were received for the larger quantity, against 31 millions for the smaller, showing a fall in the average price per ton from 14l. 4s. in the former year to 7l. 2s. in the latter, or a diminution of one-half in the return of this great industry. Exports to the United States have slightly increased in quantity during 1885, as compared with 1884, owing to a demand for old materials and for hematite. But this result has been attained at a reduction of 25 per cent. in price. Exports to the Continent of Europe are everywhere barred by hostile tariffs. Coal, the mainspring of mechanical work, has been exported in larger quantities, but, like iron, at lower prices. The figures for the first eleven months of 1885 were 21,994,865 tons exported for 9,843,162l., against 21,685,801 tons for the price of 10,095,808l. in the corresponding portion of 1884. Iron ship plates are now quoted at the unprecedentedly low price of 4l. 10s. per ton. A remarkable feature of the ship-building trade is the increase in the proportion of sailing vessels built, a class of craft which a year or two ago seemed likely to disappear from the seas. The question of the balance between cost of wages and cost of coal, which, rightly regarded, is the determinant of the lowest cost of railway transit, as affected by speed, is thus being reconsidered by ship owners. In favour of the steamer, how-

ever, it must be noted that triple-expansion engines have fulfilled the most sanguine expectations of their working, and have secured an economy of 20 per cent. on the two-cylinder compound engine.

**B**Y the Highgate and Kilburn Open Spaces Bill, which is now before Parliament, it is proposed to give power to the Ecclesiastical Commissioners to convey to the City of London certain lands known as Gravel Pit Woods at Highgate, in the parish of Hornsey, and certain other lands at Kilburn, in the parish of Willesden, by way of gift, for the perpetual use of the public as open spaces. The land at Highgate consists of about 69 acres, and is bounded on the east by Southwood-lane, and on the western side by the Great Northern Railway's Edgware, Highgate, and London line, and the Alexandra Park Branch Railway. The land at Kilburn contains about 30 acres, and forms part of a much larger area belonging to the Commissioners. It is bounded upon the north-west by the Tottenham and Hampstead Junction Railway, on the north-east by Salisbury-road, on the south-east by the London and North-Western Railway, and on the south-west by Chamberlayne Wood-road. Approach roads to these open spaces are proposed to be formed and maintained by the Commissioners until taken over by the Local Authorities, but the Corporation are not to be liable for the cost of paving or lighting these roads. The Corporation are empowered by the Bill to raise a sum not exceeding 15,000l. for the purposes of the Act, and are further to be permitted to dispose of a sum of 20,000l., with accumulations now in their hands as the residuary legatees of the will of the late Mr. William Ward, who left the whole of his real and personal estate (in addition to a legacy of 20,000l.) to the Corporation for the erection or maintenance of some institution or the creation of some fund for the benefit of the poorer classes. The Bill proposes to declare that the maintenance of these lands as open spaces would be such a benefit, but it is open to doubt whether this was within the scope of the testator's intentions.

**T**HOUGH the Home Office inquiry respecting the condition of the dwellings of the working classes in Mile End does not reveal much that was not hitherto known, it is satisfactory to find that attention is being directed to the subject. The hamlet of Mile End, although it undoubtedly contains a large number of insanitary dwellings, is, we fear, not much worse in this respect than some other districts of the metropolis. We say this with regard both to ordinary house or "cottage" property and the so-called "model" dwellings which are reported as "unfit for human habitation." We have on previous occasions called attention to the sanitary dangers inherent to large blocks of tenements in flats unless the buildings be properly planned and constructed, and possessed of adequate means of light and air. These dangers were well pointed out by Mr. P. Gordon Smith, the Architect to the Local Government Board, in a paper read at the Sanitary Congress at Leicester last autumn, of which we gave a report at the time (see *Builder*, Sept. 26, 1885, p. 442). Mr. Gordon Smith's experience, irrespective of his official position, entitles his opinion on such a subject to great weight. The subject was also discussed at a recent meeting of the Association of Public Sanitary Inspectors, and the sanitary evils of badly-planned and constructed dwellings in flats were pointed out with much force by experienced officers. For town dwellings the "flat" system has undoubtedly many advantages, but unless it is to fall into disrepute (for which we should be sorry) in future buildings of the kind sanitary conditions at least equal to those of the best buildings of their class must be strenuously insisted upon by the public authorities, and private or corporate speculators anxious for good dividends must not be allowed to minimise those conditions below certain necessary and practicable standards.



AT the business meeting of the Institute of Architects on Monday, the proposition moved by Mr. Lacy W. Ridge, "that it is undesirable to maintain the disability to take out quantities under which Fellows now labour in consequence of the declaration made by them under By-law XXI," having been duly seconded and a good deal discussed, was negatived by a large majority: a decision in which we entirely concur. The resolution does not properly represent in its wording the real state of the case, as what is objected to is not the taking out of quantities, but the acting as quantity surveyors for other architects, or rather for the contractors employed by them. The position is not in accordance with the professional dignity of Fellows of the Institute, and quantity-taking is no part of architecture, nor is it necessarily even a part of architectural practice, though every architect should understand it. Mr. Phené Spiers's resolutions tending to the equalisation of the Fellows' and Associates' subscriptions were finally left as suggestions merely, and not formally put; and Professor Kerr's motion, of which notice had been given,—"That the Council be requested to call a special general meeting under the By-laws LXXI., LXXII., and LXXIII., to consider the expediency of suspending the By-laws regulating the process for electing the Council so far as to admit of a ballot of the Fellows, and, if possible, of the Associates, being taken by voting-papers without personal attendance, as part of the said process of election on the next occasion," was dropped for want of time. Much talk and little done. The drawings of the Pugin Student, Mr. Bidlake, which were hung in the room, were much and deservedly admired. They consist of sketches from Lincoln and the neighbourhood. The President referred to the death of Mr. Fergusson in a few words which we have given in another column.

THE fourth article in the current number of the *Edinburgh Review* will be found well worth attention in these times of commercial depression. The writer, at the outset, implies that the Joint Stock Companies Acts have, on the whole, been a curse rather than a blessing, and the facts he adduces certainly go very far to support that view. He shows, by extracts from the "Report of the Select Committee on the Companies Acts, 1862 and 1867" (published in 1877), and from other Blue Books and Parliamentary papers, how the provisions of the Acts have been abused by company-promoters. Although the Acts were passed in the belief that joint-stock adventures would prove beneficial to the community, to trade, and to the investment of capital, their abuse has no doubt, as the writer says, ruined large numbers of credulous persons, contributed to the depression of trade, and led to the loss of an enormous amount of capital. With regard to practicable remedies for the abuse of the Acts, the writer says:—

"It would not be very difficult to introduce changes in the existing law which could go far to check the worst of these abuses, without interfering with the legitimate objects of association, which are sometimes highly beneficial. We see no reason why a heavy stamp duty should not be imposed on the articles of association or on registration, without which they should be invalid. This duty might fairly be fixed at 2½ per cent., and it should be assessed on the nominal value of the company. That would amount to 25s. on every 1,000l. of nominal capital,—not an unreasonable charge on a sound undertaking. Such a tax would at once extinguish all those ephemeral schemes professing to start with an enormous capital, of which not one-tenth part has been paid up or has any real existence, and when paid it would afford some guarantee of the solidity of the enterprise.

But the responsibility of directors is the key of the position. Even if the liability of shareholders is limited, we see no reason that the liability of directors should be so. They are the managing partners in the concern. They know its resources and its exigencies. They have the power to incur debts and issue debentures. If directors were personally liable for the transactions they conduct, as trustees for the body of shareholders, who know nothing of the details of management, and if they were compelled on their election to give some sufficient evidence of their own ability to meet the engagements they contract, the whole fabric of 'bogus boards' and men of straw would be swept away."

In conclusion, the writer remarks that the French law on the subject is in some respects superior to our own; and he expresses the hope that the subject may receive early attention at the hands of the new Parliament, "if it is able to accomplish any good work in the shape of practical legislation; for, although such matters are less exciting than political debates and party divisions, they are infinitely more useful and important to the nation."

NOTHING is more indicative of general progress than activity in the building trade, and as such a condition is not usual when rents have a downward tendency, it is evident that the advance in rents which is said to be taking place at Berlin augurs well for the future prospects of building industry in that city. It is possible that those interested in the growth of the German capital may be forming an exaggerated idea of its probable development, but the tendency of opinion in this direction is indicated by an estimate referred to in the *Deutsche Bauzeitung*. According to this calculation, the population of Berlin will probably amount, in 1890, to two millions, and ten years later to double that number. Building has not yet, however, displayed that activity which might have been looked for under these circumstances, but it is expected that an early revival is assured, one indication of a better state of things being a reduction of the number of forced sales of real property, from 783 in 1878 to 140 in 1885. The present advance in rents would seem to be practically a return to those paid before 1878, the official statistics showing, in the years 1878-1880, reduced valuations in 30,333 cases, against increased valuations in 2,750 cases, while in the years 1882-1885 the total of increased valuations was 31,302, against 8,547 in which a reduction was notified. The movement in each case was progressive, the number of increased valuations in 1885 being 14,956 against 8,452 in 1884. The number of unoccupied houses has, meanwhile, diminished by more than a third. It is instructive to compare the number of houses erected in 1875-1878 (2,255) and in 1879-1882 (948) with the movement of rents, as described above, and when the facts are taken into account that the annual increase of population has augmented from 31,480 in 1875 to 42,000 in 1885, it will be seen that the new buildings for 1883-1885 (842) are in number sufficiently below the average of the eleven years under review to account for the increase of rents to which reference has been made.

WITH reference to the proposed application of compressed air, to be supplied from a central station as a motive power, now contemplated, it will be useful to bear in mind the real cause of the failure of the atmospheric system of railway propulsion, which was taken in hand by Mr. Brunel in this country, and by M. Eugene Flachat in France. There were, no doubt, mechanical difficulties with the longitudinal valve; but there is good reason to think that they would ultimately have been overcome. The true, and insuperable difficulty was not mechanical, but physical. As the air in the main was rarified by the action of the air-pumps, the heat of the earth rushed in, and raised the temperature of the rarified air, raising its tension at the same time. Thus the air-pumps were actually engaged in pumping out the endless supply of terrestrial heat; and, indeed, at some of the stations on the South Devon line, the cylinders became nearly red hot. There was no dealing with this state of things. In the case of compressed air the reverse action must, to a considerable amount, take place, and the first question as to the economy of this very elegant mode of communicating power will have to be settled after thermometric experience has been obtained. It will be well to give timely attention to a feature in the case as to which Nature will not fail to assert her laws.

THE revenue of the London, Brighton, and South Coast Railway for 1885, instead of showing the normal increase of about 70,000l. over the previous year, shows a falling off of

56,000l. For the half-year the decrease of revenue has been 34,000l., to which has to be added an increase of 14,000l. in charges on capital. On the other hand, there has been an economy of nearly 22,000l. in working expenses, including the reduction of Government duty, showing a net difference of 28,000l. to the bad, which falls on the ordinary and deferred stock. The dividends proposed are at the rate of 3l. 2s. 6d. per cent. for the half-year on the undivided ordinary stock; 3l. 10s. on the preferred ordinary stock; and 2l. 15s. for the whole year on the deferred ordinary stock; carrying forward a balance of 5,900l. At the corresponding period of last half-year the dividends were respectively 5l. 10s. and 3l. for the half-year, and 3l. per cent. for the whole year. The dividend on ordinary stock, of which 1l. 5s. per cent. was paid in July, thus averages 4l. 7s. 6d. per cent. for 1885, against 4l. 10s. for 1884, and on the deferred ordinary stock the decline is from 3l. per cent. to 2l. 15s. per cent. for the year.

THE results of burning naphtha for the locomotives on the Trans-Caspian Railway, as compared with the only other fuel there available,—wood—have lately been published. They are to the effect that the work done costs only one-fourth as much by the use of the former as compared with the latter fuel. The amount is given in the Russian dimensions of sajenas, poods, versts, and kopeks, which are unfamiliar to the English reader. The difficulty of rendering them in English equivalents is increased by the arbitrary and shifting value of the rouble, as it is not stated whether silver or paper roubles are used. If we assume the latter to be intended, and if we value it at 2s. (a halfpenny more than the last quotation we have seen), the price given as 7 kopeks per pood is equal to 0.0466 per pound for the naphtha. The consumption, 64 poods per verst, is equal to 3,480 lb. avoirdupois per mile. The price per mile, cited as 4.57 roubles per verst, comes thus to about 15d.; while for wood, with a consumption of 442 cubic feet, the cost amounts to 9s. per train mile. These figures, if they do not bear out the statements of the extraordinary results to be obtained from the use of petroleum refuse, at all events show what gigantic efforts Russia has been making for the establishment of the Trans-Caspian lines of railway.

ON Saturday, the 16th, there was opened at the École de Beaux Arts in Paris an exhibition of the designs of the late Auguste Joseph Magne, architect, and honorary Inspector-General of Public Works, who died in July, 1885. The drawings exhibited include the design for a cathedral, which gained him the second "Grand Prix" in 1838; the drawings for the Église St. Bernard, the Théâtre de Vaudeville, and of various public markets which he constructed in Paris, and those of the Théâtre d'Angers. There are also designs for sepulchral monuments, and some water-colours of great interest. A biographical notice by M. Lucien Magne accompanies the catalogue.

AT the last celebration of the "Winckelmannsfest" in Berlin, Dr. Robert laid before the Archaeological Society the full programme of the great work on Greek and Roman sarcophagus reliefs which is to be published by the Institute. He also showed a few specimens of the plates of the first volume, which, it is hoped, will appear in the course of the present year. The work, it will be remembered, was projected long ago by Dr. Jahns, and begun by Friedrich Matz; retarded for a while by his early death, it is now carried on under the excellent editorship of Dr. Conze and Dr. Robert. According to Dr. Robert's account it has been found possible to draw a clear line of demarcation in that usually debatable borderland of Græco-Roman and Roman work. In the Greek work each sarcophagus is conceived as an architectural whole, and the design of the relief is superadded, a decorative ornament. In the Roman work, influenced as it was by Etruscan style, the sense of architectural condition is wholly lost, and



hence the design of the relief is no longer decoratively treated. All the sarcophagi are classified under four heads. The first and most numerous class are decorated with scenes from daily life (the *vita communis* section, as Dr. Robert calls it), scenes of marriage, hunting, palestra, death and burial, and the like. Secondly and thirdly come mythological scenes, i.e., secondly, mythology proper, scenes from popular cycles, such as the Trojan war, myth of the Argonauts, labours of Herakles, also symbolic myths, Meleager, Adonis, Alcestis; and thirdly, mythologico-decorative scenes, where the meaning is more or less subordinate to decorative intent. Fourthly come designs purely decorative.

AT Naukratis the Egyptian explorers have been rewarded by finding a colossal statue bearing the name "Aam," which, as the name is geographical as well as personal, would seem to denote that the place was a Libyan name of importance. The explorers of the Greek necropolis have, for the most part, lighted only so far on a number of objects in terracotta, which have served to decorate coffins; the coffins themselves, being of wood, have perished. It is noticeable that part of the necropolis seems to have served as a burying-place for dead animals, whose bones, found in great quantities, are much corroded by the damp earth. The boundary-walls of the temples of the Dioscuri and that of Aphrodite, have not yet been completely laid bare but four pillars belonging to the Dioscuri temple have been discovered, which are interesting, from the fact that they are made of unburned clay, and decorated with painted figures of oxen. Some painted terra-cottas have also been found, which seem to have served as a lining to the walls. In the Aphrodite temple a number of votive vessels have been discovered, of the local fabric. A short account appears in the *Philologische Wochenschrift* of January 16.

IN Dr. Loewy's "Altes Stadtrecht von Gortyn und Kreta," the public have before them for the first time a full and circumstantial account, with an intelligible rendering and commentary on the famous Gortyna inscription. The discovery is of exceptional interest to the general public, as well as to the specialist, as the inscription is so long and so excellently preserved that it presents us with a large portion of the legal code of Crete. Minos, the mythical conqueror of Crete, ruled so well in the upper world that, after death, he was promoted to be judge over "the strengthless heads of the dead" in the shades below, and the legends of his government, we are sure, contain some kernel of historical fact in the economy of the early island politics. The inscription is full of curious and detailed information about the relations of buyer and seller, slave and master, and contains minute enactments as to divorce, and thus incidentally gives a lively picture of ancient life and manners, and in many points forms a commentary on the legal speeches of Athenian orators.

A STUDIO which has just been established in High-street, Notting Hill, is likely to be of some service to those who for any purpose require original designs in the Arabian or Persian styles or in that mingling of them called "Turkish," and who, while wishing for the real thing, do not want the trouble of sending abroad for it. The manager employs a staff of Armenian artists, the chief of whom claims to have been the principal designer of decoration for the Palace of the Sultan Abdul Aziz, at Constantinople. Some of the designs already produced are of considerable merit, and a collection of the best, which is to be issued, will certainly be interesting. We must not omit to add that the execution of the designs is also undertaken, and that many are applicable to metal-work and embroidery.

ARCHITECTS who have competed for the Fulham Vestry-hall, the designs for which we noticed some time ago, are beginning to

ask when they are to hear the result. The inquiry is the more pertinent, as we understand that Mr. Currey's award has been made. If so, why are not the results published? Is this to be a new tale of jobbery?

#### THE LAST OF TAVISTOCK ROW; OR, NEW FLOWERS IN AN OLD GARDEN.

"I've had to-day a Dozen Billets-doux  
From Pops, and Wits, and Cits, and Bow-street Beaux;  
Some from Whitehall, but from the Temple more;  
A Covent-garden porter brought me four."  
DARBY (Epilogue to "King Arthur";  
spoken by Mrs. Bracegirdle).

FOR a longer period probably than any similar open space in London, Covent Garden has been used for purposes, but little different in kind from those it originally served. Fruit and flower dealers and their porters traffic in what they term "the garden,"—its site identical with that of a pleasure and herbarium enjoyed by the monks of Westminster. Situated by the ancient prebendal manor of Rugmere, it lay between Queen Matilda's hospital for lepers,—endowed with a sub-manor of St. Giles, which was separated out of Rugmere,—and the little village church dedicated to St. Martin. In 1222 was enacted the Primate's decree for readjusting the boundaries of St. Margaret's parish. As early as that date we have mention of the area by name of Frère Pye Garden. Yet so retired and remote was this spot that it scarcely comes again within the range of topographical inquiry until the sixteenth century. Henceforward we may clearly see to how significant an extent the local names of this quarter are eloquent of subsequent changes. Eastwards of the Convent Garden\* we find a Via de Oldwych or Aldwych, running to Aldwych Cross in the now Broad-street, St. Giles's; and without its western wall a thoroughfare which, for long after the establishment of St. Martin's-in-the-Fields as a distinct parish (1535), was called West Church (now St. Martin's) lane. A by-way, mentioned in 1612, through the Elms Close or Seven Acres to the north, marked the course of the modern Long Acre.† But the Abbot of St. Peter's,—whom, by the way, W. S. Landor, in his "Imaginary Conversations," strangely confuses with a lady abbess and her cut salad,—had perforce to surrender his garden, together with other possessions; and at the Dissolution this ground passed into Henry VIII's hands. His son granted it to the Protector Somerset.

Reverting to the Crown at that duke's attainder, it was regranted, in conjunction with the neighbouring seven acres, to John (Russell) first Earl of Bedford of that house, in May, 1552, who converted most of the land into pasture-ground. It was either that nobleman or his son, Francis, who built in the Strand, and opposite to their former home, the Bishop of Carlisle's "inn," what Strype describes as "a large but old-built house, having a great yard before it for the reception of coaches, with a spacious garden, having a terrace-walk adjoining to the brick wall next the garden." The front yard was entered from the Strand. The "brick wall next the garden" is the southern wall of Covent Garden. Two plans are before us,—the one of circa 1680, the other of 1690. Bedford House (it was constructed mainly of wood) extends from the Strand to the southern side of Maiden-lane, covering the present Southampton-street.‡ Northwards lies the House garden, having an additional plot or smaller garden to the east. This entire garden blocks the eastern end of Maiden-lane; towards the east it is separated from the stables by a passage, which corresponds with the later Tavistock-court. The stables are entered in the south-western corner by a way, leading from the courtyard, which has since been supplanted by Tavistock-street; they have also a gate at what was then the elbow of York and Charles streets. This latter street has since been prolonged southwards (as Wellington-street), over the site of the gateway, which faced northwards, and the adjacent part of the

\* The corruption "Covent Garden" is employed in two inquiries, quoted by Peter Cunningham, of respectively 9 and 28 Elizabeth; and in a lease from Francis Earl of Bedford to Sir Wm. Cecil (Lord Burleigh), of 7 Sept., 1570. Yet in Chamberlayne's "Notitia," 1726, we read Convent Garden.

† Hart-street, Covent-garden, was formerly styled Elm-street.

‡ In a plan, Strype's Stow, 1720, this is named Bedford-street; and the lower portion of Bedford-street, as now, is named Half Moon-street.

stable-yard. The court-yard has another approach, from the end of Exeter-street, since Denmark-court. In the plan of 1690, the gardens have three rounded projections, of which two turn out of the northern wall, the other to the west behind Maiden-lane. It is plain, then, that the Russells' garden did not reach westwards to beyond Southampton-street. About 1630, Francis, fourth earl, laid out the market square,—three acres,—with its Piazzas, from Inigo Jones's designs. The northern and eastern blocks were of red brick, with pilasters, and with dormers in the fourth story; the arcade of stone. From a comparison we have made of several views, it would seem that the dormers were removed for an attic floor about 1825; the premises between James-street and the New Club (antiquis "Evans's"), that are being prepared for the Bedford Hotel, give a fair presentment of the original elevation, as shown in Sutton Nicholls's and J. Maurer's views of 1720 and 1753 respectively.

To Francis's eldest son William, advanced Duke of Bedford May 11th, 1694, King Charles II. granted a charter of right, in freehold, to hold a market here for fruit and vegetables; the charter being subsequently confirmed by two regulating Acts, 53 Geo. III., c. 78, and 9 Geo. IV., c. 113. Strype mentions the appearance, within four years later, of the grove or small grove of trees, most pleasant in the summer season, beneath which they used to hold market. This avenue lay just along the northern garden-wall of Bedford or Russell House. But on the demolition of the house in 1704 both wall and avenue disappeared too, and the erection of Tavistock-row on their site forced the dealers further into the square. Soon afterwards the stalls gave way to the booths and even two-storied dwelling-houses, but only along by Tavistock-row, which we see in the old prints; and it is not before 1754 that we find the square generally covered by the market. The central Corinthian column with dial and sphere at top is stated to have been set up in 1668, according to the churchwardens of St. Paul's accounts, as quoted by Peter Cunningham. It certainly figures in a little print: John Seller, *excudit*, in the Grace Collection, to which a date (1640) is assigned, and which has all the air, including the costume and certain local details, of that date; though it may have been introduced into a later state of the plate. It does not appear in Hollar's view of 1640. The column was taken down in 1790, and its golden ball was subsequently placed in the garden of John Kemble's house, No. 89, Great Russell-street, Bloomsbury.

In Covent Garden-square Hogarth lays the scene of his "Morning" (1735), the picture that was exhibited a few months ago at Burlington House, and his "Rich's Glory." The latter view is taken from opposite to Tom's Coffee-house in Russell (then Great Russell) street. The print, sold for 6d., was speedily suppressed, probably owing to its figure of Pope, who is testifying in a most unmistakable manner to his contempt for the "Beggars' Opera" and Rich's triumph. The former shows the portico of St. Paul's, and the Dutch elevation (since altered) of Lord Archer's house,\*—the Paddy Green's of a few years ago. But here Hogarth fails of his customary accuracy. He puts Tom King's Coffee-house before the church portico, where the Westminster hustings used to be set up. But King's real station was in the south-east of the square, opposite to Tavistock-row, and close to that of its equally notorious compeer, Mrs. Butler's "Finish." Hard by, too, in this corner was established Powell's Punchinello, of whose counter-attractiveness the under-sexton of St. Paul's makes plain in Steele's No. 14 of the *Spectator*, the 16th of March, 1711,—"I have placed my son at the Piazzas to acquaint the ladies that the bell rings for church, and that it stands on the other side of the garden; but they only laugh at the child." These ladies, by the way, would pay 2s. 6d. and 1s. 6d. for admission, and were enjoined not to wear masks or riding-hoods. So much of the eastern or Little Piazza as stood between Russell-street and Tavistock-row was destroyed by fire on March 20th, 1769. At its angle with Russell-street (southern side) had stood the celebrated Mrs. Dubois' (afterwards the Three Chairs) tavern. This was next occupied by Small's and subsequently Rigg's Bagnio, the cupping-house known as Hummums. In

\* Built for Edward (Russell) Lord Orford, victor at La Hogue. The view is reversed in the prints.



Little Piazza lived Thomas Southerne, author of *Oroonoko* and the *Fatal Marriage*, and friend of Dryden, Pope, and Gray; and, next door to the King's Arms tavern, Dr. Berkeley, bishop of Cloyne, to whom Swift's "Vanessa" bequeathed 8,000*l*. It was to the old Hummums that Dr. Johnson's wife went to learn what she might about the apparition of Cornelius ("Parson") Ford, nephew to Dr. Johnson's mother, who, as Johnson says, died there 1731. The days of the new Hummums likewise are numbered. It is at this date being demolished for completion of the Flower Market-house, which was recently erected over the old site of Bedford House stables. Moreover, it is in contemplation to supply additional market buildings for the sale of flowers and herbs, where the garden of Bedford House formerly stood. So Tavistock-row also, its front much modernised of late, has at length gone, the last house to fall being one that remained until three or four weeks ago. This was the dismantled house; Maurice, the book-dealer's, being No. 13, wherein have lived Zincke, the famous enameller and miniature painter, and Nathaniel Dance. In that house, too, Dr. Wolcott began, under the *nom de plume* of Peter Pindar, his literary career with his once popular "Lyric Odes to the Royal Academicians" (1782-6), and wrote *inter alia* "The Pilgrims and the Peas," "Bozzi and Piozzi," and his satirical attacks upon the Royal family. At No. 4 in the Row, north-west corner of Tavistock-row, Lord Sandwich, when purchasing some neckcloths,\* first saw Miss Reay, who met with her tragical fate at Hackman's hands as, with two friends, she was awaiting her coach in the Piazza after a performance of "Love in a Village" at Covent Garden Theatre. In that same house Charles Macklin, whom Murphy happily named the black-letter copy of Macbeth, passed the close of his lengthened life, having been a constant visitor for more than thirty years at the Antelope in White Hart-yard close by; and in the adjoining house (No. 5) lived and died William Vandervelde the younger; and Thomas Major, engraver to the Court and the Stamp Office, who in 1784 furnished in twenty hours a perfect substitute in brass of the Great Seal that had been stolen from Lord Chancellor Thurlow's in Great Ormond-street. For our readers' convenience we have used above the four cardinal points of the compass, but, in point of fact, Tavistock-row faced to north-west-by-north.

#### SOME LESSONS FROM OLD GLASS.†

This difference between stained and painted glass is one mainly of terms; for painted glass is almost invariably stained also, and stained glass painted. Indeed, in the case of absolutely unpainted work the term technically used is *leaded glass*,—which again is not so absolutely discriminative as it would be if painted glass, too, were not (as I have said), for the most part, more or less leaded. It is, in fact, the more or less of paint which makes the term "painted" applicable to coloured windows generally; although, correctly speaking, it may be said best to describe the windows of the worst period.

The Early Gothic windows are clearly only a carrying further of the idea of *mosaic*. They are merely mosaics of translucent glass supplemented with paint. This supplement of painted detail was added probably from the very first, the strict mosaic of differently tinted bits of glass having been most likely even then used mainly (as it is now) for the sake of economy.

Yet there was something to be done in purely mosaic glass, or glass mosaic,—much more than was ever attempted. The pity is that economic considerations, rather than artistic, have regulated its development, or, more properly speaking, ruled its degradation.

It may be taken for granted, notwithstanding the abstract character of savage ornament, that mankind naturally prefers pictures to anything in the nature of ornamental design. And no one would think of denying that this bias has led to a higher form of art than any mere pattern-work. But it is nevertheless to be regretted that the branch of art called "fine" has been cultivated practically to the exclusion of art ornamental, which has been so generally adopted for the strict purpose of saving only

that that has come to be thought almost its *raison d'être*. To apply this to the subject in hand, the aspiration towards figure-design leads immediately to the use of paint on glass, and so to a neglect of the capabilities of another sort that lie in mere glazing. They have never been tested. I maintain that even in figure-work, if only on a very large scale, and at a sufficient distance from the eye (as, for example, in the clearstory of lofty cathedrals), splendid results might be obtained without any use of paint whatever. None but those who design for glass can realise how little the coarse lead-lines, cunningly disposed, interfere with the actual forms of the design in glass. The amateur does not suspect the amount of leading in the windows he admires, and would scarcely believe, if he saw the cartoon first, that the leads would be so little noticeable.

The difficulty in designing for a building of great size is to be bold enough (witness the recent experiments at St. Paul's), and the leading necessary in absolutely mosaic figures would compel the artist to be bold,—bolder, perhaps, than he would otherwise dare be. The windows immediately under the dome of St. Paul's suggest a position where leaded figure-work would be all that one could wish. At that distance from the eye, on the scale necessary at such a height, the folds of drapery might obviously be leaded up in any variety of shade that was desired, and even the flesh tints might equally be glazed up. Imagine the cartoon of a head "blocked in" after the broad effective French manner made familiar to us by M. Legros,—the shadows, that is to say, laid in as masses of broad flat tint: it would be a very simple thing to glaze up these masses in the right shades of glass, and the lead lines bounding them would, at that distance, be inappreciable, if, indeed, they were to be detected. I remember that in the windows at King's College Chapel at Cambridge, which are comparatively near the eye, the heavy saddle-bars in the upper lights have about the value of an ordinary lead-line, whilst the lead-lines themselves go practically for nothing. You will, perhaps, be the reader to believe in the possibility of what I suggest if you think of the way in which the tesserae of ordinary mosaic are lost in the general effect of colour. It seems almost impossible, when one sees it near the eye, to persuade oneself that such brutality of line as the mosaicist uses can be made to produce so delicate an effect.

However, it is not very often that there is an opportunity for figure-work on the scale necessary to its satisfactory execution in pure glazing, and, where there is, no committee (every big thing now is controlled by a committee, more or less incompetent by its very constitution) would be likely to venture on the experiment. What there is ample opportunity for is mosaic ornament, which is so much more amenable than figure design, and by means of which the richest possible effects of colour might be produced at a cost comparing with the common painted work, which has a way of always advertising its own cheapness,—only it would take more brains to do it. I do not mean to say that those who resort always to paint have no brains; but they economise them, as they do when they give in their adherence to traditional and worn-out types of glass design. They are, indeed, far too clever to admit,—what they must as artists own to themselves,—that their orthodoxy is the doxy of the tradesman sustained by a very present fear of profits falling off.

The more I see of old glass,—and I have studied it at home and abroad for the last twenty years,—the more I see how much there is in it to admire and wonder at, and the more I realise how ill-advised we are in copying it. We can gather from it, first and last, nearly all that is needful to know about the treatment of glass,—but the one thing for which it affords neither pretext nor precedent is the mock antique.

The art of glass-painting followed the course of contemporary art, up to its culmination and down again to its decline, from good to better, and from bad to worse; and from almost every phase through which it passed there is a lesson to be learned, but to adopt any one phase, even though it were the best, as our model, and to limit ourselves to the imitation, affectation, or reproduction of that period, seems to me out of the question.

The contemplation of old work inspires me at least with a desire to do something too, but something different. The thought of how

beautiful it is, is followed immediately by the reflection how impossible it is for us to repeat it without inaneity; and the regret that we cannot go and do that any more is tempered by the consolatory conviction that, thanks in no small degree to it, we can do something that is also worth doing, and which they did not do.

Apart from any personal objection to imitation (and I admit that mine is very strong), it seems to me that neither the earlier mosaic nor the later pictorial glass can be taken by us as an adequate "authority," and this not only because we live in our own century, and must march in step with it, but because neither is enough. The early work does not go far enough in the direction of technique, whether in respect to composition, drawing, or painting; and the later windows go too far in the way of ignoring the better principles of glass-painting, taught us by the earlier craftsmen. To put it in other words, the thirteenth-century glass is too crude in its conception, too rude in execution, too entirely out of touch with the modern notion of art; the later work, with all its technical perfection, falls far below the ideal of a workmanlike use of the capabilities of glass.

We cannot conceivably limit ourselves to glass such as now forms the glory of many a Gothic cathedral, nor can we entirely dismiss all that from our minds and be content with Cinquecento picture windows. To fuse the two styles into one is, very likely, impossible; but it is possible, it seems to me, to deduce from both principles which shall guide us in producing something as good as can be done, without overmuch perplexing our minds as to the style by name of which it shall be labelled. If it is really after the manner of glass it will not be found wanting in style.

Very hard things have been said, and I am one of those who have said hard things, of Renaissance glass; but that was in the days when I was bitten with the belief that every good thing was included in the styles called Gothic. I am less rabid now that I am older and have seen more and thought more, and I want to persuade you too that there are qualities in later styles which are worth our admiration and respect, and that we shall not reach the highest level in our art,—architecture, glass-painting, or whatever it may be,—without having learned something from all of them. There are few that can teach us only what to avoid. The tide of popular enthusiasm has turned now away from Gothic; but under no circumstances can the glass-painter ignore it, for the later styles will not teach him all his trade.

It will always depend very greatly upon our immediate purpose whether there is more to be learned from one style or another. The earliest glass will be useful to us, mainly as a guide in church work, and that especially on a fairly large scale; in a building, that is to say, in which the object is to shut out or greatly to subdue the light, and where the dimensions of the building and the scale of its detail are such that the simple forms of the glass do not appear proportionately coarse. Some of you will remember an earnest attempt that was made, not so many years ago, to introduce into the homes of the nineteenth century a rude and rigid form of Gothic furniture, with the result that it looked like Hodge in the drawing-room,—loutish, clumsy, out of place. The would-be reformation was not nearly thorough enough.

A similar incongruity occurs wherever the unadorned forms of Early Gothic glass are inserted into windows of buildings other than reproductions of thirteenth-century churches. Thank Heaven, we have not yet suffered from domestic dwellings after the Early Gothic manner, rush floors and all. What, I wonder, would Baron Huddleston say to a really Medieval court of law?

In churches, halls, and other large public buildings, we might, as I have said, not only model our practice upon that of the first glass-painters, but we might even out-Goth the Goths, and make mosaic glass that was more purely mosaic than anything they have left us.

So far as big, bold, simple work is concerned, so good; but there ends the adequacy of the primitive models. In the windows of the smaller chapels of a cathedral, or in the windows of an ordinary parish church, and most especially in domestic windows, which are now assuming some importance in the glass-painter's calculations, mosaic will not of itself suffice.

\* J. Cradock's "Memoirs," vol. i, p. 117; he, though, places the story in Tavistock-row.  
† A paper, by Mr. Lewis F. Day, read before the members of the Architectural Association on the 16th inst.



We must go for inspiration to Renaissance glass or Transition work, or, at any rate, to the very latest phase of Gothic, to work, that is to say, not much earlier than about the year 1500.

The very perfection of glass-painting, as such, is attained in cinque-cento windows, such as those at St. Gudule at Brussels. The breadth, the dignity, the monumental character of their design, is unsurpassed, the drawing is the very best that Flanders at that time afforded, and the painting is something in the nature of a *tour de force*. (Therein, in fact, is its weakness). To have seen such work, and to have appreciated it, is to be incapable ever afterwards of going back to the ideal of thirteenth-century art. It is not as if our whole choice lay between the two. If I believed that, I, for my part, must be disposed to toss up the whole thing in despair.

It is not only in the matter of painting that this glass, and much other of the period, stands superior, but, as I have said, in drawing, and often in design. There is nothing in early work to compare with the large spirit in which it is conceived. There is often a simplicity and straightforwardness about the composition that is not to be excelled. In fact, the composition of some of the windows in the Chapel of the Holy Sacrament is of a naivety that one would be disposed to attribute rather to a designer of the thirteenth century than to Michael Coxie or his master, Bernard Van Orley, who had studied in Italy to such purpose that his paintings have been passed off as the works of Raffaele.

These are, of course, superlative examples. The later glass-designers had not all that admirable self-restraint, that sense of fitness, that supreme quality of style, in short,—far from it. But, for all that, there are generally to be found in windows of the early sixteenth-century qualities, more or less pictorial, which we cannot at this period of the world's wagging do without. That men who lived before us knew not of them and were content, will not help us.

Why, then, can we not follow these later lights? Are we so much greater than they? No, but we have seen what their neglect of the qualities most characteristic of glass led to; we come after the event, and it is easy to be wise.

The error of their ways lay, in a word, in too exclusive a reliance upon painting. How far they were ignorant of the nature of glass, and how far only impatient of the restraint it would have imposed upon them, may be open to dispute. It is certain, however, that the painters of this period (who, by the way, were painters, and not glass-painters by craft) sought to do in glass just what they would have done on canvas; and, if the truth must be told, some of them very nearly did it, but never quite. The result is in no case all that it might have been on canvas; and I contend that it might easily have been finer had they relied more upon glass and what could be done in it. The wonderful degree of success reached by force of art, in spite of the material used, makes us wonder what such men might have done had they known, had they cared, more about glass.

The unfortunate effect of depending upon the use of paint in glass is most conspicuous in the windows of later date, when the decadence was already far advanced. You see it, on a vast and gradually declining scale, at Gouda; and you see it very manifestly in the windows ascribed to the pupils of Rubens in the south chapel at St. Gudule itself, where during great part of the day colour is eclipsed. But the evil exists, not altogether latent, in the splendid windows in praise of which I have said so much. Take, for example, the deeply-shaded soffits of the canopy arches, against which the golden swags tell so splendidly: it cannot be doubted that if that coffering had been leaded up in browns and "pot-metal" yellows, instead of being so heavily loaded with paint, a richer quality of colour might have been obtained. So also with the canopy work altogether, if the shaded portions of the masonry had been glazed in shades of deeper-tinted glass (as was actually done, here and there, in work of about the same period, by men more thoroughly imbued with the traditions of Mediæval glass-painting), the gain in translucency and brilliancy would have been very considerable; and surely it is translucency, brilliancy, and richness of colour that one can least afford to sacrifice on glass.

A glass-designer has, so to speak, to think

in glass; and the men of the Renaissance, being more painters than anything else, did not sufficiently think out their thought in the language in which it was ultimately to be expressed.

The vice of over-painting was inherent from the very first in the art of glass-painting, growing with its growth, already by the time of its culmination deeply rooted, so that we can point to no one period as being absolutely the best in the history of glass-painting. With the most perfect technique we have the fault of obscurity already strongly marked. If we go back to the period previous to the development of the evil, we find that we have gone back too far for perfectly-developed technique.

But if we can define no period, we can point sometimes to specimens in which the happy medium seems to have been as nearly as possible found,—where the painting has been carried to the highest point without undue sacrifice of the translucency which is so indispensable in what is, after all, only translucent mosaic painting.

Delight in shadow seems to be partly a national characteristic. Certainly it was developed in the Netherlands at a period when elsewhere there was a much stronger feeling for colour, and it was there, of course, that the school of *chiaroscuro*ists *par excellence* arose. Glass-painting of the sixteenth century is inevitably pictorial; but there are pictures and pictures, glories of colour, and marvels of light and shade. It is only in proportion as the painters' ideal is one of colour that it is capable of realisation in glass,—and by colour is meant not colour in the subtle sense of, for example, a Reynolds (who failed very conspicuously at New College), but in the sense of the early Florentine and Venetian painters; of the men so much in love with colour that they hesitate to sacrifice anything of its beauty for the sake of qualities, equally beautiful may be, but less dear to them. We find, accordingly, in France a quantity of early sixteenth-century glass, quite pictorial in its aim and yet not going far beyond what may be done, and well done, in the material. It is inferior to such works as that at Brussels only in largeness of design and strength of execution; in colour, which is of most account, it is sometimes superior. Indeed, it affords, on the whole, a type of old work most fit for our guidance in pictorial glass of modest aim and moderate dimensions. Its pictures are always decorative in design and glowing with jewel-like brilliancy of colour, not obscured by heavy painting, but modelled often with a delicacy reminding one rather of sculpture in very low relief than of the pronounced light and shade of pictures, which pretend to be "real" in proportion as they are lacking in the qualities most beautiful in art.

It is by no means only in coloured pictures that this quality of delicate, and as I think adequate, modelling is observed. One meets with windows in grisaille (there are some beautiful specimens at Châlons-sur-Marne) which fulfil in transparency exactly the part of sculptured bas-reliefs on a wall. I have a vivid recollection also of some medallion heads, in one of the châteaux on the Loire, painted very thinly on ordinary sheet glass, which reminded me more of some of Holbein's tinted drawings than of anything that I know of in glass. Here, if you like, is something on which we might found a treatment of domestic window panes.

The later Swiss glass, heraldic or what not, is, in like manner, most suggestive, although it is usually on too finikin a scale, even for the purposes to which it is applied. But nowhere can we learn better what can be done in the way of delicate manipulation and finish in glass-painting, than from those same medallions and heraldic panels, to be found in nearly every Continental museum of any importance. There are some superb specimens in the museum at Lucerne. The Swiss colour, however, is inclined to be crude, even where enamel has not been resorted to in order to evade the necessity of leading,—an evasion, by the way, which may be said to lie at the root of all evil in glass.

A beautiful feature in the best French glass, as seen, for instance, at Rouen, is in the grey-blue sky tint, on which is painted, with some minuteness and much delicacy, the background of the subject, architecture, landscape, or, it may be, the sea. This is going beyond what is necessary in glass, or, perhaps, desirable; but there is not much fear of its revival to any

great extent. To be tolerable it must be done as it was done; that is to say, so well that only the designer himself could be the painter of the glass,—a practice much to be desired, but scarcely to be hoped for in these days; when the applied arts have practically no existence apart from commerce, and penny-wisdom rules that the artist's design shall be executed by a cheaper, and presumably, therefore, inferior, artist. One thing we might learn from the old glass-painters is,—to treat our art as an art, and not as so much manufacture.

The Renaissance glass in Italy is much of it, of course, earlier in date than that of other countries, which goes far to account for its individual character. The art was never very largely cultivated there, for obvious reasons; and what there is said to have been executed to a great extent in France and Germany; but the design is Italian, markedly so, reminding one far more of contemporary Italian paintings than of old glass elsewhere.

It must be obvious to any one, on the slightest reflection, how well fitted are the paintings of the Italian masters of the fifteenth century for reproduction in glass. The love of simple forms and pure, bright, beautiful colour evinced in them, can find more adequate expression than ever in the medium of glass,—so much so that one is almost tempted to marvel (until one calls to mind to what extent Italian churches were at the same time picture-galleries) that they did not more commonly adopt it.

The pictorial quality of Italian glass was more decorative than that of the French glass spoken of, partly no doubt because it was earlier,—and probably the happiest mean of all is found in it between the glass-like and the pictorial. This is a mental note that others have made before me. The first of modern glass-painters has drawn something of his inspiration at that source. Mr. Burne Jones, whose treatment of glass is as workmanlike as it is original, would doubtless confess some indebtedness to the teaching of certain old windows at Florence and elsewhere in Tuscany. There are hints, both as to treatment, colour, and design there which no other glass affords.

I said both as to treatment, colour, and design, and I may add that what was said of the inadequacy of any one historic type as our model in the treatment of glass holds good, and that even more emphatically, with regard to colour and design.

Because the early figure glass was mostly deep in colour, are we to have no figures in grisaille? Because the later glass was best when it was delicate and silvery in tone, are we to have no rich windows any more? Because the medallion subjects of the thirteenth century were diminutive in scale are we to have no larger pictures ever? Because the Cinquecento pictures were spread over the entire window, are we to give up all ideas of framing smaller subjects in ornament? And as to that ornament, are we to choose, once and for all, between the forms of this or that period, between the formulas of design adopted in one or other of them?

It is very true that in times past the artist worked pretty much on clearly-defined lines, which can be traced very distinctly in his work, and mark the period of its execution. But there was a good deal in that that was mere fashion, only more respectable than the fashions of our own day because it was less ephemeral. Strip off all that unmeaning and unnecessary surplusage, and you will find that the naked principles underlying the work of the various periods are not nearly so dissimilar as they at first appeared. Once unveiled, they are, indeed, seen to be not only of one kind, but of one family, the later only a development, for better or for worse, of the earlier,—in certain directions, and up to a certain point, decidedly for the better, and from a certain point very much for the worse.

To follow the development of glass design would be to follow once again (and once too often) the well-worn course of the styles, which succeeded one another in glass much as they did in sculpture and the rest of the allied art which go to make up architecture,—only always a little in the rear of architecture. The essential thing is to note how the succeeding fashions of design fitted in with the conditions of glass-painting, what the art gained from them, and wherein they were misapplied,—in fact, their influence, good and bad, upon glass-painting.

The design of the glass has always depended more or less upon the shape of the window



opening. The proportions of the Norman round-arched windows, or of the Early Pointed lights, almost of itself suggested a good broad border to the glass. And it happens that in the Renaissance, again, when windows of somewhat similar shape occurred, a somewhat similar use of the broad border recurs also.

The Early notion of breaking the space within the border into medallion pictures, with intermediate mosaic of geometric or foliated ornament, is in direct pursuance of early Christian tradition. There is a painted ceiling in the Romanesque Michaelis Kirche at Hildesheim (there is a photograph of it here), which may have been used straight off as the design for an early window. And you see very much the same kind of thing in the little enamelled tryptichs of Byzantine workmanship. But the use of the medallion form is by no means confined to the first Gothic period; it survives in some shape or other to the very end of glass-painting. The cartouche of the Rococo is only a degraded medallion form.

With narrower lancet-lights came narrower borders, the medallions being sometimes allowed to cut over them. This constitutes a new departure in design, carried further in Decorated glass, in which it was sometimes quite a feature in the composition, as in the fourteenth-century windows at Freiburg. Our eyes once opened to the usefulness of a device of this kind, we cannot, in reason, shut them to the facilities it affords, whatever the style we adopt.

But even in the thirteenth century there were men to whom that was not liberty enough, and we have accordingly,—as, for example, at Augsburg,—groups of lancet-lights treated as one window, the medallions, of great size, extending across the three lights, giving all possible scope to the figure-painter. The result is effective enough; and an occasional break in the monotony of Early design is welcome. How far such a practice should be followed may be open to dispute. But I think it would be more than hard to deny the artist such a licence altogether.

This opens up the whole question as to the desirability or permissibility of transgressing in glass-design the limits of a single light. The glass-painter is bound to respect, and, in the main to follow, the form of the window-frame. But the architect,—assuming him to be, humanly speaking, faultless (*quod est*, in every individual case, *demonstrandum*),—is compelled sometimes, by reasons of construction or other equally imperative conditions, to adopt a window shape not just what he would have chosen had he had nothing to think of but the effect of his window from the inside. In such a case it is within the province of the glass-designer to bring it to something like the proportion he would have preferred. A broader or narrower border, for example, a horizontal division, or the introduction of any strongly-marked shape, will make all the difference in the apparent proportions of a window.

Already, in very early glass, the designers sometimes took upon themselves to contradict, so to speak, the window shape in the design of their glass; that is to say, they would divide a too-broad window into two, and treat the halves as separate lights with borders of their own, and perhaps the semblance of a quatrefoil or so by way of tracery in the window-head. (This occurs, I remember, at Bourges). Or again (as, for example, at Poitiers), they would include two lights in one design, with a border only on the outer side of each, the ornament or subjects enclosed extending across the two.

In the second Gothic period, when windows were divided into many tall and narrow lights, it was the almost invariable custom to cross the constructional lines of the window with the lines of the glass. This was, doubtless, with the full concurrence of the architect, who very likely reckoned upon some such filling to complete his windows. At all events, they seem to stand in need of that banded treatment adopted in Decorated glass, to hold the lights, as it were, together. The use of horizontal bands of subjects in colour across the window, alternating with bands of ornament in grisaille, proved a very satisfactory solution of the difficulty of treating a tall window of Decorated or Perpendicular type; and its use does not end with those types.

In the earlier instances each subject was completed within the width of the light, only its weight and colour connecting the one with the other. But it was only a short step from

that to bridging over the space of two or more lights (or, perhaps, the whole window) with a canopy enclosing a single subject, so affording space for figures on a much larger scale than was any otherwise possible,—on a scale, in fact, as large as the lights allowed. The later Gothic glass-painter took just what space he wanted for his subject. In a five-light window, for example, he would, if it suited him, carry one subject through two lights and another through the remaining three, allowing himself equal licence as to the height of his subjects, a practice rather perplexing to the eye accustomed to some sort of symmetry in arrangement. We attach, perhaps, too much importance to symmetric composition in glass, which seems much more necessary on paper than in actual work. In my experience many a window which has attracted me by its interesting distribution of colour has proved to be devoid of symmetric balance, although I had never felt the want of it until I came to analyse the design.

Still the confusion which results from a recklessly haphazard distribution of subject is to be avoided. It is no uncommon thing in old windows for the sky which forms the background of our subject to get hopelessly mixed up with the sea in the front part of its neighbour; distant landscape is interwoven with foreground grass; and the meaning of it all is only to be unriddled by a painful effort, incompatible with pure enjoyment of the beautiful colour of it all.\*

#### SEWAGE PURIFICATION.

SIR,—In attacking my paper as to sewage purification at Guildford, Dr. Thresh repeats his assertion that my results are diametrically opposed to those of all previous experimenters. But he carefully avoids any reference to the exact quantitative results obtained by Mr. G. M. Taylor, C.E., F.C.S., which have been published in various journals, and which were cited in the paper in question (*Builder*, vol. xlix., p. 887). Thus when, after the expression of general doubts as to which it is not necessary to discuss the details, he says that I have not adduced "a shadow of proof" as to the resolution and escape of the putrescent matter, he omits to say that he has before him a statement to that effect from a competent analyst, who is a member of an engineering firm second to none in authority as to matters connected with water supply and purification. I leave Dr. Thresh's doubts to be confronted with Mr. Taylor's definite statements.

The establishment of Government-paid chemists in every town, as proposed by Dr. Thresh, would no doubt be an excellent thing for the members of his profession. How far the result would be equally advantageous to the country it may be time enough to inquire when there seems any probability that such a step towards the endowment of science is about to be taken. As far as candour in treating any discovery that does not emanate from themselves is concerned, Dr. Thresh does not afford the most brilliant promise, as, in his letter to the *Manchester Guardian* of 1st December, he represented my dose of 100 grains of sulphate of iron in each gallon passing through my tank as being 100 grains in every gallon of sewage.

I must also add that unless Dr. Thresh has published something which I have not seen, his statement "I showed . . . that I had carefully repeated the experiments he described with several different samples of sewage," is incorrect. My first letter on the subject was published on October 1st. Dr. Thresh's criticism appeared on October 3. It contains not a word about repeating my experiments, for which, indeed, there would hardly have been time in the interval.

Allow me, without further comment, to reply to the four questions very pertinently put by Dr. Thresh.

"1. Does the process remove all the suspended matter in the sewage?"

Answer.—Yes. In the very strong domestic sewage on which, as being always almost perfectly identical in its strength, our main series of analyses has been conducted, the whole of the suspended matter, and 29 per cent. of the matter in solution, is removed by the process.

"2. Does it remove any considerable portion of the dissolved putrescent matter?"

Answer.—Yes. It removes it all.

"3. Does the sludge deposited permit of being

\* To be continued.

readily removed, pressed, and dried; and what is its nominal value?"

Answer.—There is no sludge. The analysis of the precipitate gives 11.56 grains of mineral matter, and 15.84 grains of organic matter, precipitated from a gallon of sewage. This precipitate contains no slime, no lime, and no clay, and does not entangle water in the form of drying. The costly procedures of pressing and drying, which form part of Dr. Thresh's "typically perfect process," are thus rendered unnecessary.

The manual elements of potash and phosphoric acid are not removed by my process; and while the albumenoid ammonia is greatly reduced, the free ammonia is increased, so that any value present in the sewage is obtainable in a convenient form.

"4. Can the matter added to the sewage possibly be deleterious, if ever used slightly in excess of the actual requirements?"

Answer.—The only result of an overdose will be the deposit, as in the case of the purification of the water of the river Nethe at Artwerp, of a small quantity of oxide of iron, when the metal has fully performed its work of purification. The presence of a small portion of this substance is said, by the chemical text-books, to be advantageous to vegetation.

Fully agreeing with Dr. Thresh, that "in experimenting with sewage scientific method cannot safely be ignored," I enclose Mr. Taylor's analysis, which distinctly proves the above points, and remain, your obedient servant,

FRANCIS R. CONDER, M.Inst.C.E.

P.S.—Dr. Thresh might, with advantage, have added a fifth query, viz.—"Has it any effect on the main cause of diphtheria and typhoid fever, namely, sewer gas?"

Answer.—It destroys sewer gas in its nascent state.

#### Illustrations.

##### LIVERPOOL CATHEDRAL.

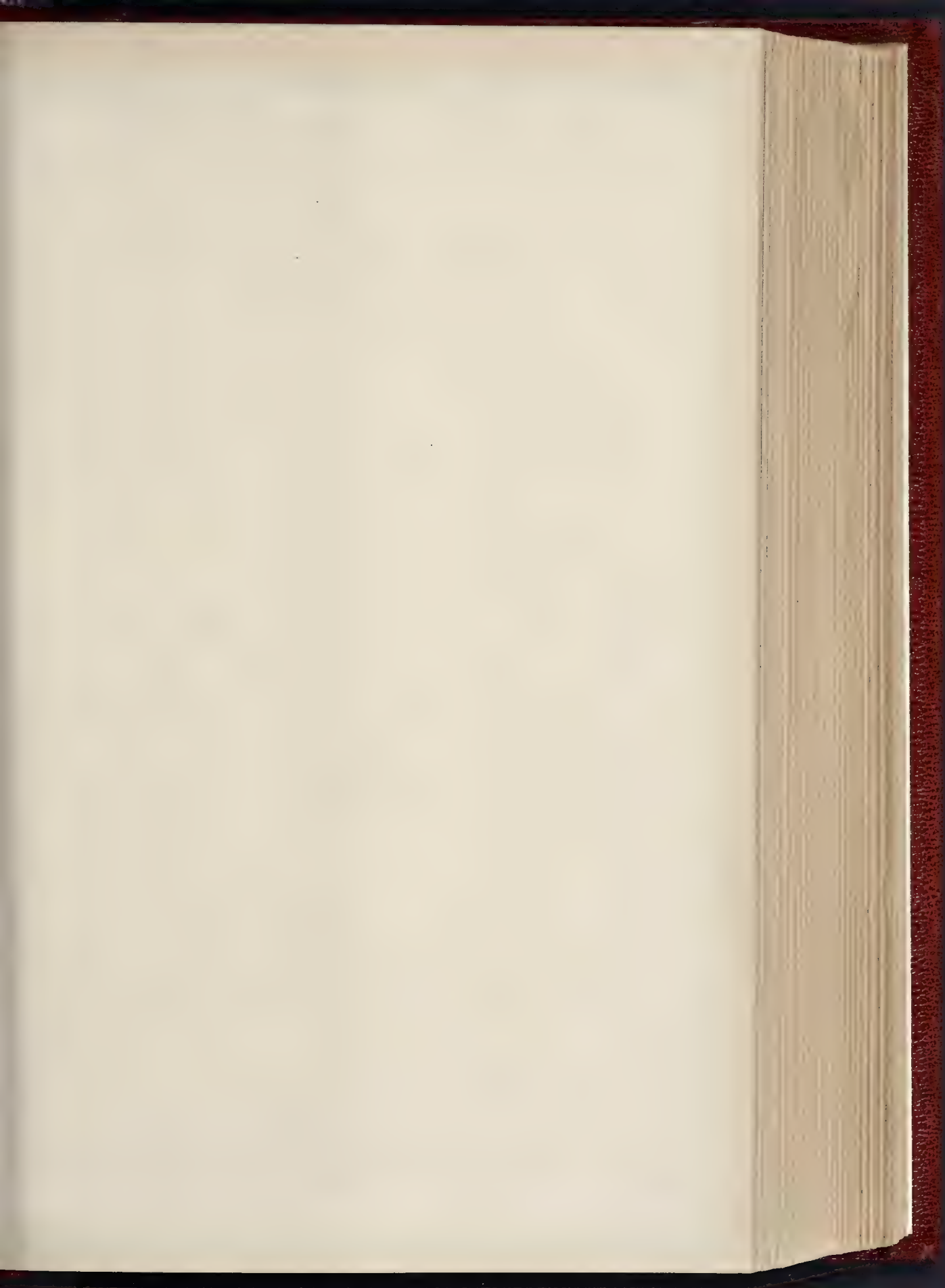
DESIGN BY MR. W. EMERSON.

THE views, plan, and geometrical drawings of this design, given in the present number, are fully referred to and described in the article, and the quotations from Mr. Emerson's report, in another column.

##### DESIGNS FOR STAINED GLASS.

These designs, reproduced from drawings by Mr. Lewis F. Day, are introduced here in connexion with his paper on the subject recently before the Architectural Association, and reported in another column. The paper being very long one, however, we are unable to find space for the whole of it this week, and the special references to these plates occur near the end of the paper in the portion not yet published. The first of them illustrates an ideal taken from marble wall panelling, the central panel of coloured marble being represented by a patch of red made up of flames and diamonds. The other illustrates the application of purely ornamental design to glass, without the introduction of figures.

"What is a Bill of Quantities?"—I refer to a letter under this heading, in our issue of January 2, on which we commented at the time, it appears that we have unwittingly allowed an injustice to Mr. Cheers, the architect of the Slough Public Institute, which was the building for which the quantities referred to were made out. The quotations made by our correspondent, the "Suburban Builder," were correct as far as they went, but he did not notice that an sum was named in a separate portion of the bill of quantities for the terra-cotta details, and a price per cube foot given which would be accepted for the mason's work named in the general clause quoted by our correspondent. This is not exactly "taking out quantities," certainly, but it is quite a different thing from what was implied by the "Suburban Builder," that no further information had been given as to the work named in these general clauses. The woodwork always was given much more fully than was stated in his letter. The "Suburban Builder" does not seem to have looked at the quantities carefully enough before making his protest, which was at a time when a good deal stronger than the circumstances called for. We had not an opportunity of seeing a copy of the "Bill" again till this week, or we should have referred to the matter before.

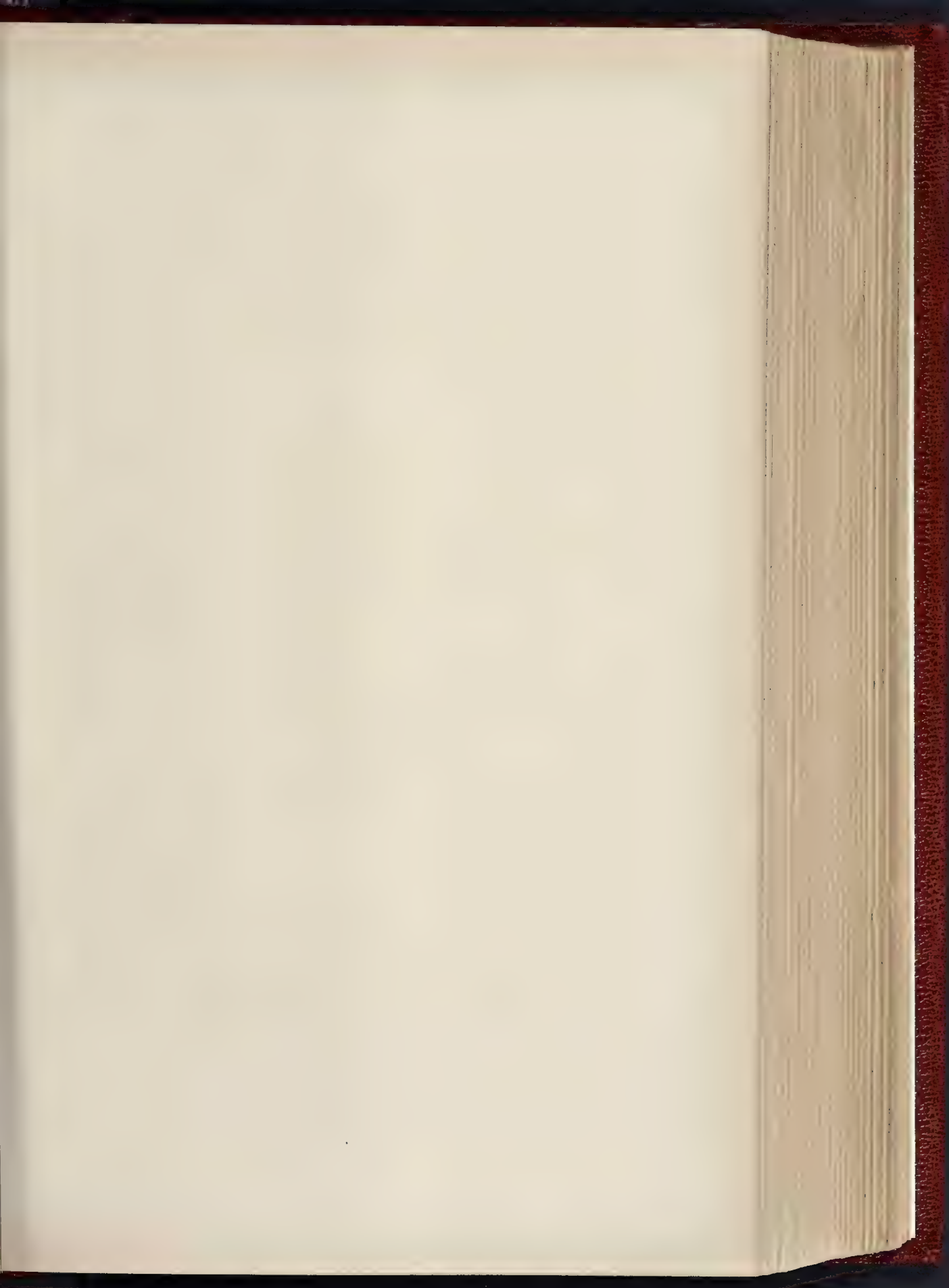






INK PHOTO SPRAGUE & CO LONDON

DESIGN ILLUSTRATIVE OF MR. LEWIS DAY'S PAPER ON STAINED GLASS.







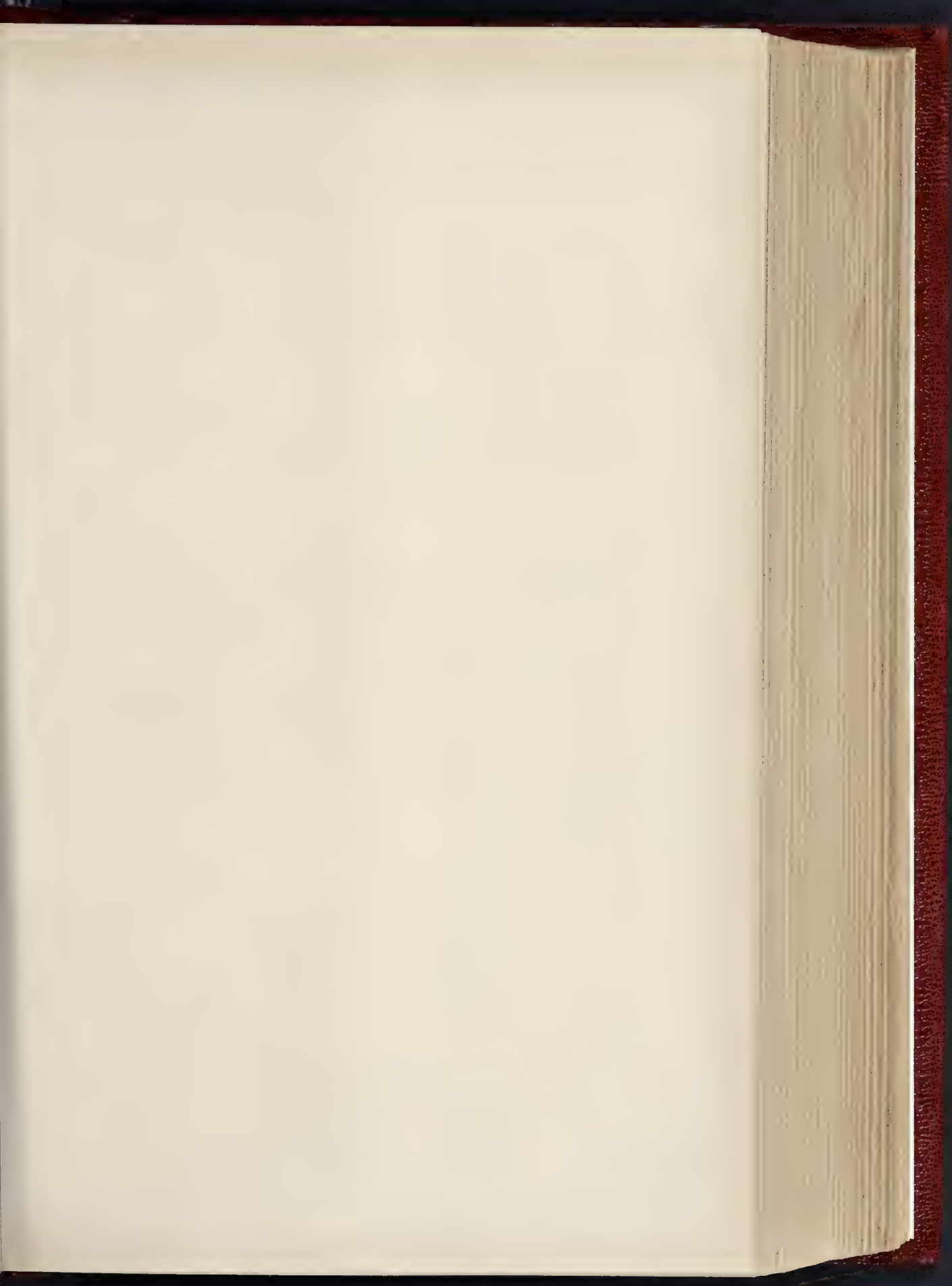


LIVERPOOL CATHEDRAL COMPETITION — DESIGN BY MR. W. M. EMERSON, F.R.I.B.A.  
INTERIOR VIEW

THE PHOTOGRAPH BY J. A. HARRISON









THE BUILDER, JANUARY 23 1886



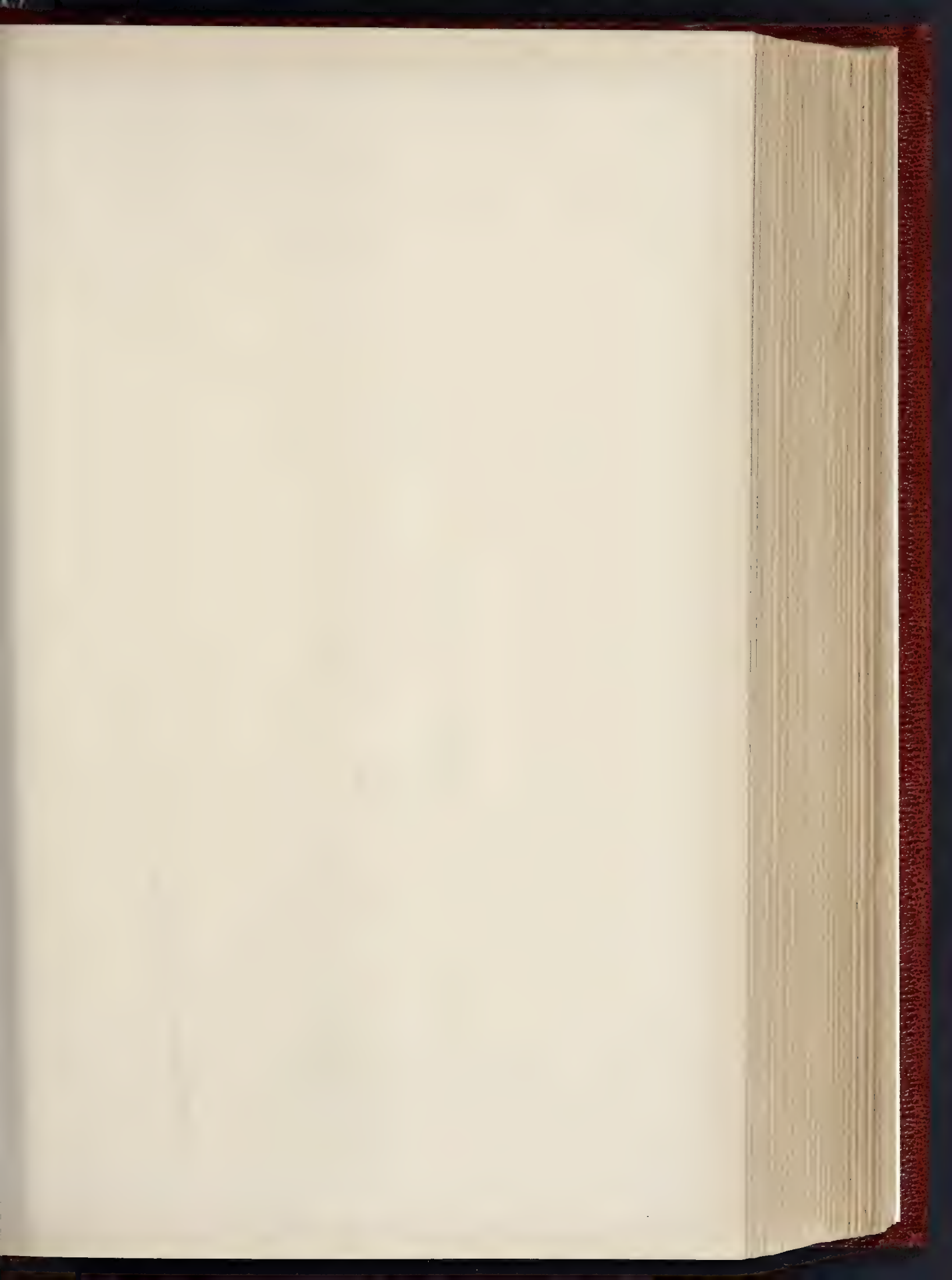


LIVERPOOL CATHEDRAL COMPETITION —DESIGN BY MR WM. EMERSON, F.R.I.B.A.  
PERSPECTIVE VIEW FROM THE S.W.

THE ARCHITECT, MR. W. EMERSON, F.R.I.B.A.



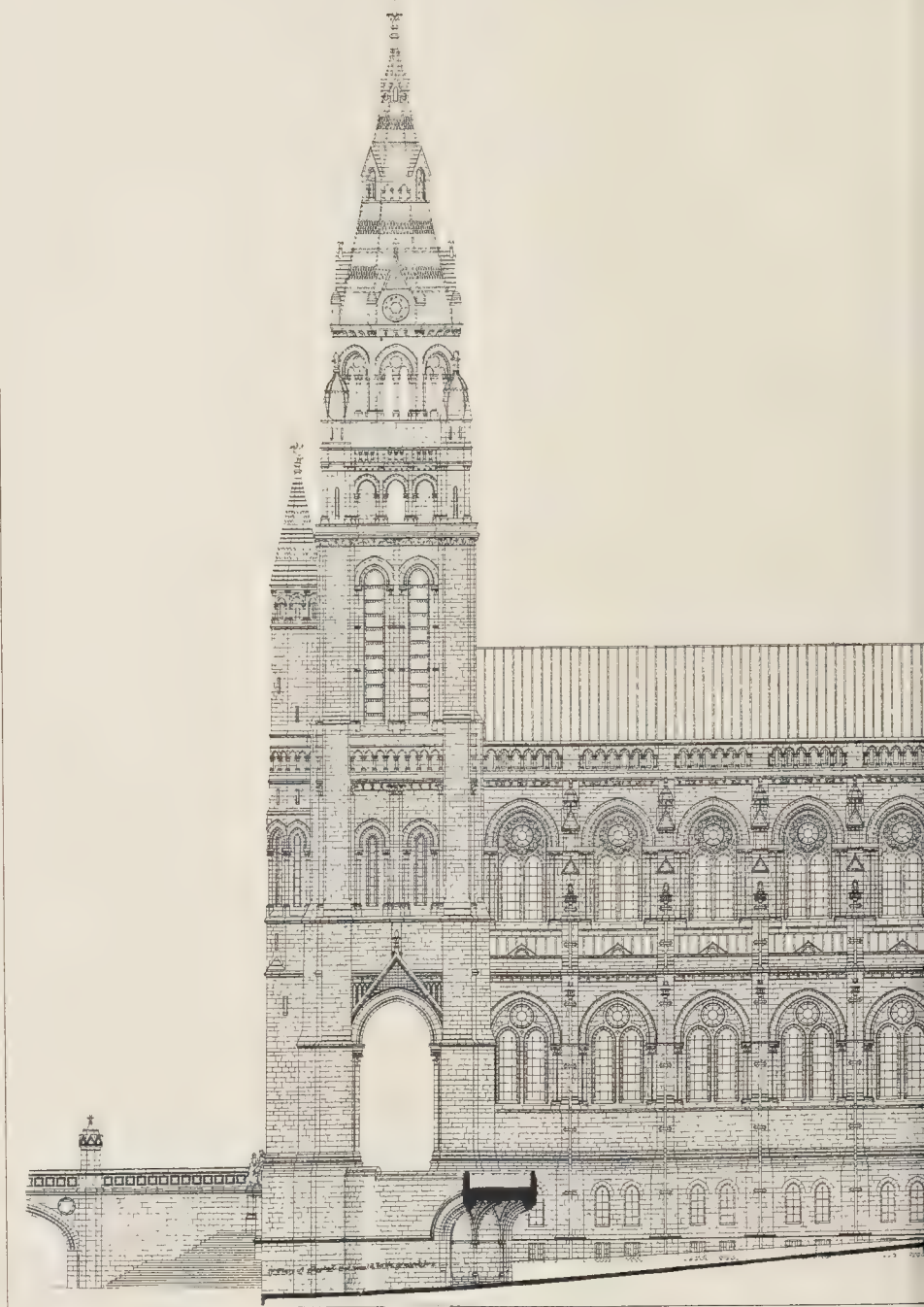






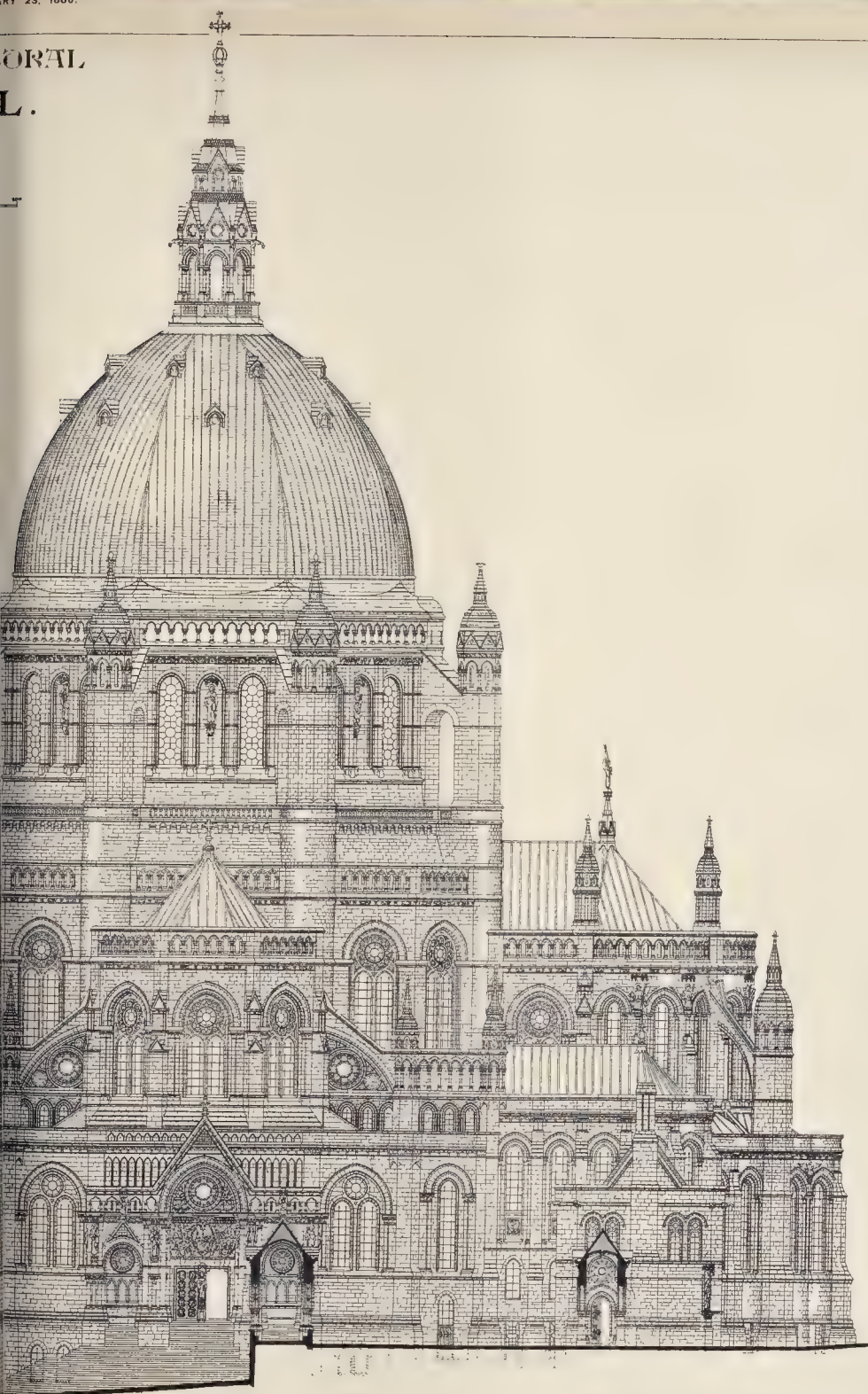
# DESIGN FOR PROPOSED CATHEDRAL LIVERPOOL

SCALE



ORAL

L.

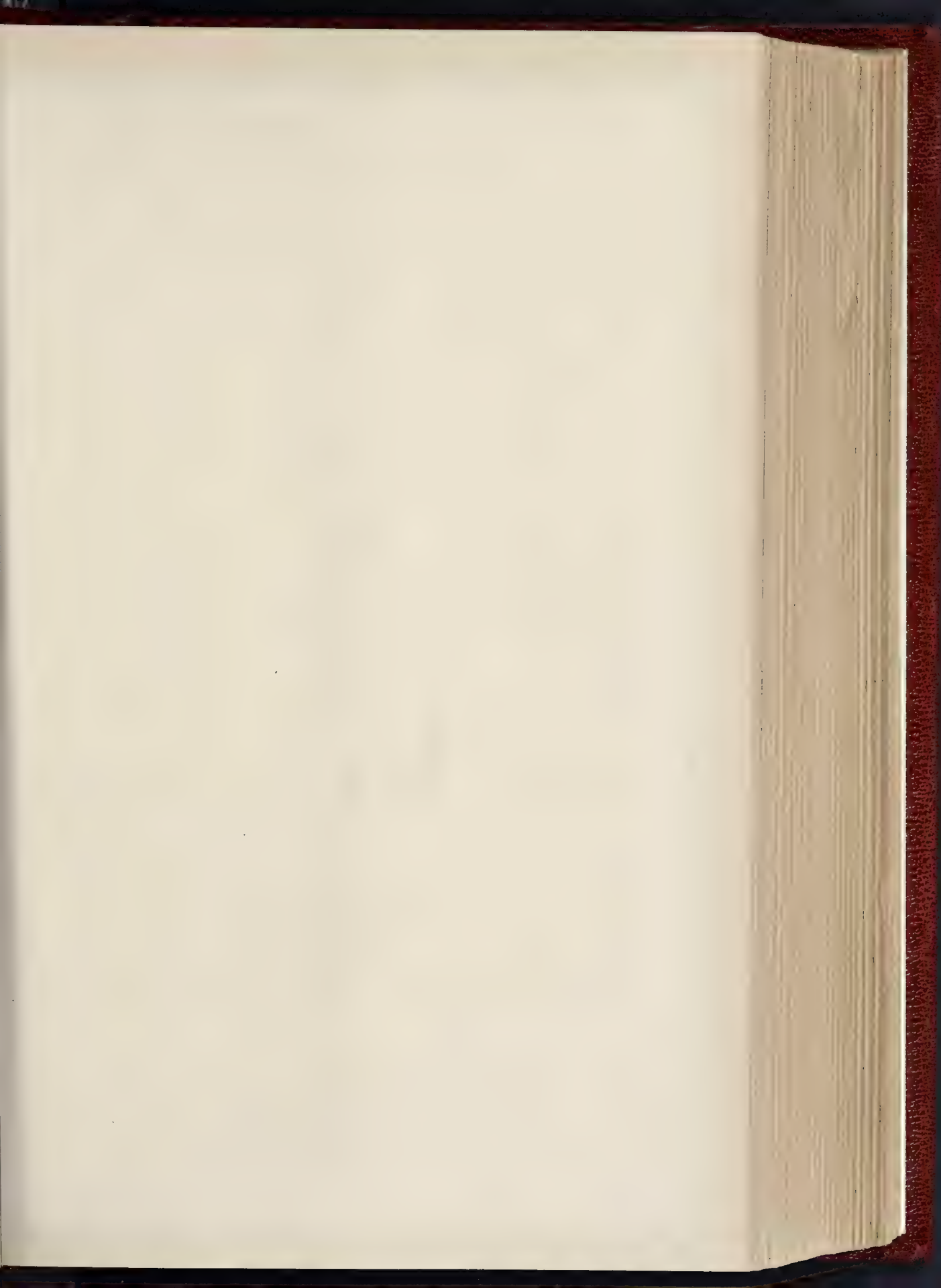


PHO O. HO SPRAGUE & CO. LONDON

DESIGN BY MR. WM. EMERSON, F.R.I.B.A.









# DESIGN FOR PROPOSED CATHEDRAL LIVERPOOL

SCALE



LIVERPOOL CATHEDRAL COM

LONGITUDE

ORAL  
L.



PHOTO. THO SPRAGUE & CO. OYDON

IGN BY MR WM. EMERSON, F.R.I.B.A.

ING NORTH





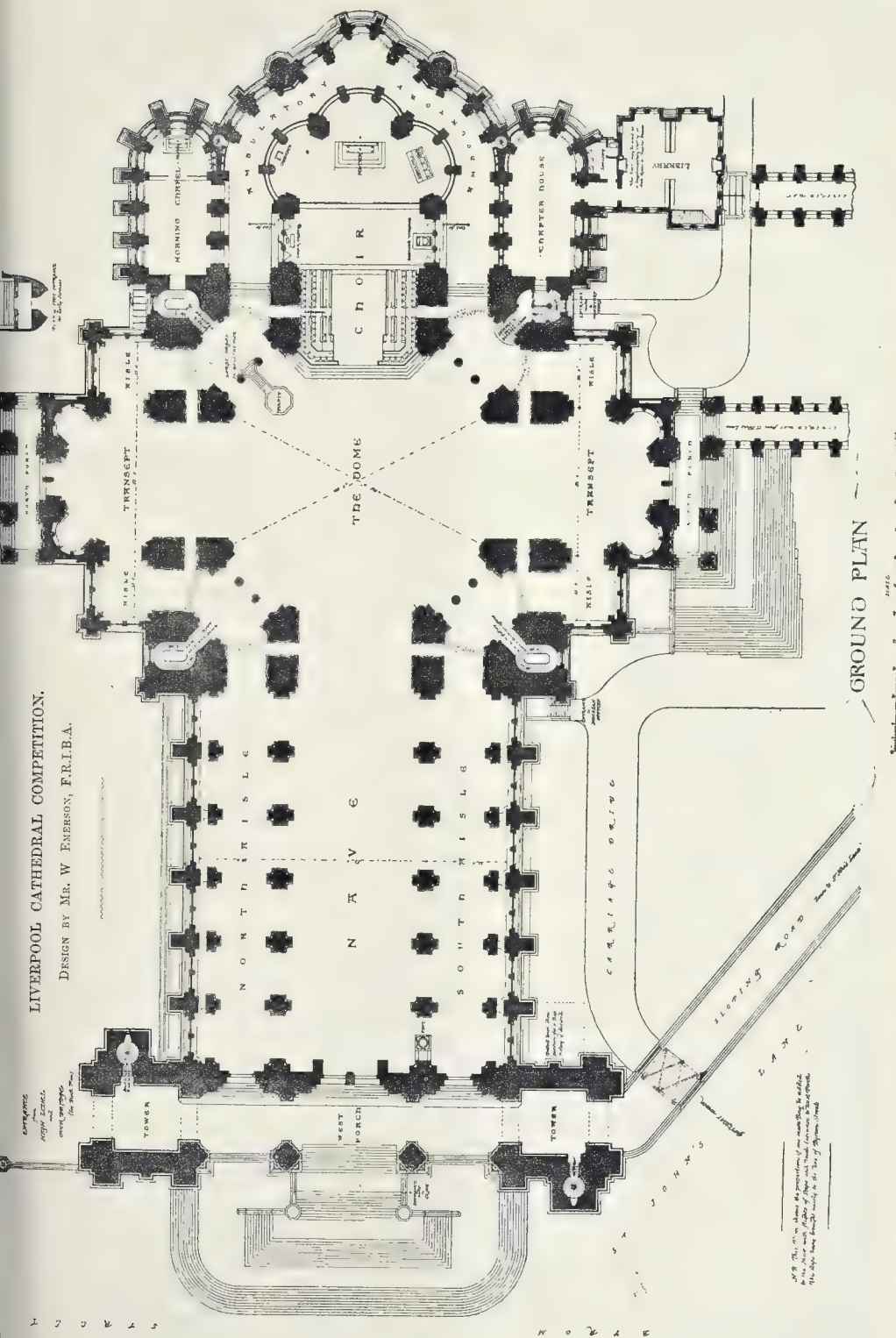


INK PHOTO SPRAGUE & CO LONDON

DESIGN ILLUSTRATIVE OF MR. LEWIS DAY'S PAPER ON STAINED GLASS.









# ST. SAVIOUR'S, SOUTHWARK, PARISH GRAVEYARD, AND THE DISUSED BURIAL GROUNDS ACT, 1884.

On January 15th last Vice-Chancellor Bacon gave an important judgment upon the effect of this Act in preventing the erection of buildings on disused burial-grounds. We gather that by an Act of 1883 for abolishing church-rates in St. Saviour's parish, Southwark, the ancient graveyard; at the junction (north-east) of Redcross and Union streets, and otherwise known as the "Cross Bones," was transferred from the parish wardens to trustees for certain parochial purposes specified in the statute. The ninth clause thereof enabled these trustees to sell and grant building leases of any land so vested in them. In the following year was passed an Act for the prevention of building over grounds of this character. In the fifth section, though, of this Act of 1884 exception is made of "any burial-ground which has been sold or disposed of under the authority of any Act of Parliament." In May last the St. Saviour's Rectory trustees offered for sale what they described as "valuable freehold building land in Union-street, Borough, occupying the large area of about 15,000 ft. adapted for a builder, contractor, timber-yard, &c." They further set forth that: "notwithstanding Section 3 of the Disused Burial Grounds Act, 1884, which renders it unlawful to erect any buildings upon any disused burial-ground except for certain purposes, the vendors believe that they are entitled to sell the property comprised in the particulars as building ground." They based their belief, presumably, upon the terms of the fifth section of the Act of 1884, which we have quoted. It would seem that Messrs. Thomas and George Oyler bought the land for 2,300l. But, having made their purchase for building purposes they felt unable to complete it, inasmuch as the Act of 1884 forbade them to build. A summons in chambers having been taken out by the vendors under the Vendor and Purchaser Act, 1874, the Chief Clerk adjudicated in their favour. The summons was adjourned into court. There, after arguments heard for either side, it was decided that whereas the parish Act of 1883 was not a sale or disposition within the exception of the Act of 1884 (clause 5), and whereas when the Act was passed in 1884 neither the trustees nor anybody else had power to build over this land, the purchasers were entitled to the objection they had taken. So the summons was dismissed with costs.

The ground in question,—marked by no headstones, neglected, and recently a builder's yard,—belonged formerly to the diocesan estate of Winchester see. It had been used as a place of interment for the unfortunate inmates of the Bankside stews that lay between Bear Garden and Clink Prison. Sir William Walworth, temp. Richard II., held the stews as lessee under the Bishop of Winchester, whose "inn" stood hard by, westwards of Montague Close. Shakespeare makes the Duke of Gloucester to allude to the grant of licences by the bishops, in upbraiding Cardinal Beaufort,—at that time Bishop of Winchester,—with the words: "Thou that giv'st whores indulgences to sin." "Winchester Goose," moreover, formed a vulgar term of reproach. The "Cross Bones" served as a burial-ground for more than three hundred years, but has not been so used since October 31st, 1853, when two interments took place, which were solemnised with all the formalities observable in the case of consecrated ground. It is on record that during the Great Plague as many as six hundred bodies were deposited here within one week. About the year 1708 the Bishop leased the ground, and this for the first time, for three lives, for the purposes of burial. The next lease bore date June 16th, 1820, being for three lives and sixty-one years, at a rental of 65l. per annum. But before the later lease expired the wardens enfranchised the ground for a sum of 3,338l. On November 8th, 1854, they leased the land for a term of years; the lessee transferred it to another, who converted it into a builder's yard and paid 50l. a year, the vestry thereto consenting.

**National Association of Master Builders.** The half-yearly meeting of the National Association of Master Builders of Great Britain will be held at Derby on Tuesday next, the 26th inst.

## THE LATE MR. FERGUSSON.

At the business meeting of the Institute of Architects last Monday, the President, in reference to the lamented death of Mr. James Fergusson, said:—

"It has once again become my sorrowful duty to announce to you from this chair the decease of a distinguished member, past Vice-President, and Royal Gold Medallist of our corporate body, Mr. Fergusson.

Few men of our profession have done more valuable work than he, the historian of our art; and few, if any, have achieved a more world-wide reputation by the labour of the pen. Such men, unfortunately, are rare; and however much some of us may have differed from his views as to the art we practise, we cannot but honour and admire the enthusiasm with which he worked, and mourn the extinction of the light his labours were qualified to shed on subjects of great importance in art and archaeology.

It is not for me to dilate on the very interesting career and numerous works of Mr. Fergusson; that has been done by others, and may hereafter be supplemented by those better acquainted with him than myself; but I think it is only right that, as your President on this occasion, I should mournfully and publicly acknowledge the great loss we have sustained by the passing away of so distinguished a contributor to the literature of our art, and of a man so highly esteemed, not only by ourselves, but by many of kindred pursuits in the path of literary and artistic work.

The Council thought it right that the Institute should be represented at the funeral, and several gentlemen were consequently present, together with both our secretaries, Mr. Waterhouse, and myself, to pay to his memory our last tribute of appreciation and respect."

## OBITUARY.

*The Late Mr. William B. Colling.*—A member of the profession has just passed away whose abilities entitled him to have taken a more prominent position than fell to his lot. We refer to the late Mr. William B. Colling, who died on Sunday last at the age of 72, from the combined effects of an attack of bronchitis and other ailments. Mr. Colling was one of three brothers who all inherited more or less the abilities of their father. His younger brother, the late Wallis Colling, was clerk of works at the Royal Courts of Justice under the late Mr. Street, having in a similar capacity superintended the erection of Montague House, Whitehall, and other important works, for the late Mr. Burn. As the author of "Art Foliage" and "Gothic Ornaments," Mr. James K. Colling,—now the only survivor of the three brothers,—is well-known. In early life William B. Colling was the associate of the present President of the Institute, Mr. Ewan Christian, and of the late Sir G. Gilbert Scott. Having studied at Norwich and London, in the offices, we believe, of Brown and Habershon respectively, he entered the office of the late Mr. Burn in 1846 as confidential assistant, which position he continued to occupy first with Mr. Burn, and afterwards with Mr. Macvicar Anderson, up to the time of his death. Unbroken confidence and mutual esteem characterised this long connexion of forty years. Seldom indeed have faithful services been so ungrudgingly and so devotedly rendered. Mr. Colling's natural powers were of a high order, and such as, if backed by a greater amount of ambition and self-confidence, must have brought him to the front. He was an excellent draughtsman, and was well versed in the theory and practice of architecture and the cognate arts. His leisure was devoted to his favourite studies of music and languages, in both of which he was a proficient. The only works which Mr. Colling carried out from his own designs, as far as we are aware, were a memorial tower at Guernsey, which he won in competition; and "Hendrefolau," a country house, which he erected in Wales for Mr. Dillwyn, M.P.

Mr. Joseph Mayer, F.S.A., died at Bebbington, Cheshire, on Monday night, in his 83rd year. He was formerly in business in Liverpool as a goldsmith, and was well known as a collector of antiquities and as the donor of valuable gifts to the Corporation Museum of Liverpool. In consideration of his munificent gifts Mr. Mayer's statue by Fontana was placed in St. George's Hall.

## ARCHITECTURAL SOCIETIES.

*Architectural Association.*—The seventh ordinary meeting of the present session was held on Friday, the 15th inst., at Conduit-street, Mr. C. R. Pink (President) in the chair. The following new members were selected, viz., Messrs. Percy L. Marks, W. G. Wallis, R. H. Fowler, Henry L. Treadwell, Harold A. Barnett, E. Stanley Walters, John Hutchings, Thomas Ketchie, and Walter Tarrant. Mr. L. F. Day then read a paper entitled "Some Lessons from Old Glass," of which we print the first portion this week (see p. 156). A discussion followed of which we defer our report. The Chairman, before closing the meeting, referred to the recent loss sustained by the profession in the death of Mr. James Fergusson. Not to speak of the great work he had carried out in architecture and archaeology, architectural students owed him a debt of gratitude for the "History of Architecture." This was not merely a most valuable text-book, but was also one of the most critical works of any country of any branch of art.

*Liverpool Architectural Society.*—At the meeting of this Society held on Monday evening last Mr. Thomas Mercer, President, in the chair, Mr. James M. Hay read a paper, illustrated by drawings, entitled "St. John's site,—its fitness for a great cathedral; design of a great cathedral,—its fitness for St. John's site." In his opening remarks Mr. Hay mentioned that these drawings had been prepared months ago, and he had only waited till the competition designs had arrived and were laid open to public view before bringing them forward. He then proceeded in terse and humorous terms to combat all the objections that had been urged against this site, expressing his belief that the real secret of all arose from the prevalent feeling of the incongruity of placing a Gothic building in close proximity with a structure of such a several Classic style as that of St. George's Hall. The cathedral must be Gothic, and of an old stereotyped plan, then he sympathised with the objection.

A Gothic building there would be an anachronism. The genius of the place demands that it should be Classic. Admit that, and the site becomes the finest in Liverpool, although the whole city were pulled down in search of a better. In the course of his paper Mr. Hay made a suggestion in regard to the disposal of the proposed cathedral with respect to St. George's Hall, to which we have referred on another page. Some discussion followed, and reference was made to a memorial from the Council of the Society which was read at the meeting of the Town Council last week. The memorial expressed the opinion that the specimen sculpture panel on the east front of St. George's Hall was out of harmony with an inferior to the high standard of the architecture, and suggesting that no step be taken to continue the sculpture without further consideration.

## COMPETITIONS.

*The Great Northern Central Hospital.*—The committee of this hospital, in April last, invited six architects to submit plans in competition for the proposed new hospital in the Holloway road. In response to their invitation five sets of plans were sent in on the 18th of September last, one of the invited architects having declined to compete. The designs were referred to a building committee, comprising several gentlemen specially acquainted with hospital arrangements and of members of the medical staff, who were assisted in technical points by Messrs. Hovenden, Heath, & Co. surveyors. The committee, after having carefully examined all the designs, decided to award the first place to those bearing the motto "Thought." Upon opening the envelope, the authors were found to be Messrs. Keith Yon & Henry Hall, 17, Southampton-street, Bloomsbury, who have accordingly been appointed architects of the new buildings. The drawings of the competing architects will be on view to the out-patients department of the present hospital, in the Caledonian-road, for a fortnight from the 23rd of January inst.

*The Vacant District Surveyorship.*—The meeting of the Metropolitan Board of Works this Friday, the 22nd of January, the business will be the election of a District Surveyor for the Western Division of the City of London, in the room of Mr. Rawlinson Parkin, deceased.



## INSTITUTE OF BUILDERS.

The second annual general meeting of the Institute of Builders was held at the offices, 31 and 32, Bedford-street, Strand, on Tuesday last, the following report being presented:—

"In submitting their second Report to the members of the Institute, the Council are pleased to be able to state that the arrangements contemplated at the time the last Report was presented have been carried out, and they have, in conjunction with the Builders' Accident Insurance, Limited, and the Central Association of Master Builders of London, secured the whole of the first floor of Nos. 31 and 32, Bedford-street, Strand. This has enabled the Council to throw open a Library and Reading-room, and they feel confident that the facilities thus afforded for mutual intercourse will cause a large increase of members, although the number to be admitted is limited.

An inquiry into the cause of the depression of trade and industry having been instituted by the Government, a copy of the questions propounded by the Royal Commission appointed to investigate the matter was forwarded to the Council, and such of the questions as applied to the building trade were very carefully considered by them, and replies sent in.

The Council regret to announce the resignation of Mr. Leonard J. Mason, who for several years acted as secretary of the Builders' Society, and afterwards of the Institute, as he felt he was not able to undertake the secretarial duties on the removal of the Institute to the new building.

Under the Articles of Association the President (Mr. Stanley G. Bird), one of the vice-presidents (Mr. J. Howard Colls), the treasurer (Mr. George Pucknett, J.P.), one of the auditors (Mr. Geo. Burt, jun.), and four members of the Council (Mr. Wm. Brass, Mr. Edward Conder, Mr. Arthur G. Lucas, and Mr. Joseph Randall) retire, but are eligible for re-election.

The meeting then proceeded to the election of the officers, who, with the exception of the Council, were all re-elected; the members of the Council being Mr. B. Neill, jun. (Manchester), Mr. J. H. Trollope (London), Mr. Wm. Hill (Gosport), and Mr. Joseph Randall (Woolwich).

## THE PROGRESS OF THE WORKING CLASSES IN THE LAST HALF-CENTURY.

This was the subject of an elaborate paper, read by Mr. Robert Giffen, LL.D., at the meeting of the Statistical Society on Tuesday evening last. In concluding his paper, Mr. Giffen said:

When the increase of earnings from labour and capital is compared, it is found that the increase from capital is from 180 to 400 millions only, or about 100 per cent.; the increase from the "working" of the upper and middle classes is from 15 to 320 millions, or about 100 per cent.; and the increase of the income of the manual-labour classes is from 171 to 550 millions, or over 300 per cent. In amount the increase in capital is about 210 millions; to labour of the upper and middle classes, 166 millions; and to labour of the manual-labour classes 79 millions,—a total increase of 755 millions. The general conclusion from all the facts is, that what has happened to the working classes in the last fifty years is not so much what may properly be called an improvement as a revolution of the most remarkable description. The new possibilities implied in the changes which in fifty years have substituted for millions of people in the United Kingdom who were constantly on the brink of starvation, and who suffered untold privations, new millions of artisans and fairly-well paid labourers, ought, indeed, to excite the hopes of philanthropists and public men. From being a dependent class without future and hope, the masses of working men have, in fact, got into a position from which they may effectually advance to almost any degree of civilisation. Every agency, political and other, should be made use of by themselves and others to promote and tend the improvement. But the working men have the game in their own hands. Education and thrift, which they can achieve for themselves, will, if necessary, do all that remains to be done. Whatever else is to be done will be done all the more easily if education and thrift are practised. I am not now speaking theoretically. I know from experience, and from intimate acquaintance with working men themselves, using the words "working men" in a popular sense, what can be done on very small means. It will be a shame to English working men if they cannot,

with comparatively ample means, raise themselves to the standard of education which Scotch peasants have long since been able to reach with what, until recent years, were very narrow means. In conclusion, let me point out that in the near future there is a very serious difficulty impending; the difficulty, in fact, is already upon us. Since I wrote two years ago prices have further declined, which would seem to give working men even a greater advantage than they had then. But this decline is due to causes, as I believe, which necessarily involve a fall in wages and profits. Wages and profits must to some extent be adjusted to the changed prices. Hence in the present paper the present time I have spoken of has been rather that of two years ago, when my former paper was written, than the actual present. If I were to take account of the most recent changes in prices, I should also have to take account of the most recent changes of wages, which are all in a state of transition. What I have to suggest to all concerned is that the fall of prices, considering the length to which it has gone, is a phenomenon which working men should carefully study in their own interest, and that they should be prepared to some extent for a reduction in money wages. What concerns them is not "money" wages, but "real" wages. It is quite possible that in a period when money wages are falling, along with all other money values, their real condition may improve, because the fall in money wages is less than the fall in the money prices of the principal commodities which they consume. It has been a great convenience in the present inquiry that prices at the end were obviously much the same as at the beginning, or rather less, so that there could be no question as to the change in money wages indicating a corresponding real improvement. But this very convenience helps to impress on my mind the conviction that we have entered on a period in which all comparisons of that sort are already extremely difficult. The question is not one which working men or any other class can avoid.

In the discussion which followed, Messrs. Harris, Jeans, Leone Levi, Benjamin Jones, David Chadwick, Stephen Bourne, Rowland Hamilton, and Major Craigie took part. The conclusions drawn by Mr. Giffen were contested in certain particulars.

Mr. Giffen, in the course of his reply, said that, as to rent and house accommodation being dearer than formerly, the evidence which he gave in his former paper on that point proved conclusively to him that, taking the country all over, the chief cause of the increased rent demanded had been the improvement in houses and in the accommodation they contained.

## THE CLEANSING AND VENTILATION OF SEWERS.

At the meeting of the Metropolitan Board of Works this Friday, the 22nd inst., a report will be presented by the Special Purposes and Sanitary Committee, as to the cleansing and ventilating of sewers, recommending:—

1. That any old and defective, disused, or partially disused sewers which may remain in any part of the metropolis should be disconnected from the present sewerage system, cleaned, and filled up; and that, where necessary, pipe or other proper sewers should be substituted.
2. That stringent measures be taken by the Board, and by the Vestries and District Boards, (a), for preventing road-sweepings passing into sewers; (b), for preventing the discharge into sewers, from manufactories and other places, of improper substances, such as chemicals, refuse or trade filth, or of hot water or steam, so as to be the cause of nuisance.
3. That the most important requirement for keeping sewers in satisfactory condition is a supply of water sufficient in quantity to carry the sewage in suspension through the sewers.
4. That whenever the supply of water in sewers is insufficient for cleansing the sewers, effectual provision for cleansing such sewers should be adopted by flushing or other means.
5. That one of the most effectual methods of flushing would be by means of water simultaneously discharged into house drains, as such a simultaneous discharge would flush branch sewers, then local sewers, and finally main sewers; that such a method of flushing can be effectually carried out by householders flushing their house drains periodically and simultaneously at stated times; that a great number of householders would probably be willing to co-operate with the authorities in improving the condition of the sewers in their district in this way; and that it is desirable that the several Vestries and District Boards should intimate upon what days and at what hours householders should flush their drains.
6. That provision near the heads of branch sewers, for flushing such sewers from their commencement, is to be desired.
7. That the practice of flushing the courts, alleys, small streets, &c., in poor districts, in summer, is to be highly

recommended as a desirable method of flushing sewers and improving the sanitary condition of the districts.

8. That next to effectual cleansing, one of the most important safeguards against nuisance and danger to health from sewers is the dilution of the gases therein by a constant and plentiful supply of fresh air to the sewers by means of effective ventilation.

9. That the ventilation of sewers in the metropolis, by means of ventilating shafts leading to gratings in the centre of roadways, has been the cause of complaint owing to the imperfect manner in which the system has been carried out, the ventilators being deficient both in size and number.

10. That the surface ventilators to the recently constructed sewers have ordinarily been placed at a distance of from 60 to 65 yards apart, with air-openings in the gratings equal to 60 square inches; and that the number and size of many of the ventilators on other sewers in the metropolis should be increased.

11. That the amount of ventilation afforded by large special ventilating shafts in no way commensurate with their cost, and that the adoption of such shafts, with or without fire heat, or the connexion of sewers with factory shafts, can only be adopted in very exceptional circumstances. Where shafts with fires are used, the sewer gases should be allowed to pass into such shafts over as well as through the fires, otherwise the amount of ventilation afforded will be very much limited.

12. That pipe ventilators of large section, and constructed with bends and without angles, can be used with great advantage in addition to, and not in substitution for, surface ventilators, wherever the consent of owners and occupiers can be obtained to such ventilators being affixed.

13. That the Committee are of opinion that the ventilation of the sewers of the metropolis may be improved by altering the construction of many of the surface ventilators as previously recommended, and by carrying up large pipe ventilators at convenient points wherever practicable.

14. That the use of charcoal or other appliances for deodorising gases in sewer-ventilators is undesirable, as such appliances do much harm by obstructing ventilation, are costly and troublesome, and are quite unsuitable for general use over a large sewerage system.

15. That during the cold and wet seasons the arrangements suggested in the report for providing ventilation will be sufficient, as putrefaction proceeds so slowly at low temperatures, and when the sewage is diluted with large volumes of fresh water, that the foul matters pass from the sewers before material quantities of offensive gases are generated.

16. That during dry and hot weather the foregoing recommendations respecting the flushing and cleansing be carried out as far as practicable, especially in sewers having only a small flow of water.

17. That in addition to these precautions, a system of deodorisation during the summer be arranged for the main sewers on the plan adopted by the Board during the past summer (see pages 23 and 24 of the report); that Local Boards be requested to adopt a similar system with local sewers, and to use all their influence to induce householders to employ in their house-drains suitable deodorising agents during periods of high temperature and drought.

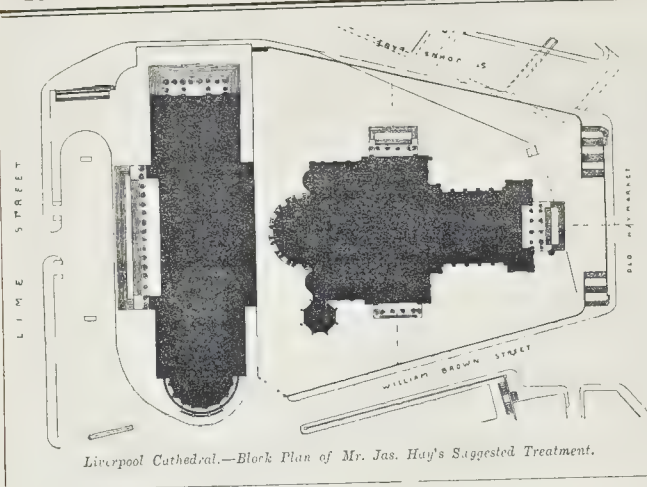
18. That manufacturers and others discharging refuse into the sewers be compelled to so treat their waste water (by such process as they may deem fit, but to the Board's satisfaction), that it shall have no greater deodorising power than average household sewage.

That the Committee are not prepared to recommend the Board to exercise the powers given by the 33rd section of the Metropolitan Management Amendment Act for making by-laws for the guidance, direction, and control of the Vestries and District Boards, and other persons in relation to the maintenance, cleansing, ventilation, &c., of sewers, until it is shown that the suggestions made in the report have not been voluntarily adopted.

We may return to the subject next week.

**Royal School of Mines.**—Prof. Warington Smyth, F.R.S., in continuing his lectures upon mining, in the theatre of the Geological Museum, Jernyn-street, spoke at length upon the considerations necessary before venturing to reopen a mine after it has once been abandoned, and particularly the different systems in vogue of estimating the value of the workings. It is necessary that the lode should be tested at a great number of points, and no reliance placed upon the select few. Some of the most monstrous impostures brought before the country have been due to a lode having been tested at one or two convenient points, and then statements made on the assumption that the lode throughout would be of the same character. The correct course is to take fair and average samples of the lode from a great number of separate spots, build them up into a circular pile, cut it through by cross trenches, mix one of the quadrants obtained, and proceed as before, till we get a last sample for examination, which may reasonably be considered a fair average of the whole. Even in a slate-quarry, the blasting of a few pieces of rock, in which the cleavage seems perfect, is not sufficient to show the real value of the mass. Nothing but the actual working of it can do so. In the case of mineral deposits there is often a considerable cover of gossan, which renders superficial trials of little value, in which case preliminary operations soon merge into actual mining. The true character of a lode can only be obtained by running levels through a considerable length of ground, and frequently a depth of thirty or forty fathoms; sometimes sixty or eighty fathoms have to be reached before profitable returns may be expected, in which case it is evident that little can be done without sufficient capital and plant.





THE LIVERPOOL CATHEDRAL.  
A NEW SUGGESTION.

At a meeting of the Liverpool Architectural Society on Monday evening last, elsewhere mentioned, Mr. James Hay read a paper in illustration of a design which he had made for a cathedral for the site now recommended. The accompanying is a block plan showing his proposal for the placing of the cathedral, with its main axis at right angles with that of St. George's Hall, and centrally with the latter building, so that the two buildings would form an architecturally-connected group, the cathedral being, of course, Classic in its architecture. We can say nothing of the design, which we have not seen, but this idea of the treatment of the plan is unquestionably a very fine one, and well worth consideration.

#### PROJECTIONS BEYOND THE BUILDING LINE.

GREENWICH DISTRICT BOARD OF WORKS V. HOILE.

At the Greenwich Police-court, Mr. Alfred Hoile, builder, of 40, Colfe-road, Forest Hill, was summoned before Mr. Marsham, at the instance of the Greenwich District Board of Works, for erecting certain buildings in Malpas-road, Brockley, beyond the general building line as defined by the Superintending Architect of the Metropolitan Board of Works. An order to demolish was asked.

Mr. Morton Smith, counsel for the Board, said the houses and shops were commenced in June last. A plan was deposited with the Greenwich Board, who thereupon obtained a certificate from Mr. Vulliamy fixing the building line. The defendant erected the houses as he had begun them, however, and there was no doubt they exceeded the building line.

Mr. Glen, who appeared for the defendant, raised an objection to the certificate of the Superintending Architect being put in without Mr. Vulliamy being put in the box.

Mr. Marsham, however, admitted the certificate. After some formal evidence, Mr. Glen submitted, first, that the buildings having been roofed in at the date of the certificate no proceedings could be taken against the builder. They were completed, within the meaning of the Act, so far as the builder was concerned, and any proceedings must be against the owner or occupier. He further submitted that the Board was precluded from proceedings, because they had not, as required by the Act, given notice of objection within fifteen days after the defendant had deposited his plans. It was only after the completion of the building that his unfortunate client knew that he had transgressed.

Mr. Morton Smith said the defendant was warned in July by Mr. J. N. Smith, the Board's engineer, that if he built where he had placed his footings he would exceed the building line.

The defendant denied that any such conversation took place.

Mr. Glen, in continuation, submitted that, before adjudicating, his Worship must have proof that both parties were heard before the Superintending Architect. Another point was that the Superintending Architect had treated the land in question as vacant ground, whereas there was a School Board building previously upon it and projecting beyond the line of the buildings now complained of.

Mr. Vulliamy, who had been subpoenaed by the defence, stated that when he made the line of building, he was not made acquainted with the fact that there was any building on the land previously.

Mr. Smith said the school was a temporary iron building, for which a licence was granted by the Metropolitan Board of Works.

After hearing the evidence, Mr. Marsham said the only question seemed to be whether the Board ought to have given notice.

Mr. Smith contended that the 76th section of the Act 18 & 19 Vic., cap. 120,—the one under which it was directed that notice should be given by the District Board within fifteen days,—related only to drainage and the construction of drains.

Mr. Marsham, who had taken some time to consider his decision, and had viewed the *locus in quo*, said he had no doubt that the section related to the drains alone, and that it was not necessary for the District Board to give fourteen days' notice of objection. When the Act in question was passed, the whole matter of building lines was in the hands of the vestries, but now the Superintending Architect fixed the line, and the whole procedure was altered. He made an order for the demolition of the houses, with 5*l.* 5*s.* costs.

A case for a Superior Court, on the point of law as to notice by the District Board, was applied for and granted.

#### THE EXAMINATION IN ARCHITECTURE (INSTITUTE).

SIR,—Will you allow me to object very strongly to the letter from Mr. Arthur Cates published in last week's *Builder* (p. 143)? If there be one principle of administration more fixed than another with reference to official "exams," it is that there shall be no private intercourse between examiners and examinees. Now, I understand Mr. Cates's letter to indicate, in the first place, that the exam. for the admission of Associates is something like a failure; and as he advertises himself to be "Chairman of the Board of Examiners" I am disposed to suggest that it may be very much his fault. I took an opportunity a fortnight ago, while sitting (on thorns) with the Council on the Charter inquiry, to challenge the policy of the examiners (which I referred to adversely as the policy of Mr. Cates) in not publishing the past examination questions in the way that is customary; and I was supported by Professor Roger Smith, and, I think, Mr. Waterhouse, amongst others present. I fear our remonstrances must have made no impression, for within a few days out comes this letter. At the same time, at last Monday's quarterly election of members, not a single Associate was put up. Then, when I look into the new "Kalendar" of the Institute, I must confess that the programme of the work for the exam. completely takes my breath away. Nearly a hundred books are catalogued as representing part of the reading required, while the explanations further given appear to cover the work of a long lifetime. And all this for the test to be applied to a youth of one-and-twenty, to prove that he is up to the average of his contemporaries—all that the Institute is entitled to require. Then, I am prompted to ask, by what official authority or permission Mr. Cates advertises himself as

"Chairman of the Board of Examiners"? I do not see his name in the "Kalendar" in any such important capacity,—for important, and indeed all-important, such an office would be. If it were proposed to call a general meeting to confer upon any person whatever that title formally I, for one, should certainly object most earnestly. What would it mean? Nothing less than Grand Gatekeeper of the Guild! And most emphatically so if a personage with such a sounding appellation were to be allowed to whistle all the candidates to the feet of Gamaliel in the way, now done. I know something about exams. by this time, and I happen besides to be the sole survivor of those by whom the "Voluntary Examination" of the Institute was organised many years ago, with a success which leads me to ask again and again (and I never get a answer) what has become of it. I may take leave, therefore, to advise the young men to go to Mr. Cates, but to memorialise the Institute instead, and demand a proper understanding as to how far this exam. really is meant to stand. Matters are in such a state at the Institute just now that I write this letter with not a little inclination to tremble; but I feel that we have all been keeping silence too long, and so I venture, if with many misgivings, to appear in the *Builder*.

ROBERT KERR.

#### "PLUMBERS AND PARLIAMENT"

SIR,—The very sensible letter upon this subject in your issue of the 2nd inst. [p. 63], signed "C. A. M. B.," suggests that the Plumbers' Company, who are making laudable efforts to improve the technical knowledge of the members of the trade, should also endeavour to reform various anomalies now existing in the same.

I quite agree with the writer of this letter, but venture to suggest that the question should be taken up by the builders themselves, who undoubtedly employ the largest number of men in this particular branch.

Where is the Central Association of Master Builders, which, as representing the builders, should take up and deal with matters so important to its members?

It is well known to all who have much to do with plumbers that their class prejudices are very great, and that some of these are not to the interest of the community at large; for instance, it seems unreasonable that they should work different hours to all other trades employed upon a building, and this in the worst winter days, when the use of a feal light is an absolute necessity; of course this do little or no work in this half-hour, but it only makes the danger and risk of fire the greater, and it is to be feared that plumbers are responsible for many losses in this way.

SIR,—In reply to Mr. George Shaw's letter in your last issue, I beg to enclose a copy of a letter forwarded to him, and which up to the present has been acknowledged.

The letter was posted on August 20th, 1885, not having been returned by the Post-Office authorities, was, I presume, delivered by them in due course of post.

Since I wrote the Worshipful Master, the object of this Association have been removed to Bedford-street, Strand, W.C.

E. S. HENSHAW,  
Secretary of the Central Association of Master Builders of London.

(COPY.)  
"Central Association of Master Builders of London, 27, King-street, Covent-garden, W.C."

SIR,—A statement delivered by you at a meeting of the Worshipful Company of Plumbers, held on the 29th June last, having recently been placed before me for perusal, I gather from a remark that the co-operation of other trades connected with house-building is sought. It occurs to me to suggest that at least one representative from this Association, and likewise from the National Association of Master Builders of Great Britain (Mr. W. Knowlton, Liverpool, Secretary), might be a good idea to join your Council.

It is also to be the advantage of your Council to have a representative from the Institute of Builders; of this, Mr. L. J. Maton, 21, Car street, E.C., is the Secretary.

I am, Sir, your obedient servant,  
E. S. HENSHAW, Secretary  
To the Worshipful Master of the Plumbers' Company,  
6, Lawrence Pountney-lane, E.C."

#### LISTS AT No. 4, UPPER THAMES STREET.

SIR,—In reference to your notice of Mr. Steven Bros.' new premises, No. 4, Upper Thames Street, E.C., in last week's issue (p. 142), Mr. Steven Bros. authorize us to ask you to mention we supplied, in addition to the hydraulic press, lift mentioned in your notice, hydraulic gear and crane, and three being worked by pressure of the mains of the London Hydraulic Power Co. Palmouth-road, S.E.

R. WATWOOD & CO.



## "TWO DOOMED LONDON CHURCHES."

SIR,—I have been waiting for some other and better-informed person to correct an error in your issue for January 9th, in regard to the notice of the de-consecration of two out of the four of the London churches. You state that one of the four is "St. Thomas in the Liberty of the Rolls," and then proceed to give an account of "The Rolls Chapel," which is altogether another place. St. Thomas in the Liberty of the Rolls (and which is to be pulled down shortly) is a church built by the law stationers of Chancery-lane some fifty years or so ago (the incumbent of which is a Mr. Moran), and is situated in Broom's-buildings, Chancery-lane, and is from every point of view a very different place in interest to the Rolls Chapel situated in Rolls-yard. I trust you will kindly insert some notice of this correction, as I dare say there are numerous other readers of your interesting paper who would share my very great regrets at any interference by the Goths and Vandals of this destructive age with such an edifice as the Chapel of the Rolls.

J. ALLEN ATKINSON,  
The Grandson of one of the contributors  
to the building of "St. Thomas in the  
Liberty of the Rolls."

\*. The mistake arose, not from want of knowledge of the facts, but from an oversight in revision and condensing of the article, and the omission of some portions of it.

## THE SNOWSTORM AND THE VESTRIES.

SIR,—With reference to the above, both the vestries and their surveyors have recently experienced a fair amount of obloquy at the hands of a generally unthinking public. I do not for a moment wish to exonerate from blame those to whom it is due, but a consideration of the figures below will prove the unreasonableness of the complaints of many persons whose object in life is attained when they see their names in the local papers in connexion with a complaint. Indeed, many persons obtain a great deal of cheap popularity by this simple means, who otherwise would be unheard of and unknown. With regard to the recent snowstorm, the figures relating to the amounts to be dealt with, and the attendant expense, are simply appalling.

According to the figures given by Sir Joseph Bazalgette, when addressing the Institution of Civil Engineers as President, in 1878, the mileage of the metropolis streets exceeded 1,700, the width between the channels being 30 ft.; if we add 18 ft. for the footways, and allow for the increase since that date, the superficial area will certainly be not less than 54,000,000 square yards. My own observations proved that the recent fall was equal to a depth of 3 in. when compressed as earth, therefore the quantity to be dealt with amounted to no less than 4,500,000 cubic yards. Allowing for the distance to the available tips, it would be difficult for a cart to deal with more than 20 cubic yards per diem, but 225,000 horses and carts and drivers would be required, costing, at 10s. per diem, 112,500l., and 50,000 fillers and sweepers, costing, at 3s. 4d. a day, 75,000l., if the snow were cleared in one day.

That it is impossible to do so must be at once conceded; indeed, it is exceedingly doubtful if all the snow could be cleared in twenty days, and it allows that carting can only be practised to a very limited extent, and that should be in the direction of freeing the principal thoroughfares, crossings, &c., from snow. In my district,—Wimbledon,—the quantities to be dealt with were only one-hundredth of the above, and although every man that offered his services was engaged at 4s. per diem, twenty is as the maximum number available. What is really required is the cordial and hearty co-operation of all the occupiers. If the rather lax regulations of the footways were so framed that the obligation to free from snow the footways adjoining all premises within a reasonable time were compulsory as regards the occupier, and a penalty for non-compliance were not only provided, but means for its enforcement too, since the police courts are wholly inadequate to deal with the enormous number of cases that would at first assuredly arise, much good would result. The footways being clear, one gang could clear the snow from the channels to ensure the flow of all water resulting from a possible thaw, while another should clear the middle of the streets, the snow being then heaped in parallel rows along the sides of the roadway, and temporary snow-ploughs may with advantage be utilised for the street clearing. By these means the foot and road ways may be rapidly put in good condition for both vehicular and pedestrian traffic. Of course, the surveyor's efforts will be in the direction of the principal thoroughfares, and the amount of work he will perform will depend on the number of men and carts available; but, as regards the footways, there is no reason why all should not be quite free from snow within a few hours after the cessation of any fall.

WM. SANTO CRIMM,  
Assoc.-M. Inst. C.E., F.G.S.

Wimbledon.

"Art Criticism" was the subject of a paper by Mr. G. C. Haite, read at the Richmond bazaar last week.

## PROVINCIAL NEWS.

**Gateshead.**—Messrs. John Davidson & Sons have, as an addition to their present mills, built a new roller mill on the site of some warehouses, and, on digging for putting in the foundations, a part of the old wall for the defence of the town was found in a very perfect state with its arched doorways and secret covered way leading to the river. The new building is five stories in height, built with red bricks and stone dressings, the interior being lined with white glazed bricks. The several floors are carried on rolled iron girders, supported on cast-iron columns, which rest upon a deep foundation of concrete and inverted arches. The whole of the interior woodwork is dressed and painted with Asbestos fire-proof paint. The several floors are filled with the latest improved machinery for the manufacture of flour by Mr. Harrison Carter, of London. The engine-house is 50 ft. long by 26 ft. wide and 30 ft. high, with open-timbered curved ribbed roof, surmounted by a lantern light. The walls are finished in Keene's cement with framed pitch-pine dado. Two horizontal engines, each 300 horse-power, are laid upon immense blocks of concrete, 12 ft. deep. They were supplied by Messrs. Wood, Bros., of Sowerby Bridge. The whole of the buildings are lighted with the electric light, by Messrs. Clark, Chapman, Parsons, & Co. The work has been carried out by Mr. Walter Scott from designs by Mr. Richard Cail. Messrs. Donkin & Nickol, engineers, supplied the ironwork, Mr. W. H. Wilson acting as clerk of the works.

**Cheltenham.**—The President and Council of Cheltenham College have commissioned R. L. Birelton, sculptor, to prepare a memorial tablet, with medallion portrait in white marble, of the late Rev. T. A. Southwood, M.A., to be placed in the chapel next to that of the late Major Pierson, by the same sculptor.

**Calne.**—A large clock has just been erected at the Town-hall. It strikes the hours, chimes the quarters, and shows time on one 5 ft. dial. There is automatic apparatus to turn the gas up and down. The work was carried out by John Smith & Sons, Midland Clock Works, Derby.

**Oxford.**—According to the *Oxford Chronicle* the fall of Osney Bridge has brought with it a series of complications, the solving of which, it is now almost certain, will take place in the law courts. The local board, at their last monthly meeting, accepted a tender from Mr. Charles Bosson, of Oxford, to erect for 477l. a temporary timber bridge over the River Thames, from Russell-street to East-street, Osney, according to plans prepared by Mr. W. H. White, M.Inst.C.E., Engineer to the Board. This work has been undertaken under an arrangement between the Board and the County Bridge Committee, the cost to be ultimately borne by whichever of the two bodies named is proved to have been chargeable with the maintenance of Osney Bridge. As it is probable the temporary bridge may have to stand a long time, it will be of a substantial character, and suitable for all traffic, except traction engines and the like. The supports in the river portion of the bridge will consist of three rows or "piers," each of six 12 in. square piles, varying in length from 18 ft. to 22 ft., driven 6 ft. into the river bed, each row to have two pairs of walings and strong diagonal braces.

## CHURCH-BUILDING NEWS.

**Stevenage (Herts).**—Holy Trinity Church, Stevenage, has been enlarged. The church was built about twenty-five years, from Mr. A. W. Blomfield's design, and consisted of nave and chancel, Early Decorated in style. The additions comprise another nave and chancel on the south side, being about 16 ft. longer east and west, and joined to the original building by an arcade of three arches.

**London.**—For some months past important external works have been in progress at the ancient church of St. Giles, Cripplegate. The upper portion of the south frontage, containing the clearstory, was, until lately, faced with brick. This has now been replaced by Kentish rag-stone. As refaced, the clearstory is now surmounted by battlements. Portions of the south aisle frontage below, and the west end frontage of the north aisle, the stonework of which was found to be decaying, have also undergone restoration, as well as the old octagon tower at the south-

east end, containing the staircase entrance to the galleries of the church, which were some time since altogether removed. The old tower consequently no longer serves any practical purpose, but it was, nevertheless, decided to retain it, refacing the brickwork of which it was constructed with Kentish rag-stone and battlements, uniform with the reconstructed clear-story. A new strong-room for the safe deposit of muniments and registers belonging to the church has been erected, adjoining the south-east entrance. Messrs. Dove Bros. have carried out the works, under the supervision of Mr. Edmund Woodthorpe, architect.

**Kenn.**—The parish church of St. Andrew, which Mr. H. Woodyer restored some time ago, possesses a particularly fine old roof-screen of carved oak, and of fifteenth-century date. A new roof, with sculptured figures of the suffering Christ, and of the Virgin and St. John, has recently been placed thereon. The cross has foliated ends, and is about 9 ft. high. It has been erected by Mr. Harry Hems, of Exeter.

**Hebburn-on-Tyne.**—Funds are being raised for the erection of the new Church of St. John the Evangelist. The late Mr. Ralph Carr-Ellison, J.P., of Dunston-hill, Whickham, and of Hedgeley, promised 1,000l. towards this church. To assist in the work, Mr. John Ralph Carr-Ellison, J.P., has offered a site at Hebburn Hall of more than half an acre, in part walled in and drained, and a long wing of a substantial building thereon for conversion into the new church. Hebburn Hall is situated in the new parish, and it is a building of great antiquity, and of archaeological and historical interest. The Committee have gratefully accepted Mr. Ellison's assistance. The plans of the Church are prepared to seat 580 persons, and they are designed by the architect, Mr. F. R. Wilson, of Alnwick, author of "The Churches of Lindisfarne," in the Geometric Decorated style.

**Southport.**—The new Church of St. Philip, Southport, will be opened by the Bishop of Liverpool next week, its consecration being deferred for a period. The structure, which is situated in Scarisbrick New-road, is built in the style known as Geometrical Gothic, of Early English type, and comprises nave, north and south aisles, chancel, transepts, clergy and choir vestries, and organ-chamber, and will afford accommodation for 800 worshippers. The architect is Mr. R. H. Tolson, of Manchester, the contractors being Messrs. William Brown & Sons, of Salford.

**Anstey.**—The new chancel-screen which has been provided for this church is of oak, and is divided into five bays, the centre one being fitted with polished brass gates. The lower portions of the sides of the screen consist of cusped arches, supported by small columns, surmounted by circles containing carved sexfoils and traceried mouldings. Springing from the floor, and dividing the lower panels into bays, are buttresses and trefoil columns, which support the crocketed gables. At the intersections are placed figures of two of the Evangelists, above which are canopied pinnacles, each gable being filled by a bold arch, with cusps and carved spandrels, and the apex with a cinquefoil, surmounted by figures of angels. Immediately above the richly-carved centre arch is a niche containing a figure of St. Michael, the patron saint of the church, and this again is surmounted by an elaborate cross. At the sides of the centre gable are figures of the two other Evangelists, under crocketed and gabled canopies, above which are figures of angels on carved pedestals. The work has been executed by Messrs. Jones & Willis, of London and Birmingham.

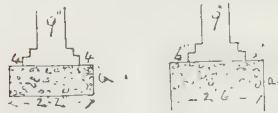
**The New Street from Piccadilly Circus to New Oxford-street.**—The Works and General Purposes Committee of the Metropolitan Board of Works have resolved to recommend to the Board that the new street above indicated be named "Piccadilly-road"! If this absurd appellation be adopted it will be productive of great inconvenience. The same Committee have decided to recommend the Board to grant a site for a bronze statue to the late Lord Shaftesbury ("subject to the design of the pedestal and statue being approved by the Board") "at the circus west of Dudley-street which has been lately formed at the junction of the new thoroughfare from Piccadilly-circus to New Oxford-street with the proposed new street from Charing Cross to Tottenham-court-road."



## The Student's Column.

## FOUNDATIONS.—IV.

**B**y the by-laws in force in the metropolis (under the Act of 1878) concrete in the trench is required to be, at least, of the thickness of 9 in., and to project 4 in. beyond the footings in each side, unless the subsoil is a natural bed of gravel, where none is required. For a foundation on soft made-ground or on boggy soil this is inadequate; but it is the most that it has been thought right to fix as a minimum requirement. In the case of a 9-in. wall, with proper footings, the concrete will measure 26 in. in breadth, or very nearly three times the thickness of the wall,—an enormous advantage, certainly. In general practice the concrete is made



BY LAW. IN PRACTICE.

to project 6 in. beyond the footings, and the depth is regulated by the nature of the soil. When the bottom of the trench is considered to be sufficiently sound (a matter to be judged of, as has been said, by the light of experience, which cannot be acquired too soon), the question whether the concrete shall be carried up to a greater or less height must depend mainly on the relative cost of concrete and brickwork of their respective widths. In the common case of a wall one brick and a half in thickness, the area of the bottom of the concrete will be nearly three times the area of the wall, and piers of 1 ft. 6 in. and 2 ft. 3 in. will stand on ground about seven times and five times their respective areas.

It is important to see that the bottom of the trench is as clean as possible, being free from any soft mud that may have been allowed to fall into it, and particularly from mud formed by water having been allowed to stand in the trench. When it is evident that water will rise in the trench as soon as the concrete has been deposited, the lime used should be blue lias rather than any ordinary kind, which is not capable of setting under water. Pumping should be kept up so as to keep the water below the level of the concrete until it is deposited in the trench, but not so as to draw away the water through the freshly-deposited material which would remove a large proportion of the lime. If it is necessary to deposit the concrete under water, more care is required to use good hydraulic lime, to mix the concrete with less water, and to drop it quietly into its place.

The application of concrete where the subsoil is of irregular composition, and the mode of using it in underpinning, remain to be considered.

**Soils of Irregular Composition.**—Referring to preceding observations on the virgin soil and on made-ground, it will be seen that the soil in different parts of the same site may vary considerably, so that the artificial foundations that might be suitable for one part of a building may be insufficient in depth or in breadth, or may even be unsuitable in kind for another part. We have, therefore, to contend with this difficulty in addition to that which might be caused by the nature of either of the soils if it extended over the whole site. Made-ground whether, as a whole, soft or hard is generally best to increase the amount of concrete both in its breadth and in its thickness, so that weak parts of the soil may be bridged over and the effect of any sudden transition from one kind of soil to another may be spread, and also extended along a considerable length of trench.

On an old site it is very common to meet with wells, or cesspools, or holes out of which clay or gravel has been dug. When these occur along the course of a trench they are sometimes filled up with concrete which, if the hole is narrow and deep, is wasteful and may be mischievous. For if the general foundation is compressed to the slightest extent by the weight of the build-

ing, it is not merely useless to make a small portion of it unusually firm, but that portion may cause fracture in the wall by refusing to yield to the same extent as the rest. Such holes may be filled with hard rubbish, and the concrete may be run over them, a relieving arch being thrown over the spot in the brickwork above the footings as a precautionary measure. Wider holes into which it is necessary to carry down the concrete should (unless they are very shallow) have the transition from the shallow to the deep foundation made by steps. If old walls are met with, or the large boulders that sometimes occur in ordinary soils, or if the point of a rock sticks up through a soil that may be expected to subside somewhat, it will be a question whether the obstacle is one that can be easily removed or whether it is better to throw an arch over it. By so doing, the building will be made to rest entirely on the yielding foundations, for which provision has been made.

Where part of a wall has to be built upon rock, and there is an abrupt transition to some soft stratum, the trench should be carried down through this stratum if by that means concrete can be laid upon a harder bottom, or upon a deeper part of the rock. When it is necessary to continue the wall upon the softer stratum without such deep foundation, concrete of extra width and thickness is required, but if the building is of considerable weight fracture of the wall is very likely to occur over the place where the foundation passes from the rock to clay or even to gravel. It is much better that an abrupt change such as this should happen under an opening in the wall, and the wider the opening is the less will be the danger to the building through differences in the amount of settlement. Where the opening is very wide, as in a bridge, there may be no ill effect from such difference in foundations; whereas, if it should happen under a pier the structure might be very seriously damaged.

In the sketch section, on page 65, a bed of peat is shown to "thin out" gradually so as to lie like a wedge upon a bed of gravel. It is very common to find an instance of a soft bed of clay silt or made-ground getting rapidly thinner as the ground beneath it rises. A heavy building placed on such a stratum will heel over, whether it has concrete below it or not, owing to the greater amount of compression of the soft bed on the side where it is thickest. A similar result may be experienced from a bed which is of uniform thickness becoming softer (as it is very likely to be) on that side of a building which is nearest to a stream. From one of these causes or the other a very large proportion of the most important buildings that stand on these soft foundations in the lower parts of England, Holland, and Italy, show a distinct and, to those who see them for the first time, an alarming deviation from the perpendicular. But when the extreme amount of compression has been effected, the subsidence is stopped; and, if it has not gone so far as to lead to the serious injury of the building, there may be no further danger. The best known instance of this is the Leaning Tower of Pisa, which was begun in 1174, and not completed till 1350. As it rose it began to lean over, and as each new story was added an attempt was made to build it upright. The limit of this one-sided subsidence was not reached till some time after the eighth and last story was put on. It overhangs its base 13 ft. in a height of 179 ft., and has probably long been stationary. The worst of the two Leaning Towers of Bologna, built early in the twelfth century, overhangs 8 ft. 6 in. Dante, in the "Inferno," written 200 years afterwards, makes use of the fearful appearance of this tower to one who stands under it in describing the effect produced in his mind by the vision of a giant that stooped over him. In the sixteenth or seventeenth century Guido painted these towers looking very much as they look now. At Dordrecht and at Delft, and in the neighbourhood of Venice, the towers lean very perceptibly, but the movement seems to have been arrested long since. The tall factory chimneys that stand on any of these treacherous foundations usually lean over, and it is sometimes necessary to cut out some of the lower courses on one side in order to restore them to the upright. The prevalence of strong winds from one quarter may bring about this result by throwing extra stress upon the soil on one side of such a structure.

## Books.

*How to Select Property before Purchasing, and How to Ascertain its Correct Value.* By JOSEPH HENRY MCGOVERN. Liverpool. Gilbert G. Walsley.

**H**IS work is little more than an expansion of a section of a well-known surveyors' handbook. As it is possible by dilution to obtain a gallon of soup from a cubic inch of the compressed article so, out of a few pages of Hurst, with seasoning of Banister Fletcher, it is possible to make a volume of McGovern. There is, perhaps, no harm in this. The nutriment is there, and to some mental constitutions, the concentrated form is not the most convenient or wholesome. It is recorded of a certain Government clerk that he had the art of making a *précis* of a given subject longer than the original documents. The author of this work runs him very close, for he almost succeeds in making the headings of his chapters as long as the chapters themselves, allowing for difference of type. The professed object of the book is to show an unbelieving public that a surveyor's valuations have a "mathematical basis" and are not arrived at by "rule of thumb"; that they are the result of a careful weighing of the conditions of each problem in detail, and not mere guess-work. The author, accordingly, exhibits the processes by which, in given instances, his results are obtained. There is nothing new in the system pursued, but we are glad to note that he has the courage to put the deductions collectively at something like the real proportion they bear to the rack rent, a point in which a too sanguine view of the subject often invalidates otherwise careful calculations.

When Mr. Mark Twain sent a portrait drawn and engraved by himself, to his Holiness Pope Pius IX., the Cardinal Secretary assured the artist in a courteous note of thanks that "there was nothing like it in the Vatican" and the compliment was duly printed among other equally flattering testimonials. The last steward of the Earl of Derby was presented with a copy of a previous work by Mr. McGovern, and, while opining that it contained valuable information, admitted frankly that he had "read it," and this is also duly chronicled by the gratified author. "These be f humours!"

*Houses and Building Societies: How to buy or how to sell, and how to manage Property.* By the Author of "Secrets of Success." London: Simpkin, Marshall, & Co.

THE name of the author of this little volume transpires in the reading of it, and an advertisement at the close thereof announces him the manager of a prosperous Building Society. It is not surprising, therefore, that the book questions sets forth the merits of these societies—and we would be the last to underrate that—with an intimate knowledge of their works and a desire that their many virtues should be better known. The little volume is in its original matter, and in a larger measure a petition of the speeches and writings of others. Nothing that can be said for building societies is omitted, whilst such little drawbacks as may attach to them in common with every other humane institution, are kept out of prominence. It is doubtful whether the author's object will be assisted by adducing as evidence the beneficial working of "an old-established society," instances of such a very unusual character as some of those quoted by him.

W. A. bought a property which brought net rental (after making the usual deduction of 54l. per annum, for 305l. W. A. was fortunate, but if M. or N. expects to go do likewise we fear he will be kept waiting. W. B. obtained property worth 320l. for M. and P. S., D. F., &c., were almost equally lucky.

We submit that for practical purposes should be shown how property may be profitably acquired at the normal rates through the agency of a Building Society, and that these "sporting" achievements tend to demoralise rather than improve the character of the thrifty souls who are the main support of such societies.

We should hardly have expected to meet such a book with the antiquated fallacy that you open the lower sash of a window then the will come in, but if you open the top sash, the heated air will go out. Try it.



*The Suburban Cottage: its Design and Construction.* By W. B. TUTHILL, A.M. New York: William T. Comstock.

We have much pleasure in directing attention to this book, which is nearly all that a book of the kind ought to be. The author is quite master of his subject, and gives the world the benefit of his knowledge in a concise, lucid, and unaffected manner. After setting out the desiderata of an American suburban villa to cost 1,500l. or 1,600l., he takes the reader carefully and frankly through the whole process of planning, design, and construction, beginning with the preliminary sketches, and completing a scheme, only to compress and cut it down afterwards, as usual, almost to the prescribed figure. The arrangement of the several apartments, &c., is an American, and not an English one, it is true; but there are points about the plan which strike us as of doubtful propriety anywhere. In the first sketch for the house the pantry is without external light, and is wedged between a water-closet, a kitchen, and a laundry. It would be difficult to persuade us that this is quite right. In the reduced, and in some respects improved plans, the position of this apartment is amended somewhat, but now the kitchen has no less than six doors (it had four in the first sketch), to which we must demur. There may, of course, be "exquisite reasons" for this, although we cannot imagine them. It is a critic's business to criticize, but with this preliminary grumble our opinion is gone; for, with the exception of the questionable recommendation that all joints in lead pipes should be "wiped" as has hitherto been the practice, we have really no difference with the author. There is much in his book which may be usefully noted by English architects, and while English authors may imitate with advantage his clear and perspicuous style, English publishers may take some useful hints from the attractive manner in which American books are presented to the reading public.

#### RECENT PATENTS.

##### ABSTRACTS OF SPECIFICATIONS.

13,636, Window Sash Fastener. F. Howcroft.

A bracket on the upper sash carries a hook which works on a pivot in such a manner that the point projects when the window is closed and prevents the lower sash rising. To open the window the hook is pressed back, but a stop prevents it from going too far.

14,393, Asphalt Pavements. J. Stanfield.

The top layer is made of comparatively fine stone screenings, sand, &c., mixed with tar or pitch and creosote or other oil, and is well rolled. The surface is then painted with a mixture of mineral or rock pitch, or both, creosote oil, and finely-powdered chalk or spent gaslime, or the like, the consistency of this varnish being varied according to the size of the stone to be employed for the final dressing. The varnished surface is entirely covered with stone or other material chosen so as to give any colour desired, larger sizes of stone, if employed, being laid by hand, and the interstices filled with smaller sizes, and is well rolled in order to imbed the dressing in the varnish, any excess of stones being swept off.

16,734, Slates, Tablets, &c. J. Willoughby.

Sheets of iron or steel are made suitable for riding upon by oxidising the surface. The sheets are placed in a furnace, and while at a high temperature are subjected to the action of superheated steam or air.

15,976, Fireplaces. E. R. Hollands.

In grates where the burning fuel is lifted by a gas passing between the bottom bars and fresh fuel fed beneath it, the bottom front bar is replaced by a frame with a horizontal flange round the inside, forming a tray. The frame is supported by a pivot at each end, about which it may swing, in order to close the aperture through which the ash fuel is fed into the grate. It is retained in a close position by a weighted finger, which engages beneath it as it is lifted, and which, being moved by the poker, allows it to fall into its normal position.

15,161, Embossing Canvas. W. S. Morton.

For decorating walls, &c., the canvas, prepared by successive steeping in boiling water and size, is then into the pattern upon a mould plate of metal or the like, the deeper cavities in its back being filled with paper pulp, or similar material, a paper backing pasted and beaten on, covered with sawdust, and pressed. The sawdust is then moved, and the mould placed upon a heated table, again covered with sawdust, and heated until the canvas is dry and ready for use.

#### NEW APPLICATIONS FOR PATENTS.

Jan. 8.—299, J. Revill, Electric Indicators for House Bells.—307, A. White, Lavatories.—346, C. Wells, Closed Fireplaces.

Jan. 9.—364, J. Hyde, Sash Fasteners.—373, H. Copland and J. Gilmour, Formation and Construction of Harbours, Piers, and Breakwaters.—394, J. Stanley and J. Todd, Boilers for Heating Public Buildings, &c.—400, W. Madge and J. Penrose, Water-waste Preventer.—407, G. and S. Jennings and J. Morley, Flushing Cisterns.

Jan. 11.—411, B. Sutcliffe, Hand Planing and Thickening Machines.—432, A. Henderson, Sinks and Lavatories.—440, S. Jenner, Chimney-top or Ventilating Shaft.—441, J. Pullar, Apparatus for Opening and Closing Hinged or Pivoted Windows, Ventilators, &c.—447, H. Peters, Portland Cement.

Jan. 12.—488, W. Youton, Butts of Hinges.—492, A. Boulton, Locks.—494, A. de Boischevalier, Polishing Plate Glass, Marble, &c.—502, J. Jox Long, Open Firegrates.

Jan. 13.—517, J. A. and J. Bidwell, Cement.—521, J. Hicken, Automatic Door Opener.—522, J. Green and Others, Kitchen Ranges.—625, W. Morrison, Cooking Ranges.—638, R. Somers, Fireplaces.—547, H. Green, Door Bolts.—650, K. Weise, Pantile Roofing.—554, G. Bolton, Cowl and Ventilator.—560, J. Wrang, Fastener for Windows, Doors, and Shutters.—561, J. Stanley, Smoke-consuming Fireplaces.

Jan. 14.—587, T. Brattan, Hanger Attachments for Sliding Doors.—591, T. Bradford, Disinfecting Apparatus.—616, J. Howie, Drying Chambers.

#### PROVISIONAL SPECIFICATIONS ACCEPTED.

13,762, E. Hinkel, Locks.—13,788, G. Wyatt and W. Ballard, Hinged Sliding Sash.—13,821, W. White, Locks and Latches.—15,064, G. Porter, Hot-air Stoves.—15,108, J. Gilson, Cooking Ranges and Stoves.—15,309, E. Horsley, Window Fasteners.—15,364, E. Colton, Encaustic Tiles.—15,404, P. Sorel, Glazing.—9,588, E. Haynes, T. Ford, and J. Keatley, Fasteners for Window-sashes.—12,505, W. Allen, Self-flushing Water-closets.—14,525, J. Gordon, Syphon Drain Traps.—14,812, F. T. T. Machines for Cutting, Dressing, Turning, Planing, and Shaping Stone.—14,901, H. Rushbury, Door Locks.—15,007, W. Storey, Firegrates.—15,050, A. Coke, Electric Thief Detector.—15,519, H. Bonnycastle and T. Jones, Refractory and Non-conducting Bricks, Blocks, Tiles, Slabs, and Pipes.

#### COMPLETE SPECIFICATIONS ACCEPTED.

##### Open to opposition for two months.

2,323, G. Oulton, Soldering Irons.—339, J. Lorrain, Heating, Cooling, and Ventilating.—3,130, J. E. & F. B. Rendle, Structures for Horticultural Purposes.—3,216, E. Ormerod and W. Horne, Cements.—3,748, A. Reddie, Rock Drills.—15,035, W. Scott Morton, Domestic Fireplaces.—15,252, P. Justice, Furnaces for Burning Limestone.—560, T. Clapham, Kitchen and other Firegrates.—2,233, H. Cleave, Lath Backing for Plaster Work.—3,299, N. Thompson, Connecting Lead and other Soft Metal Pipes, &c.—3,801, R. Keates, Dies for Ornamental Tiles, Bricks, Slabs, &c.—10,036, D. Doyen, Door Checks or Closers and Annunciators.—14,064, H. Mathey, Cement and Lime.

#### RECENT SALES OF PROPERTY.

##### ESTATE EXCHANGE REPORT.

JAN. 12.

By DOWSETT & WOODS.

Cheapside—2, Laurence-lane, freehold, area 615 ft. £4,210

By WATERBURY & SONS.

Weybridge—The residence, "Hothfield," and 3½ acres, 67 years, ground-rent 26l. 10s. 4,200

By L. FARMER.

West Hampstead 12, 14, and 16, Birchington-road, 81 years, ground-rent 26l. 6s. 2,880

By BAILEY & HILL.

Commercial-road, E.—26 and 28, New-street, 21 years, ground-rent 7l. 485

JAN. 13.

By C. P. WHITELEY.

Stoke Newington-green—35, and "Howard" and "Warwick" Houses adjoining, copyhold 2,330

JAN. 14.

By NEWSON & HARDING.

Canonbury—25, St. Mary's-road, 19 years, ground-rent 10l. 950

Islington—273, Liverpool-road, 30 years, ground-rent 15l. 650

Kensington—44 and 46, Rochester-road, 68 years, ground-rent 10l. 855

Haverstock-hill—1, Lion Villas, 61 years, ground-rent 2l. 600

Chalk Farm—42, Gloucester-road, and studio, 29 years, ground-rent 7l. 620

A Social Evening at Tunbridge Wells.—

On Saturday evening the employes of Messrs. Beale & Son, the well-known builders, &c., of Frant-road, were entertained at dinner, provided at the Swan Hotel, by the liberality of Mrs. and Miss Mills, in order to celebrate the completion of their new residence, "Cranwell House," Lower-green, by the firm. The house has been erected from the designs and under the superintendence of Mr. Herbert Caley, architect. Mr. L. S. Beale occupied the chair, and Mr. S. Beale the vice-chair, and a very pleasant evening was passed.

#### MEETINGS.

FRIDAY, JANUARY 23.

Metropolitan Board of Works.—Election of a District Surveyor for the Western Division of the City of London. 12 noon.

University College.—Professor C. T. Newton, C.B., on "Greek Inscriptions." II. 4 p.m.

MONDAY, JANUARY 25.

The Worshipful Company of Plumbers invite a meeting of the Plumbers' Trade of London, to be held at the Guildhall to confer as to the Registration of Plumbers, &c. 3 p.m.

Surveyors' Institution.—Discussion on Mr. Edward Smith's paper on "The Copyhold Emfranchisement Bill, 1881-85." 5 p.m.

London Institution.—Mr. Frederic Harrison on "Paris as a Historical City." 5 p.m.

Society of Arts (Conator Lectures).—Professor H. B. Hale Shaw on "The Friction of Fluids." 8 p.m.

Inventors' Institute.—Mr. William Johnson on "Brick-making Machinery, Bricks, and their Manufacture." 8 p.m.

Leeds and Yorkshire Architectural Society.—Mr. C. Pebody on "The Architecture of the Thirteenth and Nineteenth Centuries." 8 p.m.

Dundee Institute of Architecture.—Mr. W. Stephenson on "Egypt and its Monuments." 7 p.m.

TUESDAY, JANUARY 26.

National Association of Master Builders.—Half-yearly meeting, to be held in Derby at 2.30 p.m.

Royal Institution.—Mr. Reginald Stuart Poole on "Saurashtra." 3 p.m.

Institution of Civil Engineers.—Mr. C. E. Stromeayer on "The Injurious Effect of a Blue Heat on Steel and Iron." 8 p.m.

Architectural Association.—Meeting of members interested in Italian Excursion. Discussion on Florence. 6.30 p.m.

WEDNESDAY, JANUARY 27.

Society of Arts.—Mr. Henry Davey on "Machinery in Mines." 8 p.m.

Civil and Mechanical Engineers' Society.—Mr. R. Parkes Twigg on "The Safety of Life and Property at Sea." 7 p.m.

Liverpool Engineering Society.—Mr. G. L. Burton, Assoc.-M.Inst.C.E., on "Modern Milling, with special reference to the Caster Process." 8 p.m.

THURSDAY, JANUARY 28.

Royal Academy of Arts.—Lectures on Sculpture: Mr. A. S. Murray on "The Early History of Bas-Relief." 8 p.m.

Society of Antiquaries.—The Rev. F. J. Heales on "Roman Remains from Willoughby, Lincolnshire." 8.30 p.m.

Society of Telegraph-Engineers and Electricians.—The President, Prof. D. E. Hughes, F.R.S., will deliver his "Inaugural Address." 8 p.m.

London Institution.—Professor John Perry on "Telephage." 7 p.m.

FRIDAY, JANUARY 29.

Architectural Association.—Mr. A. Beresford Pite on "Cathedral Facades." 7.30 p.m.

Institution of Civil Engineers (Students' Meeting).—Mr. Llewellyn B. Atkinson on "Electrical Measuring Instruments." 7.30 p.m.

#### Miscellaneous.

**The Registration of Plumbers.**—The Worshipful Company of Plumbers, being desirous to take steps for giving effect to the recommendations of the General Council who have been considering the best means of securing the greater efficiency of plumbing and draining work in dwelling-houses, have, as will be seen by an advertisement in this week's *Builder*, convened a meeting of the London plumbing trade, to be held at Guildhall on Monday next, to consider the question of registration, &c. The recommendations of the Council will be found in the *Builder* for August 8, 1885, p. 185.

**Accident to a Church Tower.**—Extensive restorations have been going on at the parish church, All Saints, Kingston-on-Thames, since August last, under the direction of Mr. Pearson. On the 2nd inst. an alarming accident occurred. It had been intended to raise the north and south arches of the tower, as the east and west one had previously been raised; an arch for the south side was built in before Christmas, and immediately after Christmas the workmen proceeded to take down the walling between the new and the old arch. No sooner, however, was this done than a crack appeared in the south-east pier of the tower, which showed an unsuspected weakness in that part. The tower was shored up for Sunday, and the next day Mr. Pearson came down and pronounced that the idea of raising these two arches must be abandoned. He gave directions as to the shoring-up of the tower on that side while the damage to the pier was being repaired. This is now being carried out, and Mr. Pearson has confidence that the pier will ultimately be made very much stronger than ever it has been before.

**A New Pulpit of Caen Stone.** embelished with three carved figures of Our Lord, St. Peter, and St. Mary Magdalene (the latter being the patron saint of the Church), was presented to the Parish Church of Lillington, near Leamington, at Christmas. The work was executed by Messrs. Jones & Willis.



**Liverpool Engineering Society.**—The first ordinary meeting of the twelfth session was held at the Royal Institution, Colquhoun-street, Liverpool, on Wednesday, January 13th, Mr. Coard S. Pain (President) in the chair. A paper was read by Mr. Arthur J. Maginnis, M.Inst. N.E., entitled, "A Strange Failure of Steel Boilers." Since the introduction of steel for marine boilers, much has been written and disclosed about the strange freaks of the material, but as far as can be traced no similar cases of failure to those described in the paper have been experienced. The peculiar nature of the failure consisted in the steel plates commencing, in two steamers (after a period of two and a half years' satisfactory working), to crack spontaneously some days after steam had been let down, without exhibiting any special reason for so doing; and as they continued to occur each time the vessel came into port, at one time in the combustion chamber plates, at another time in the furnaces, and so on, it became evident that some change was taking place in the material. Some extensive mechanical and chemical tests were made on strips from the cut-out portion of the plates (given in the appendix to the paper), but as they threw no light on the matter, and the cracks continued to occur, it became a matter for serious consideration whether the boilers, or at least the interiors, must not be condemned, and as no previous cases had occurred, considerable difficulty was experienced in coming to a decision as to what course to take. It was eventually decided to have new boilers altogether, and the wisdom of the step was soon afterwards confirmed, as it was found that the blows given when cutting off the rivets cracked and broke the shell, furnace-fronts, and other plates in a most unusual and alarming manner. As the failure of the material in these boilers reveals the unpleasant fact that it is possible for steel to be used which may afterwards become treacherous, notwithstanding the extensive tests and rigid inspections now made, it will be interesting to obtain some satisfactory reason for the unaccountable change which undoubtedly took place, but as mild steel is now generally conceded to have passed beyond the tentative state, the owners of these steamers decided to again have steel boilers, but of the Siemens-Martin manufacture instead of the Bessemer.

**The Charterhouse.**—At the meeting of the Metropolitan Board of Works on the 15th inst., the Parliamentary Committee presented a report recommending the Board not to petition against the Bill promoted by the Governors of the Charterhouse for the sale or other disposal of the Middlesex estate of the Charterhouse, but in consequence of a letter addressed to the Board by the Holborn District Board calling attention to the Bill, and asking the Board to take such steps as they may think proper to secure the land as an open space or recreation-ground for the use of the public, and forwarding a copy of the report of the Medical Officer of Health for the District on the subject, the matter was referred back to the Committee for further consideration. The Society for the Protection of Ancient Buildings have presented a memorial to the Governors, in which they suggest that the buildings should be utilised as a picture-gallery or some similar purpose, and that the grounds should be thrown open to the public as a place of recreation.

**Lectures on Forestry at the City of London College.**—Professor Boulger, F.L.S., is in progress of delivering a course of ten lectures at this College on "Forestry," with special reference to the examinations of the Surveyors' Institution. The course commenced on Jan. 13. It is intended to give practical demonstrations in the country during the spring. The syllabus embraces the consideration of climate and trees, land suitable for arboriculture, the drainage and other preparation of the land, nurseries and their management, planting operations, thinning and maintenance, felling and barking, timber measurement, exploitation and management of coppice, the distinctive characters of the various British timber trees, &c.

**The Portland Cement Trade.**—Messrs. Matheson & Grant's "Engineering Trades' Report" for January says that the Portland cement trade, the factories for which are mainly situated in the London district, is in a very depressed condition; both home and foreign orders are much below the average of the last two years, and some of the factories are working short time.

**The Surveyors' Institution.**—More than 100 candidates have, we are given to understand, sent in their names for this year's examinations. Of this number forty-five are candidates for the studentship of the Institution,—their examination taking place during the present week. The remaining fifty-seven candidates will shortly offer themselves for examination in professional knowledge with the view of qualifying for the Professional Associateship or Fellowship of the Institution. The number of the candidates would have been still larger this year but for the effects of the new rule requiring, as a condition of admission to the examinations, proofs of satisfactory performance of practical and responsible duties in a surveyor's office under the hands of their employers.

The whole body of candidates is nearly equally divided between the three branches of land agency, valuing, and building surveying.

**The Menzel Exhibition at Berlin.**—One of the principal attractions in Berlin, during the past few weeks, has been the exhibition of the works of Herr Menzel, which are now on show in the salons of the Royal Academy of Fine Arts in that capital. The fête commemorative of the seventieth birthday of the artist, in connexion with this exhibition, passed off in the most brilliant manner. The German Emperor sent his felicitations in an autograph letter. The Prince Imperial, the German Chancellor, and several other great dignitaries, as well as all the most eminent representatives of literature and art in Berlin, presented their congratulations in person to the artist, at his private residence. In the evening Herr Menzel dined with the Crown Prince. On the opening day the exhibition was visited by the Crown Prince and Crown Princess, Herr Gosler, the Minister of Education, and likewise representatives of the other Ministries. From Breslau a deputation of the Town Council waited upon Herr Menzel, to present him with the honorary citizenship of that town.

**New Water Towers at the Wandsworth County Lunatic Asylum.**—The fire which took place about six months since at the Surrey County Lunatic Asylum, near Wandsworth Common, has led to the erection of two water-towers, and the laying down of additional water-mains for use in case of future outbreaks of fire. The tower on the east side of the asylum buildings occupies a site about 20 ft. above the ground-level of the several ward blocks, is 22 ft. square at the base, and is 60 ft. in height to the point where it is surmounted by the tank. The tank has a capacity of 22,000 gallons. The tower is faced with stock and red brick, with string-courses and quoins at the angles in blue Staffordshire brick. The tank was designed by Mr. Mackenochie, C.E., of the Surrey Commercial Docks, and manufactured by Messrs. Stothard & Pritt, engineers, Bath. The tower on the west side of the buildings is also 22 ft. square, but of less altitude than that on the east side, being 40 ft. in height to the platform level, the extreme height, including the tank, which will hold 10,000 gallons of water, being 52 ft. This tank was constructed by Messrs. Shand & Mason. The water to supply the two tanks will be pumped up from three wells within the ground by engines of 20-h.p. As an additional safeguard in case of fire, seventy-nine hydrants have been laid down, forty-one of these being in the asylum buildings. The whole of the hydrants were supplied by Messrs. Shand & Mason. Two external staircases have also been erected at the main asylum buildings. A new block of buildings has also been erected for the accommodation of an increased number of inmates. Mr. F. Iles, architect to the asylum committee of magistrates, designed the towers and other works, which have been carried out by workmen in the employ of the county authorities, under Mr. Iles's superintendence.

**The Inventions Exhibition.**—Invention asks:—"Can the statement now put forward in a contemporary be true, that the Inventions Exhibition, though it was not expected to draw so much money as its predecessors, has resulted in a loss so large that the surplus from former exhibitions has been nearly absorbed? The receipts must, after all, have been magnificent, and it is strange news that the last South Kensington show has left so heavy a loss. It would be as well if the accounts were promptly published, and in a more detailed form than those of previous exhibitions."

**Sanitary Assurance Association.**—Prof. T. Roger Smith, F.R.I.B.A., lectured on "A Damp House" at the Parkes Museum last evening (Wednesday), when there was a large attendance, and Sir Joseph Fayrer, K.C.S.I., President of the Association, presided. Prof. Roger Smith, in his lecture, said that damp was the enemy of the English climate, and pointed to the importance of taking every precaution to keep damp out of our houses. Damp from the soil should be kept back by means of asphalt and other impervious materials in the walls, and, indeed, over the whole area within the walls of the house. He advocated hollow walls, and particularly urged the great importance of using the best materials in house building. In addition to dampness from without there were sources of dampness from within. Tanks of water under floors were objectionable, and a fruitful source of dampness of the worst kind was defective drains. The combustion of gas in any large quantity charged the air with moisture. He recommended any one who had a damp house to leave it, but if that was impossible, then the house should be thoroughly examined, and defects made good in the most thorough way. Any half measures were a mistake. To all he said, "Shun a damp house; he runs a great risk who lives in it. He does a good work who turns a damp house into a dry one." A most interesting discussion followed, in which Mr. H. Rutherford, barrister-at-law; Mr. E. C. Robins, F.R.I.B.A.; Mr. T. M. Rickman, F.R.I.B.A.; Mr. Thos. Blashill, F.R.I.B.A.; and the Chairman took part, the Chairman remarking that damp was the most fruitful source of disease in India. The meeting terminated at a late hour with votes of thanks to Professor Roger Smith and Sir Joseph Fayrer.

**The Aeri Filter.**—Under this title a filter patented by Mr. J. Mallie, is being introduced in England by the House Sanitation Company. It is claimed that the Aeri filter not only clarifies the water, but also retains the germs, animalcules or organisms held in suspension therein, whereby the water after passing through the filtering medium will be rendered physiologically pure without being deprived of the salts and air necessary for its digestion. The water in this filter is also in contact with a cushion of air under pressure which becomes absorbed by and highly aerates the water, and renders it very digestible. The filter is very readily connected to water-supply pipes leading from cisterns. It is easily taken to pieces and refitted, and readily cleaned by plunging in boiling water, and brushing, so as to destroy and remove all dangerous germs or microbes arrested therein, the frequency of cleaning depending on the quantity of water used, and the degree of impurity (usually about two months). The filtering medium is inclosed in a protective transparent, thick glass casing, and is also provided with a safety-valve arranged to shut off the supply in the event of the filter becoming broken, whereby all danger of flooding is avoided, as well as the admixture of unfiltered water. The filtering action operates in an outwards direction through the walls of the filter, and the liquid supplied by the pipe from a cistern containing water under pressure (at least 10 lb. above the level of the filter), percolates through the porous surface to the outside.

**Earthenware Cisterns.**—Messrs. J. Duckett & Son, of Burnley, inform us that they have succeeded, by a new process which they have patented, in producing earthenware cisterns of a much larger size than have hitherto been made. They have just made, and successfully burned, a cistern of the size of 7 ft. 8 in. by 3 ft. 7 in. by 3 ft. 6 in. The great difficulty in the way of large cisterns of this material is to prevent the clay warping and cracking during the burning; and this difficulty the patentees state that they have been able to get over in the process they employ. If so, the improvement is an important one.

**Messrs. Doulton & Co.'s New Building.** With reference to a paragraph in our issue (p. 146), referring to certain tenders for installing some premises which had been destroyed by fire, Messrs. Doulton & Co. wish to say that the report which they received from their architects, Messrs. Waring & Nichol, was that the firm whose tender was the lowest had made an error in calculation, and required an increased price. Under these circumstances, and with the advice of their architects, Messrs. Doulton felt they were at liberty to take course they might deem advisable.



**Science and Art Department.**—We have received from Colonel Donnelly the Calendar and General Directory of the Science and Art Department for the year 1886, published by Eyre & Spottiswoode, from which, at the cost of 1s., a complete statistical statement is to be obtained of the working of this now immense ramification of official artistic instruction all over the kingdom.

**Royal Meteorological Society.**—The annual general meeting of this Society was held on Wednesday evening at the Institution of Civil Engineers, Mr. R. H. Scott, F.R.S., President, in the chair. The secretary read the report of the council, which stated that the past year had been one of great activity, as the eight committees which had been appointed had met frequently and had done much for the advancement of meteorology. The number of Fellows on the roll of the Society is 537. The President (Mr. R. H. Scott) then gave his retiring address. The officers and council for the ensuing year were then elected, Mr. William Ellis, F.R.A.S., being the new President.

**The Mersey Tunnel Railway** was formally opened for passenger traffic on Wednesday last by H.R.H. the Prince of Wales. In the *Builder* for February 26 last year we gave views of the stations at James-street, Liverpool, and at Birkenhead, both of the buildings having been carried out from the designs of Mr. G. E. Grayson, architect. We will give some further particulars about the new tunnel and railway next week.

**Railway Coupling Trials.**—The trial of safety couplings promoted by the Amalgamated Society of Railway Servants will (through the kindness of Mr. C. Scotter, General Manager of the London and South-Western Railway) take place at the Nine Elms Goods Yard, London, S.W., on a date yet to be fixed. As the number of wagons placed at the Society's disposal is limited, it is obvious that a selection must be made by the committee entrusted with the arrangements; and in order that this may be done, the Society asks inventors desirous of competing to forward to the office of the Society, not later than January 30th, drawings, specifications, or models of the couplings they desire to have tested. Preference will be given to such as retain the kind of draw-bar hook at present in use.

**Paving Apportionments.**—At the Workhouse-street Police-court on Wednesday last, Mr. Hannay gave judgment in a number of summonses taken out by the Hackney District Board of Works against owners of house property in Amherst-road, Hackney, for the recovery of rates made under an apportionment for paving works, in accordance with the Metropolitan Local Management Act. A very large amount of money was claimed by the complainants, the expenses having been incurred under peculiar circumstances. In the year 1877 certain paving work was executed by the District Board of Works in the road named, and the cost, about 1,000l., was charged on the rates. In consequence of recent decisions of the High Court, the metropolitan vestries had decided that they had been wrong in so charging the costs on the general rates, and these proceedings were taken to recover the rates. Mr. Hannay's decision was to the effect that the Board had in question was a "new street" in the meaning of the Act, and that he was unable to behind the resolution of the Board that it was a new street, and required paving, the ward themselves being fully responsible for the resolution. He considered the orders made for should in justice be made, and he accordingly made the orders for payment. He granted a case for the consideration of a Superior Court.

## PRICES CURRENT OF MATERIALS.

TIMBER.	£. s. d.	£. s. d.
Heart, B.G. .... ton	6 10 0	7 10 0
K. E.I. .... load	12 10 0	15 10 0
Coia, U.S. .... ft. cube	0 2 6	0 2 9
Canada .... load	3 0 0	5 0 0
" .... do	3 0 0	7 0 0
" .... do	3 10 0	4 10 0
Dantaic, &c. .... do	1 10 0	4 10 0
" .... do	3 0 0	5 0 0
" .... do	3 0 0	7 0 0
" .... do	3 10 0	5 0 0
" .... do	4 10 0	6 0 0
" .... do	5 0 0	7 0 0
" .... do	2 15 0	4 10 0
" .... do	3 12 6	3 15 0
" .... do	7 10 0	8 10 0
" .... do	6 0 0	7 10 0

## TIMBER (continued).

£. s. d.	£. s. d.
Riga .....	8 0 0
St. Petersburg, 1st yel. ....	9 0 0
" 2nd .....	7 0 0
" white .....	8 0 0
Swedish .....	8 0 0
White Sea .....	8 0 0
Canada, Pine 1st .....	17 0 0
" 2nd .....	12 0 0
" 3rd, &c. ....	7 0 0
" Spruce 1st .....	9 0 0
" 3rd and 2nd .....	8 0 0
New Brunswick, &c. ....	5 0 0
Battens, all kinds .....	4 0 0
Flooring Boards, sq. 1 in.—Pre-	
pared, first .....	0 9 0
Second .....	0 7 8
Other qualities .....	0 7 0
Cedar, Cuba .....	0 0 3
Honduras, &c. ....	0 0 3
Australian .....	0 0 3
Mahogany, Cuba .....	0 0 3
St. Domingo cargo av. ....	0 0 4
Tobacco cargo av. ....	0 0 4
Mexican .....	0 0 4
Honduras cargo av. ....	0 0 4
Maple, Birdseye .....	0 0 3
Ripe Rio .....	7 0 0
Bahia .....	5 0 0
Rox, Turkey .....	7 0 0
Satin, St. Domingo .....	0 0 0
Porto Rico .....	0 0 0
Walnut, Italian .....	0 0 4

## METALS.

£. s. d.	£. s. d.
Iron—Pig in Scotland .....	2 2 6
Bar, Welsh, in London .....	4 15 0
" " in Wales .....	4 7 6
" Staffordshire, London .....	5 15 0
Sheet, single, in London .....	7 10 0
Hoops .....	7 5 0
Nail-roads .....	5 15 0

## METALS (continued).

£. s. d.	£. s. d.
Copper—	
British, cke. and ingot .....	43 0 0
Best selected .....	46 0 0
Sheets, strong .....	52 0 0
" India .....	46 0 0
Australian, fine cke. ....	40 2 6
Chili, bars .....	40 10 0
Yellow Metal .....	12 10 0
Lead—Pig, Spanish .....	12 17 6
English, com. brands .....	13 16 0
Sheet, English .....	15 2 6
Spelter .....	14 17 6
Silicon, special .....	15 5 0
Ordinary brands .....	15 5 0
Tin—	
Banca .....	96 0 0
Billion .....	84 0 0
Straits .....	92 5 0
Australian .....	92 5 0
English ingots .....	97 0 0
English sheet .....	0 0 0

## OILS.

£. s. d.	£. s. d.
Linseed .....	18 15 0
Cocoon .....	29 10 0
Ceylon .....	28 0 0
Copra .....	14 0 0
Palm, Lagos .....	23 10 0
Tallow .....	25 0 0
Rapeseed, English pale .....	22 10 0
" brown .....	21 0 0
Cottonseed, refined .....	17 10 0
Lubricating and Oleine .....	25 0 0
" Refined .....	7 10 0
TURPENTINE—	
American, in cks. .... cwt.	1 6 6
Tar—Stockholm .....	0 19 0
Archangel .....	0 12 6

## COMPETITIONS, CONTRACTS, & PUBLIC APPOINTMENTS.

*Extrict of Advertisements in this Number.*

### COMPETITIONS.

Nature of Work.	By whom required.	Premium.	Designs to be delivered.	Page.
New Wing to Hospital, Shadwell .....	East London Hospital .....	Not stated .....	March 31st .....	i.
New Infirmary .....	Parish of Birmingham .....	do .....	Not stated .....	i.

### CONTRACTS.

Nature of Work, or Materials.	By whom required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Construction of Tunnel .....	Leeds Cor. Waterworks .....	Filiter & Rofe .....	Jan. 26th .....	ii.
Repairing, &c. Street Lamps .....	Tottenham Local Board .....	De Pape .....	do .....	xviii.
Kerbing, Tar-paving, &c. Work .....	Lewisham Bd. of Wks. .....	Official .....	do .....	ii.
Articles and Works .....	Chelsea Vestry .....	G. R. Strachan .....	Jan. 26th .....	ii.
Australian Blue Stone or Guernsey Granite .....	Dartford Union .....	Official .....	Jan. 26th .....	ii.
Sewerage Works .....	Brighthelm Local Board .....	H. B. Nichols .....	Feb. 1st .....	ii.
Construction and Extension of Reservoir .....	Stockton, &c. Water Bd .....	J. Mansergh .....	Feb. 2nd .....	ii.
Boundary Walls, Abutments, &c. for Bridge .....	Cole and Marsden L. B .....	H. Bancroft .....	do .....	ii.
Ironwork for Bridge .....	do .....	do .....	do .....	ii.
Making-up Roads .....	Wandsworth Bd. of Wks .....	Official .....	do .....	ii.
Collection and Removal of Dust .....	do .....	do .....	do .....	ii.
Iron Fence and Gates, and Erection of same .....	Lydd Town Council .....	Burrell & Valsey .....	do .....	ii.
Casting and Putting-up Service Tanks .....	Hastings R. S. A. .....	Jeffery & Skiller .....	Feb. 3rd .....	xviii.
New Lift-lift, Carriage .....	Com. of H.M. Works .....	Official .....	Feb. 6th .....	ii.
Ironwork for Bridges .....	Midland Railway Co. .....	A. A. Layley .....	do .....	xviii.
Sewage Disposal Works .....	Burton-on-Trent Cor. .....	Jas. Mansergh .....	Feb. 6th .....	ii.
Refractory Materials .....	Com. of H.M. Works .....	Official .....	Feb. 9th .....	ii.
Alterations to Baths, &c. ....	Com. of Poplar Public .....	do .....	do .....	ii.
Mortuary Chambers, Post-Mortem Room, &c. ....	Bath and Washhouses .....	Messrs. Clarkson .....	Feb. 10th .....	xviii.
	Hornsey Local Board .....	T. De Courcy Meade .....	Feb. 15th .....	xviii.

### PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised	Salary.	Applications to be in.	Page.
Surveyor .....	Ulverston Local Board .....	277l. ....	Jan. 25th .....	xvi.
Borough Surveyor .....	Dewsbury Town Council .....	257l. ....	Feb. 6th .....	xvi.

### TENDERS.

CLAPHAM (Surrey).—For 3,150 ft. of roads, 2.5 ft. of pipe sewer, and 650 ft. of brick sewer, on the "Clock House" Estate, Clapham-common, S.W. Messrs. Wheeler & Hollands, surveyors:—				
T. Rigby, Craydon .....	£4,000 0 0			
G. Jervis Smith, Streatham .....	4,080 0 0			
G. Neal, Wandsworth-common .....	3,487 0 0			
W. Harris, Camberwell .....	3,399 0 0			
C. Killingback, Camden Town .....	3,351 0 0			
T. Blackmore, Clapham .....	3,000 0 0			
EAST GREENWICH.—For new shop-fronts and alterations to 1, Alma-place, East Greenwich, for Mr. T. H. Parry. Mr. W. T. Hunt, Jan. architect:—				
Leng .....	£181 0 0			
Lewis .....	165 13 8			
Thomas .....	160 0 0			
Schellfield (accepted) .....	154 0 0			
PINCHLEY.—For re-building class-rooms at the Anglo-French College, Pinchley. Mr. Basil Fisher, architect:—				
Bowen .....	£1,327 9 0			
Battam & Son .....	543 0 0			
Nightingale .....	533 0 0			
Evans .....	490 0 0			
Castle .....	449 0 0			
Aldridge & Co. ....	428 0 0			
Seed .....	398 0 0			
Lyford .....	386 0 0			
Wright .....	376 0 0			
J. O. Richardson .....	349 0 0			
Neave .....	348 0 0			
HORNSEY.—For the erection of play-room and repairs at the Workhouse School, Hornsey-road, for the parish of St. Mary, Islington. Mr. William Smith, A.R.B.A., architect. Quantities by Mr. T. Marcus Houghton, Imperial-buildings, Ludgate-circus:—				
Eade & Son .....	£737 0 0			
Dunford & Langham .....	717 0 0			
Bavins .....	669 0 0			
Richey .....	660 0 0			
Barber .....	635 0 0			
Palmer .....	620 0 0			
Seed Bros. ....	620 0 0			
Reeson .....	615 0 0			
Dearing & Son .....	616 10 0			
Mattock Bros. ....	616 0 0			
Larks & Son .....	610 0 0			
Roby .....	610 0 0			
Collins .....	603 0 0			
Killingback .....	600 0 0			
Hirst .....	595 0 0			
Martin .....	584 10 0			
Wells .....	575 0 0			
Whicker .....	569 0 0			
Hewitt .....	568 0 0			
Norris .....	549 0 0			
Neave & Neave .....	544 0 0			
Dixon .....	531 0 0			
Pack Bros. ....	531 0 0			
Ward & Lambie .....	513 0 0			
Watkins & Coyle .....	498 10 0			



**LEICESTER.**—For the erection of two shops and dwelling-houses, at the angle of Granby and Chatham streets, Leicester, for the Leicester Co-operative Society, Limited. Mr. Thomas Hind, architect, Leicester.—

J. A. Bent .....	£1,650 0 0
A. Flint .....	1,632 0 0
G. Hewitt .....	1,824 0 0
Sharpe & Son .....	1,816 0 0
Clarke & Garrett .....	1,698 0 0
E. Kellett & Son .....	1,678 0 0
F. Major .....	1,670 0 0
T. Tyers .....	1,630 0 0
E. Lawrence (accepted) .....	1,616 0 0

**LEICESTER.**—For providing and fixing wrought-iron hurdle fencing in Lancaster-street and Regent-street, for the Corporation of Leicester. Quantities by Mr. J. Gordon, C.E., Borough Surveyor.—

C. Mason & Co., Leicester .....	2,621 17 6
Baldwin & Amies, Ashbourne .....	472 15 0
G. B. Smith, Glasgow .....	402 7 6
J. O. & C. E. Bretell, Worcester .....	397 9 8
Hill & Smith, Brierly Hill .....	389 11 8
Hydes & Wigfall, Sheffield .....	388 18 8
W. T. Burdidge, Leicester .....	383 10 0
W. W. Judd & Co., Leicester .....	340 11 3

Iron, Wire, Wire-rope, and Fencing Company, London .....	343 1 3
W. Hayward & Co., Wolverhampton .....	339 15 0
W. C. & J. Key, Birmingham .....	327 5 0
Wright Bros., Leicester .....	324 5 0
Brookes & Co., Wolverhampton .....	288 0 0
Johnson Bros. & Co., London (66 complete) .....	231 0 0

\* Accepted.

**LONDON.**—For building new residence, 35, Hans-place, S.W., for Mr. Guy Sebright. Mr. G. S. Finlay, architect. Quantities supplied by Messrs. Drew & Rowlett.—

Bush .....	£3,493 .....	£3,662
Higgs & Hill .....	3,494 .....	3,558
J. Garlick .....	3,490 .....	3,545

\* Accepted.

**LONDON.**—For adapting certain premises in Millman-street, Chelsea, to accommodate upwards of 100 horses, for the London Road Car Company. Mr. H. I. Newton, architect, Queen Anne's-gate, S.W.—

Walker, Limehouse .....	£759 0 0
Lorden & Sons, Upper Tooting .....	659 15 0
Porter, Southwark .....	647 0 0
Chafen, Rotherhithe (accepted) .....	589 0 0

**LONDON.**—For alterations and new shop-front to 13, Oxford-street, for Mr. Raphael.—

Charles Jeffreys (accepted) .....	£232 3 0
-----------------------------------	----------

**ROTHERHITHE.**—For curbing, paving, and making up Eugenia and Alpine roads, for the Rotherhithe Vestry. Mr. Edward Thomas, surveyor.—

Beyers .....	£947 0 0
Holmes .....	823 0 0
Etheridge .....	770 0 0
Adams .....	760 0 0
Woodham & Fry .....	712 0 0
Mowlem .....	697 0 0
Treherne & Co. (accepted) .....	690 0 0

[Surveyor's estimate, £79 1 4]

**ROTHERHITHE.**—For certain alterations at Albion House, Rotherhithe, for Mr. William Houghton. Mr. Edward Thomas, architect.—

White .....	£190 0 0
Chafen (accepted) .....	187 0 0
James .....	185 0 0
Evans .....	183 0 0

[Architect's estimate, 175/]

**TILBURY.**—For workshops, stores, &c., for the Tilbury Dock Engineering and Ship Repairing Company. Mr. Edward Clark, architect. Quantities by the architect:—

Perry & Co. (accepted) .....	£10,253 0 0
------------------------------	-------------

**WALTON (Suffolk).**—For building four cottages, for Mr. Charles Rattle, at Walton, Suffolk. Messrs. R. T. Orr & Son, architects. No quantities.—

C. S. A. Woolhouse, Felixstowe .....	2,643 0 0
C. A. Wyatt, Ipswich .....	598 10 0
T. Ward, Felixstowe .....	589 0 0
A. Cox, Ipswich .....	584 0 0
W. Calver, Walton .....	560 0 0
Finch & Parker, Walton .....	540 0 0
T. Warnam, Felixstowe .....	530 0 0
C. Canham, Walton .....	487 0 0
S. Markham, Ipswich .....	470 0 0
J. D. Horne, Walton .....	450 0 0
Fox & Wallis, Walton .....	339 0 0

[Architect's estimate, 471/]

**WORTHING.**—For additions to Worthing Police Station. Quantities by Mr. Nunn, Brighton. Mr. Ellice.

J. Reynolds, jun., West Brighton .....	£1,460 0 0
J. Baker, Worthing .....	1,443 0 0
J. Morris, East Grinstead .....	1,415 0 0
J. Parsons & Sons, Hove .....	1,400 0 0
P. Peters, Hove .....	1,395 0 0
R. Cook, Ifield, Crawley .....	1,389 8 5
J. Longley, Crawley .....	1,375 0 0
Woolgar & Son, Horsham .....	1,369 0 0
C. Rowland, Horsham .....	1,370 0 0
O. C. Cook, Worthing .....	1,368 0 0
S. Sawin & Son, Worthing .....	1,353 0 0
W. Jarrett, Angmering .....	1,340 0 0
W. Twine, Worthing .....	1,209 18 6
W. W. Smith, Worthing .....	1,165 10 0
A. J. Wright, Worthing .....	1,160 0 0

**SPECIAL NOTICE.**—Lists of Tenders frequently reach us too late for insertion. They should be delivered at our office, 46, Catherine-street, W.C., not later than Four p.m. on THURSDAYS.

#### TO CORRESPONDENTS.

Registered Telegraphic Address, "THE BUILDER, LONDON."

**J. B. F. C.—R. R. R.** (If the entrance can be considered as a street or part of a street, it will appear full within the bye-law. If not, it will appear as a private enclosure, apparently the bye-law would not apply. But as you do not give the reason for the bye-law, we cannot say whether or not the bye-law applies. If you can give us any practical value, and the (as is not now)—F. J. S. (thanks; not required)—J. H. B. C. B.—R. A. L.—(we fear it cannot be published)—C. H. (not our province)—E. I. B. and A. W.—L. & Co. (it is a matter for your advertisement columns)—W. B. (we have answered already to the subject).

All statements of facts, lists of tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

**Notes.**—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

We cannot and do not intend to print correspondence.

Letters or communications (beyond mere news items) which have been submitted for other journals, are NOT DESIRED.

All communications to the Editor, if they are to be published, should be addressed to THE EDITOR; all communications relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

#### PUBLISHER'S NOTES.

Registered Telegraphic Address, "THE BUILDER, LONDON."

**THE INDEX and TITLE-PAGE** for Volume XLIX. (July to December, 1885) was given as a Supplement with our issue of January 2nd.

**A COLOURED TITLE-PAGE** may be had, gratis, on personal application at the Office.

**CLOTH CASES** for Binding the Numbers are now ready, price 2s. 6d. each; also

**READING CASES** (cloth), with String, to hold a Month's Numbers, price 2s. each; also

**THE FORTHY-NINTH VOLUME** of "The Builder" bound, price 7s. 6d. each; also

**SUBSCRIBERS' VOLUMES**, being sent to the Office, will be bound at a cost of 3s. 6d. each.

**CHARGES FOR ADVERTISEMENTS.**

**SITUATIONS VACANT, PARTNERSHIPS, APPRENTICESHIPS, TRADE, and GENERAL ADVERTISEMENTS.**

Six lines (about fifty words) or under ..... 4s. 6d.

Each additional line (about ten words) ..... 6d.

Terms for Series of Trade Advertisements, also for Special Advertisements on front page, County, &c., Contracts, Sales by Auction, &c., may be obtained on application to the Publisher.

**SITUATIONS WANTED.**

FOUR LINES (about THIRTY words) or under ..... 2s. 6d.

Each additional line (about ten words) ..... 6d.

**PREPARATION IS ABSOLUTELY NECESSARY.**

\* \* \* \* \* Stamp must be sent with all small sums should be remitted by Cash in Registered Letter or by Money Order, payable at the Post-office, Covent Garden, W.C.

**DOUGLAS FOURDRINER, Publisher.**

ALL communications to the Office, Catherine-street, W.C., must reach the Office before TEN o'clock on THURSDAY.

If the Publisher cannot be reached for the DRAWINGS, TESTIMONIALS, &c., left at the Office, the Editor will be responsible, and strongly recommends that of the latter OFFICE ONLY should be sent.

**SPECIAL.**—ALTERATIONS in a STANDING ADVERTISEMENT. If the alteration is to be made on THURSDAY, the alteration must reach the Office before TEN o'clock on WEDNESDAY.

**PERSONS** advertising in "The Builder," may have Replies addressed to the Office, 46, Catherine-street, Covent Garden, W.C., free of charge. Letters will be forwarded if addressed to the Office, &c., together with sufficient stamps to cover the postage.

#### TERMS OF SUBSCRIPTION.

"THE BUILDER" is supplied gratis from the Office to readers in any part of the United Kingdom at the rate of 1s. per annum. To all parts of Europe, America, Australia, and New Zealand, 2s. per annum. To India, China, Ceylon, &c., 3s. per annum. Remittances payable to DOUGLAS FOURDRINER, Publisher, No. 46, Catherine-street, W.C.

#### Best Bath Stone for Winter use.

WESTWOOD GROUND, Box Ground, Combe Down, Corsham Down, &c. (Summer Dried). RANDALL, SAUNDERS, & CO., Limited, Corsham, Wilts. [Ad]

#### Box Ground Stone.

is the best for use in all exposed positions being a well-known and tried Weather Stone, 50,000 ft. cubes in stock. PICTOR & SONS, BOX, S.O., WILTS. [Ad]

#### Doubling Freestone and Ham Hill Stone.

of best quality, in blocks, or prepared ready for fixing. An inspection of the Doubling Quarry is respectfully solicited; and Architects and others are CAUTIONED against inferior stones. Prices, delivered to any part of the United Kingdom, given on application to CHARRLES TRASK & SONS, Norton-sub-Hamdon, Dorset, Somerset.—Agent, Mr. E. WILLIAMS, No. 16, Craven-street, Strand, W.C. [Ad]

#### Doubling Free Stone.

For prices, &c., apply to Messrs. S. J. STAPLES, HAM HILL STONE, Quarry Owners, Stone and Lime Merchants, Stoke-under-Lyme, Cheshire. (Ground or Lump), Limestone. [Ad]

#### Asphalte.

The Seyssel and Metallic Asphalt Company (Mr. H. Glenn), Office, Poultry, E.C.—The best and cheapest material for damp courses, railway arches, warren floors, flat roofs, stables, cow-sheds, and rooms, granaries, tin-rooms, and terraces. [Ad]

#### Asphalte.

Seyssel, Patent Metallic Lava, and White Asphaltes. M. STODART & CO., Office: No. 90, Cannon-street, E.C. [Ad]

EVERY DESCRIPTION OF SEASONED WOODS AND VENEERS IN EXTENSIVE QUANTITIES.

#### B. J. HUDSON & SONS.

Millbank Sawmills, Grosvenor-road, S.W. Whitefield-street, W. And Store-street, London, W.C. Telephone No. 3,152, and Private Wire connecting Business Premises.

#### MICHELMORE & REID.

Manufacturers of

CHARLES COLLINGS'S PATENT.

COLLINGS'S PATENT HIND LEVER, SCREW, & BARREL

Self Acting "FALL DOWN" GATE STOP and IMPROVED GATE FITTINGS of every description.

36A, BOROUGHS ROAD, LONDON, S.E.

DISCOUNT TO BUILDERS.

#### GOLD AND SILVER MEDALS AT AMSTERDAM EXHIBITION.

## IRON CISTERNS.

### F. BRAY & CO.

LONDON, LIVERPOOL, GLASGOW

VERY PROMPT SUPPLY.

LARGE STOCK READY.

CYLINDERS FOR HOT-WATER CIRCULATION.

Particulars on application.

Chief Office: 360, EUSTON ROAD, LONDON.

# The Builder.

Vol. L. No. 2542.

SATURDAY, JANUARY 30, 1886

## ILLUSTRATIONS.

Liverpool Cathedral Competition: View of West Front.—Design by Messrs. G. F. Bodley and T. Garner, Architects .....	200-201
Liverpool Cathedral Competition: View from North-West.—Design by Messrs. G. F. Bodley and T. Garner, Architects .....	204-205
South Elevation of Messrs. Bodley & Garner's Design for Liverpool Cathedral .....	208-209
East Elevation of Messrs. Bodley & Garner's Design for Liverpool Cathedral .....	212-213

## CONTENTS.

The Water Supply of some Great Cities .....	189	Obituary .....	188	The Examination in Architecture .....	217
Messrs. Bodley & Garner's Design for Liverpool Cathedral .....	190	National Association of Master Builders of Great Britain .....	198	"Plumbers and Parliament" .....	218
Notes .....	192	Competitions .....	198	Sewage Purification .....	218
Metropolitan Railways and other Schemes .....	193	Election of a District Surveyor .....	198	Timber Measurement .....	218
The Spanish and Portuguese Synagogue, Bevis Marks .....	194	Liverpool Cathedral: Design by Messrs. Bodley & Garner .....	198	The Student's Column: Foundations—V. .....	219
Some Lessons from Old Glass .....	194	The Menory Railway .....	216	Recent Sales of Property .....	219
The Surveyors' Institution: Preliminary Examination, 1885 .....	196	New Bridge for Concrete Building in the Metropolis .....	216	Meetings .....	219
The Registration of Plumbers .....	196	Brick-making Machinery and Brick Manufacture .....	216	Miscellaneous .....	220
Architectural Societies .....	198	Is a Timber Stage a Building? .....	217	Prices Current of Building Materials .....	221

### The Water Supply of some Great Cities.

**T**HE pure inland seas and mighty rivers of North America afford to the inhabitants of that quarter of the world an unstinted supply of water, for all purposes of navigation, cultivation, mechanical power, and domestic use. The Mississippi River alone drains an area of more than ten times the extent of the United Kingdom. The surface of the water of Lake Superior, at a level of 628 ft. above the sea, covers an area larger than that of the whole of Scotland. The length of the inland navigation, from the Straits of Belle Isle to Fond-du-Lac, at the head of Lake Superior, is 2,384 statute miles, and from the same point of starting to Chicago, on Lake Michigan, almost exactly the same distance; while the ocean navigation from Belle Isle to Liverpool measures only 2,234 statute miles. The Ohio River, from which the great city of Cincinnati derives its water supply, has a mean annual flow of 150,000 cubic feet per second, and is 4,000 ft. wide when it falls into the Mississippi, nearly 1,100 miles above the mouth of the latter river. Lake Michigan, on the borders of which has risen the most rapidly-developed of all the great cities of the New World, namely, Chicago, has an area of 23,000 square miles. It is 320 miles long, 100 miles broad, 628 ft. above the level of the sea, and is said to be 100 ft. deep. The Croton River, at a distance of 33 miles above New York, is raised by a dam to a height of 166 ft. above mean-tide level at that city, and its waters, led thence in an aqueduct, flow at a level which provides for the supply of 90 per cent. of the area of that city by gravitation. Thus, whether we regard abundance and purity of water, or natural facilities for its distribution by gravitation, every imaginable form of convenience to the dweller in cities for the supply of his need of this great necessary of life is offered by nature in the United States. Nor is there any part of the surface of the globe in which the skill and perseverance of man have been more efficient in making the best of the gifts of nature.

It is thus of no small interest to the residents of older and more densely-populated countries, especially in those localities where the rapid increase of population has attained such a density that the citizens could not be supplied with enough water from the skies above them, even if every drop that fell over the districts in question could be caught and

stored for use, to ask what the genius of the American engineer has done to supply the need of the urban population of the chief great cities of that continent from the inexhaustible stores of its lakes, rivers, and running and falling waters.

In the United States exist (or existed at the date of the last census) but ten cities of each of which the population exceeds 200,000 souls. In the United Kingdom, excluding the metropolis, there were also, at the date of the last census, only ten cities of each of which the population exceeded 200,000 souls. On the Continent of Europe twenty-four capitals and great seaport towns exceed that population; but neither are the data so well ascertained, nor the conditions so distinctly characteristic, as is the case with the cities of the United States. The 3½ million residents of our ten great centres of population, and chiefly those of the metropolis, who form a yet larger body of water consumers, may well look with interest to the outcome of the experience of 5 millions of townsmen (in 1880, 4,855,000), of kindred race, placed amid the unfailing waters of North America.

Of these great cities, three, viz., New York, Brooklyn, and San Francisco, have laid out in the aggregate about the same sum that has been expended in the London waterworks, in order to obtain the advantage of a supply by gravitation, for an aggregate population little more than half that of London. Boston also depends on gravitation, drawing its supplies from the Sudbury river, and the Lakes Cochituate and Mystic. Philadelphia pumps to reservoirs, from the Schuylkill and the Delaware rivers. Baltimore depends partly on gravitation and partly on pumping, taking its supplies from Jones's Falls and Gunpowder Rivers. St. Louis and New Orleans pump to reservoirs from the Mississippi, as does Cincinnati from the Ohio. And Chicago, as original in its mode of procuring water as in so many other features of its masterly engineering, draws its supply from the pure water of Lake Michigan, through a tunnel of two miles in length under the bed of the lake, fed through a down-pipe at the end in a depth of 32 ft. of water. Alone among these great Western cities, Chicago (owing to its low level) adopts the old-fashioned English mode of pumping to a stand-pipe. Of all the ten cities, the cost at Chicago is the lowest, whether as regards outlay of capital in proportion to the number of inhabitants, or working cost per million of gallons. On the other hand, so freely is the water dispensed in Chicago, that the daily delivery averages 109 gallons per inhabitant. It is of interest to take note of the growth of the city which, so far as present information goes, has

at once the cheapest and the most copious water-supply in the world, although, owing to the liberality with which it is dispensed, the annual cost per inhabitant is higher than that in either New York or Philadelphia.

The population of Chicago, which, in 1830 was seventy persons, became in

1840 .....	4,583
1850 .....	29,963
1860 .....	112,170
1870 .....	285,977
1880 .....	508,185

Language fails to add to the force of these figures. From 1870 to 1880 the increase has been nearly sixty souls per day.

The waterworks of Chicago, as they existed at the date of Sir Charles A. Hartley's visit in 1873, were described by that engineer in a paper communicated to the Institution of Civil Engineers in the following year. It was found, Sir Charles says, by careful borings, that a bed of compact blue clay, at least 100 ft. thick, underlay the thin crust of silt and sand which formed the bottom of the lake. On this bottom, at the distance, as before said, of two miles from the shore, was formed an artificial island to serve as the locality for a shaft at the lakeward end of the tunnel. For this purpose a crib or timber frame, of a pentagonal plan, 90 ft. in diameter, 40 ft. high, and with walls 25 ft. thick, was constructed on shore, towed to the selected spot, and filled, in fifteen prepared compartments, with 6,000 cubic yards of stone to sink it to the bottom of the lake. The top of this structure, when settled into place, stood 5 ft. above the water, and in the centre of the mass was a sort of open well, of about 30 ft. in diameter. Within this framework, which contained 50,000 cubic feet of whole 12-in. timbers, a column of seven cast-iron pipes, of 9 ft. in diameter, and of a total length of 63 ft., was sunk through the clay to 31 ft. below the bottom of the lake. The clay was excavated within as the pipe sank, and the tunnel was started from below to meet that previously commenced from the shore. This gallery is nearly circular in section, being 5 ft. 2 in. in depth, and 5 ft. in width, and consists of two rings of brick in cement, 8 in. thick. It was started from each end, the lake end being commenced eighteen months later than the work from the shore. The land shaft is sunk to 70 ft. below the level of the lake, and 77 ft. below that of the ground, so that the tunnel has a landward fall of 7 ft. in the whole distance. The two excavations met at about one quarter of the distance from the crib to the shore.

Four steam-pumping engines were provided for the service of the city, but at the commencement of 1873 a new double-beam engine was started as a relief. This, which is said to



be the largest pumping-engine in the United States, has two 70 inch steam cylinders with 10-ft. stroke and works two pumps of 57 in. diameter, delivering 36 millions of gallons of water in twenty-four hours. If worked together with the other engines there is a combined capacity of 75,000,000 gallons per twenty-four hours. A standpipe, 140 ft. above the level of the lake, is protected by a stone tower 170 ft. high. The pumps are considered to force the water to a height of 132 ft., but in the daytime the delivery is said not to rise higher than the second story of the houses. The water is supplied through thirty-eight miles of mains, the largest of which have a diameter of thirty-six inches.

The power of delivering a daily supply of water equal to half of that now demanded by the wants of 4,000,000 of Londoners was not, however, enough to slake the thirst of Chicago. A second intake-shaft and tunnel were in progress at the time of Sir Charles Hartley's visit in 1873, and a land tunnel, 7 ft. in diameter, was pierced for four miles westward of the lake, in order to supply a second set of pumping works to accommodate the extension of the city. By the year 1880, as we learn from Mr. J. J. R. Groes, the author of "Statistical Tables of the Water Works of the United States," the sum of 1,868,000L. had been expended on the water-works of Chicago, the annual revenue from water rentals amounted to 206,000L., and a mean quantity of 1093 gallons per head of the population was daily supplied.

With this enormous volume of water, and with the simplicity of arrangement which the unlimited supply and the low level of delivery render possible, it is not matter of wonder that the working cost of water delivery in Chicago is by far the lowest in the world. In the nine years ending in 1872 the cost of delivering a million gallons of water varied from 52s. to 32s. In 1882 it had fallen to 22s. But the revenue of the works amounted, in the last-named year, to 10'26l. per million gallons, and the cost per inhabitant, owing to the copious nature of the supply, was 26 per cent. higher than that incurred in the same year by the inhabitants of London.

While Chicago is thus the cheapest of the great cities of the West in the procurement, if not in the sale, of water, the lowest cost per inhabitant occurs in New York. We must, indeed, make exception in favour of San Francisco; but the figures stated so anomalous that we await the result of inquiries made in the latter city are in some respects so anomalous that we await the result of inquiries made in the United States on the subject before quoting them to our readers. Of nine of the ten cities, certainly, New York is at the same time the cheapest, and the only one that supplies water at a less rate per inhabitant than the average price in London. Yet the capital laid out on the New York waterworks is 5'84l. per inhabitant, while that in Chicago is only 3'73l. per inhabitant, and the working cost per million gallons is nearly twice as much in New York as in Chicago, while the revenue is only about 3 per cent. more.

The water supply of New York is provided by the construction of a dam across the valley drained by the Croton River, about six miles from its mouth, which raises the water to a height of 40 ft. above the original level at that point; or to 166 ft. above the mean tide level at New York. From this dam to the Harlem River, which is crossed by an aqueduct containing eight arches each of 80 ft. span, and seven arches each of 50 ft. span, runs an uninterrupted conduit of stone and brick masonry, set in hydraulic cement, of thirty-three miles in length, including a tunnel through rock. The Harlem Aqueduct was built to carry two cast-iron pipes, each 4 ft. in diameter, at the level of 108 feet above mean tide; but a 7½ ft. diameter pipe of boiler plate was laid down in their place. The masonry conduit is continued for two miles from the Harlem Bridge. Then the Manhattan Valley is crossed by syphon pipes, and two miles more of conduit and aqueduct brings the water to the receiving reservoir at New York. This reservoir, formed in two divisions, has an area of 31 acres, and a capacity of 150

millions of imperial gallons. It is connected with a distributing reservoir of an area of 4 acres, a depth of 36 ft., and a capacity of 20 millions of imperial gallons; an additional receiving reservoir of an area of 106 acres, and a capacity of 1,000 million gallons; and a new storage reservoir in the Croton Valley, of three times the last-named capacity, raises the combined capacity of the whole of above indicated reservoirs to 4,570,000,000 gallons. And yet another reservoir in the Croton Valley was in course of preparation, at the time referred to, with a capacity of 3,700,000,000 gallons; the object being, in case of the occurrence of long droughts, to provide for 82 days' consumption of the city, at the rate of 100 gallons per head, irrespective of the minimum daily flow of the Croton River, of 27,000,000 gallons.

For the supply of the higher section of the city, north of the Manhattan valley, a high service reservoir is constructed, into which water is pumped by steam from the aqueduct near Harlem Bridge. And the very highest points are fed from a tank supported on a tower, near the last-named reservoir, at a height of 300 ft. above the sea. In 1882 the ordinary daily consumption of the city was 95,000,000 American, or ordinary wine, gallons of water; and the high service supply amounted to a further quantity of 11,605,630 American gallons. The cost of the works has attained the large figure of 7,000,000L., or 5'84l. per inhabitant. The annual revenue was 343,000L.; or 5'7s. per head, and the working cost was 70,000L., or only 1'14s. per head. The daily supply per inhabitant was 74 imperial gallons.

An instructive comparison of the two opposite methods of supply by gravitation and by direct pumping is afforded by the statistics of the water supply of Chicago and of New York. In the former, where 3'73l. per inhabitant has been laid out in the works we have enumerated, the cost of pumping to the height of 132 ft., and of the entire distribution, amounted (for an annual volume of 20,124 millions of gallons) to the incredibly low figure of 1'11l. per million. In the latter, where one-tenth only of the supply has to be pumped for about the same lift as at Chicago, the working cost for the delivery of 32,425 millions of gallons in the year 1882 was 2'18l. per million. The sum of 5'84l. per inhabitant had, as before said, been laid out on the works. If we allow the whole price of pumping and distribution at Chicago as an extra charge on the proportion of the New York supply that has to be pumped, we have a cost of 2'07l. per million gallons for the working expenses of the gravitation supply, including the maintenance of its large reservoirs, forty miles of aqueduct, and its other works, against a cost of 1'11l. per million for direct pumping; and this, too, with coal costing 28s. per ton.

It is thus evident that it is altogether idle to attempt to prescribe the cheapest method in which the water-supply of any given locality can be effected without due consideration of all the features of the case. It is, of course, clear at the first glance that, other things being equal, it is cheaper to supply water by gravitation than by pumping, independent of the extra strength of pipes and fittings that is required in the latter case. But the cost of the storage works has at the same time to be taken into account; and that both as involving interest on money and cost of maintenance. The interest on the New York gravitation-works, if taken per head of the population supplied, is, as we have shown, to that on the Chicago direct pumping works, as 5'84 to 3'73. But this is not all. The maintenance of these noble works, together with all the other working expenses of supply, raises the working cost at New York to nearly double that at Chicago.

Perhaps the nearest approach to a comparison of the same nature between towns of a certain magnitude in England is afforded by the cases of Worcester and of Plymouth. In the former city the water of the Severn, running through the place, is pumped to a reservoir, at a cost of 7'06l. per million gallons. In the latter, from works first constructed in the reign of Queen Elizabeth, the waters penned

up in a mountain valley are conducted through a leet, or open channel, of some twelve miles in length, into reservoirs for distribution, close to Plymouth. The average cost is returned at figures that do not work out to more than 1'41l. per million gallons. Here the cost of maintenance is very low, and comparatively little has been done to aid the resources provided by nature herself. With these two localities as instances of the cheapest water-supplies in England may be compared the supply of Kingston-upon-Hull, where the water is drawn from two artesian wells, and pumped into service-reservoirs of a capacity of about two days' supply of the town. Here the working cost comes to 7'34l. per million gallons, which is close upon that at Worcester. For the Kent Company, among those of the metropolis, which also relies on pumping from springs, the cost comes to 8'95l. per million gallons. It is readily intelligible why cost should be higher in the last case than in the two former; but the comparison tends to show that the cost of our urban supplies is, for the most part, very closely approaching the minimum possible under the physical features of the case. The cost to the consumers, in the exceptionally favourable case of Plymouth according to the figures given in the Return of Urban Water-supply (265, 1879), is at the rate of 7'01l. per million gallons, which is a lower figure than that in either of the great cities of the United States. Water is sold by meter at Plymouth for 2d. per 1,000 gallons, which is equivalent to 8'33l. per million. The rate outside the borough are 50 per cent. higher than within, averaging 3'33 per cent. on the rental. But the question of the amount of rate legally chargeable is always liable to some complication, that any statement of it conveys little information, if compared to this mode of application which we have followed; viz., rate of cost per million gallons, and rate of charge per inhabitant; the two figures being connected with each other by the rate of daily supply. Correcting the population given in the Return of Urban Water Supply by the increase from 1871 to 1879, the cost of water per inhabitant at Plymouth is 2'4 shillings per annum, and the daily supply is 46 gallons per head.

#### MESSRS. BODLEY & GARNER'S DESIGN FOR LIVERPOOL CATHEDRAL.



Give this week two of the external views of Messrs. Bodley & Garner's design for the proposed cathedral that from the north-west, showing the grouping of the whole building in accordance with the great central feature, and that showing the western façade. To these we add the elevation of the east end and the south side of the building, and the plan. Of the interior perspective of the nave, from the crossing, which is the finest and most effective of all the drawings by which the architects have illustrated their design, we gave a reproduction in the *Builder* for January 9th.

The following is the full text of the architects' report, which is a short pamphlet only:—

"In sending the accompanying designs for the new cathedral at Liverpool, we beg to offer the following observations upon them as a report.

The building of a new cathedral for the City of Liverpool offers an architectural opportunity such as has not occurred in England since the erection of St. Paul's Cathedral, in London, in the time of Charles II. We think that no trouble or expense ought to be spared in order to make this present work as great a success as Sir Christopher Wren's noble church is admitted to be. We do not think that, in the abstract, it would be well to adopt a revived Italian style, which was the one almost universally employed in Sir Christopher's time. We would rather advise the national style, in which our cathedrals, except this one, are erected, which is so intimately connected with an Englishman's idea of a cathedral. Sir Christopher himself, in almost all his works, and notably at St. Paul, shows great leaning towards these ideas, and we have no doubt that, had he lived in these days, he would have designed such a work in the English rather than in the Italian manner. How far a proposed site may affect this question shall be considered later.

After the question of style, the plan and general arrangement of the cathedral have to be considered.



Here, again, it will be useful to refer to the Cathedral of St. Paul as the principal cathedral of great size and magnificence which has been built for the Church of England since the Reformation. Although the style of the old English cathedrals seems to us the best to adopt for a new one, yet, in many respects, they are unsuitable as models, on account of the different wants and requirements of the present day. We do not, therefore, advise an unreasoning imitation of their plan or arrangements, but rather an adaptation. In one particular, namely, the large circular space under the dome at the entrance to the choir (so suitable for receiving a large congregation who can easily see and take part in the service), and so convenient, also, for assembling them around and in the immediate neighbourhood of the pulpit, St. Paul's offers an excellent model. Fortunately one of our old English cathedrals shows how this useful feature can be adopted in the national style, and in the octagon at Ely we have the same arrangement, treated most successfully in the English manner, by the celebrated Alan of Walsingham.

This, however, was not a building designed *de novo*, but merely an adaptation of an existing church. In the present case we have the advantage of an entirely new design, and we think that the octagon we propose, with its eight nearly equal arches, would produce an interior effect which has not been attained, as far as we know, in any cathedral yet erected in the world.

We think that the three spires would make a fine group. Lichfield is the only one of our cathedrals which, at present, possesses them, but they existed at many other English cathedrals two centuries ago, as at Lincoln and elsewhere, and may be considered as having been generally contemplated, if not executed. They could, however, be postponed if funds did not allow of their completion.

We must remark that, in our opinion, solid and massive piers to the nave are essential both to appearance and stability, and that their existence, in our design, should not be considered as a defect, because the use of the aisles, for congregational purposes, is out of the question in a church of this magnitude; and they must be considered as alleys or passages, and places for the reception of monuments,—a most essential part of a modern cathedral. We think it desirable to insist on the absolute necessity of providing a very large space for this purpose, as the number of memorials becomes so greatly increased in the course of ages, that unless there is very considerable room left, the church becomes greatly encumbered and disfigured; as is the case in Westminster Abbey, for instance.

We have kept the instructions to avoid elaborate and minute detail carefully before us; and we trust that the Committee will consider that our design does not err in this direction, the quantity of ornament being inconsiderable, compared with the dimensions of the building, and the size of the ornaments themselves being, in reality, very large. They are, in fact, larger than usual, though the small scale of the drawings makes it impossible to show this clearly. We should be quite willing, however, to simplify the design still further, in execution, if it should be thought desirable. We would, however, draw attention to the fact that the sides of the large and massive buttresses are of plain ashlar, and these, of course, do not appear on the elevational drawings. This would give a much greater appearance of solidity and plainness than might be supposed.

With regard to the dimensions of the church, we feel strongly that the cathedral church of so immense and populous, and at the same time so wealthy and important a city as Liverpool, should not be inferior in any way to the church of any other city in the kingdom. We have, therefore, designed a cathedral of the first class, and its height to the apex of the vaulting, 110 ft., is greater than any other church in England, though, of course, less than many foreign cathedrals. The style we have chosen is that of the early fourteenth century, and is of strictly English character. We cannot but think that the beautiful manner of our English architecture should be employed for this, which will be the most important ecclesiastical building that has been planned for many generations in England.

The general internal arrangements of the church do not seem to call for much remark. We think it essential that a passage should be kept all round the east end on account of visitors to the monuments and cathedral. We have placed the great organ at the west end, where it would be well heard, when played as a musical instrument merely; it might also be used on occasions when a large congregation was gathered in the nave. And a smaller organ, over the stalls, would accompany the choir. This organ would be played from the stalls.

In the planning of vestries, &c., we have indicated the general position and arrangement, but this could of course be modified to suit the practical requirements of the place. We should be happy to confer with the Committee on this point.

We have now to consider the requirements of the site, the nature of which presents a somewhat difficult problem.

On the plan supplied to us by the Committee the space allotted to the cathedral is not, in our opinion, quite sufficient. The church we have designed is, indeed, contained within its limits, and one bay of the nave could be omitted if necessary, but we feel

that it approaches too closely to St. George's Hall, and that it would be most desirable to move it a little westward. The building could be slightly reduced in scale without alteration of the design, and so more space be gained if it is thought desirable.

We have indicated this on a suggestive plan for the re-arrangement of the site, and there does not seem to be any difficulty in the way, as there is a large open space in front of the site already, which is now occupied by the weighing-machine. Of course it will be necessary to remove this, as it would not do to have this just at the west doors of the new cathedral. But we think also that the removal of the mean and unsightly modern houses at the west end is merely a question of time, and that a plan for the rearrangement of this portion of the town will form a part of the cathedral scheme. In our present plan, however, we should only require about 25 ft. or 30 ft. more, and this the open space at the west end easily affords us.

Another difficulty consists in the abrupt slope on which the building is to stand. We have arranged the necessary steps under the western porch, thus avoiding the difficulty of a long flight of steps between the carriage-road and the building, which, in wet weather, would be a serious inconvenience. The north transept we have also placed close to the road. We should recommend that an avenue of trees be planted, where we have shown it on plan, and that the rest of the ground be turfed and laid out with shrubs, the levels being made out by terraces and steps, which could be made to look very well.

Although we feel the advantages of the present site, and that it would be quite possible successfully to grapple with its difficulties, we think it should be a matter of careful consideration whether another site should not be selected, as the one proposed is certainly very confined. Another objection, and a still stronger one to our minds, is the fact that the cathedral will stand half way up the hill which is crowned by the fine building of St. George's Hall. It will be difficult to give proper prominence to the one building without, in some degree, detracting from the dignity of the other, as they are in such close proximity.

This brings us to the consideration of how far the present site must affect the choice of style. Surrounded as it is by a series of unusually fine buildings of the Classic style, it becomes at once a question how far they should influence the style of the cathedral. We have no doubt at all that, for the reasons stated at the beginning of this report, a new cathedral should be English rather than Italian; but we also think that it is extremely important that the different uses to which the buildings are dedicated should be at once apparent. There is great danger that a group of buildings, arranged as they must be very closely, and designed in the same style, should be confused together. The cathedral must, of course, be the most important in every way, but it would not occupy the place of honour, which is already taken by St. George's Hall; and we think that it would be difficult, if not impossible, to prevent the latter from appearing a part of the former. Of course, the group would, architecturally, be very fine.

With regard to the nature of the material, we should be inclined to advise the use of the local red sandstone for the interior; using some harder stone, such as Dumfries, where required. The exterior would require a stone carefully selected for its properties in resistance to the smoke and chemical action, spoken of in the instructions. We should advise Portland, or one of the best hard stones of the north. This is a matter which ought to be carefully gone into by an examination of the various stones used in Liverpool, in order to ascertain which best resists the action of smoke and weather.

In conclusion, we beg to say that, if entrusted to us, this very important work should have our best attention.

We should be glad to confer with the Committee, and to offer any explanation of the design."

There is less temptation to indulge in *pros* and *cons* about this design than about the last one we illustrated, because the view of the problem adopted by the authors is a very simple and straightforward one, being merely to build a Mediaeval cathedral in pure Mediaeval style, and on the old lines. The only point of novelty in the design is the treatment of the crossing, which is, it is true, adapted from Ely in its main idea, but is novel in regard to the proposal to raise not only a much more lofty lantern, but a tall spire, over the octagon. To do this it has been necessary to occupy the angles of the octagon with very massive piers, which, when the congregation extends beyond the area of the octagon, must very much militate against seeing and hearing over a great part of the space lying outside it in the nave and transepts. In judging of this, however, it is right to bear in mind that the authors distinctly decline to regard the question from a utilitarian point of view. Their object, as is evident from the passage in their report where they justify the massiveness of the nave piers, is to produce a fine Gothic interior, the

aisles not being regarded as for any purpose except as ambulatories, and as a space for the reception of monuments. Looking at the question from what may be called the Mediaeval point of view, this is of course perfectly logical. In another passage, indeed, the authors speak of the old English cathedrals as being unsuitable as models, on account of the different wants and requirements of the present day, and as demanding adaptation rather than imitation. But we must candidly confess that we fail to see where the "adaptation" comes in. Here is a long narrow Mediaeval nave of what may be called the processional type of church; and the octagon at the crossing cannot be called an adaptation, as it has been anticipated at Ely, to which precedent the authors especially refer, in terms which form a curious example of the way in which architecture is regarded now. "Fortunately," they say, "one of our old English cathedrals shows how this useful feature" (the space under the dome in Classic churches) "can be adopted in the national style," referring to the precedent of Ely. We should have thought the word would have been "unfortunately," and that the architects would have regretted, on the principle of *perant qui ante nos nostra dixerunt*, that Alan of Walsingham had been beforehand with them.

Messrs. Bodley & Garner, however, are fully entitled to their claim to have given a new and very fine treatment of Alan of Walsingham's idea. They have, as they say, the advantage of an entirely new building in which to work it out, whereas the octagon design at Ely was a modification of an existing building, not fully prepared in plan and foundation for such a treatment; and they are justified in saying that their central octagon, on eight lofty arches of nearly equal span, will produce an interior effect which has not been obtained in any other cathedral in the world. Some idea of it may be obtained from the interior view referred to, in the *Builder* of the 9th inst., and its construction will be seen when we have space to give the longitudinal section, which we are unable to find room for this week. There is ample verge of strength in the piers for the weight of the immense lantern (90 ft. in diameter to the exterior of the buttresses), and sufficient for the spire over it; but the superposition of the spire is a somewhat bold piece of construction, and would, at all events, require great care and calculation in carrying it out. The constructional spire, of course, starts much lower than the visible spire,—in fact, nearly from the base of the lantern where it clears the roof, but the thrust at the angles there would be very great (unless ties were employed, which is an undesirable way of bandaging up a building), and the mass of the buttresses is relatively rather small. No doubt it could be built, but it looks a little risky. The general outline and proportion of the central lantern and spire we think very fine; and both in this and the western towers the spires rise naturally as the culmination of a pyramidal composition, as we prefer to see them.

In presenting a design such as this, Messrs. Bodley & Garner, of course, put out of consideration the question of suitability to the adjoining buildings. Their idea is to make the cathedral contrast entirely with these; to give a vertical and pyramidal composition rising from among a mass of horizontal buildings. This is a treatment which has its *raison d'être*, and may be regarded as quite open to acceptance; though our own predilection would lean towards a treatment harmonising the structure with its surroundings. Generally the architecture of the design is an able and scholarly representation of the very beautiful phase of English Gothic selected. The interior is the most powerful portion of the design; the exterior, in spite of its great scale, impresses us as rather graceful than powerful. The treatment of the choir internally owes a good deal to suggestions, or more than suggestions, from Lincoln. The architects have shown themselves fully aware of the value of deeply-recessed porches at the entrance, and the detail of these porches, as will be seen in a drawing we will give hereafter, has been



worked out with the perfect knowledge of and feeling for that style of Gothic which might be expected from its designers. The question whether a pure imitation of Mediaeval architecture and of a Mediaeval cathedral should be adopted on the present occasion depends upon a number of considerations, some of them ecclesiastical rather than architectural, which we have already endeavoured to indicate. Upon purely architectural grounds we cannot but feel, as we said some years ago in regard to Truro Cathedral, that it seems to us a matter for regret that a modern cathedral should be built merely as an imitation of an ancient one, and with no attempt to work out new ideas and materials in a new form. We should be inconsistent with what we have always felt and expressed as to the need for progress and an endeavour after originality in modern architecture, if we adopted any other view; but we say this in full recognition of the admirable way in which the authors of this design have treated it from their own point of view.

We have not thought ourselves in any way called upon, in the remarks we have ventured to make on these three designs for such an important work, to express any decided opinion in favour of the adoption of one or other of them. The committee have an excellent adviser in Mr. Christian, and one whose fairness and impartiality may be depended upon; and, if we have any decided opinion in favour of one more than another, we prefer to leave it to be read between the lines. We have endeavoured to do justice to the fine points in each, and to draw attention to some of the considerations in regard to site, practical suitability, and aesthetic, which appear to us to be of special importance.

## NOTES.



Printed in our last number (p. 181) an important report of the Special Purposes and Sanitary Committee of the Metropolitan Board of Works, containing a large number of recommendations with respect to the cleansing and ventilation of sewers. In general scope these recommendations are commendable and likely to be productive of much good if adopted. We say this without unreservedly supporting every detail, but we think it very doubtful whether the local authorities will be able to secure the intelligent co-operation of householders in the way indicated in the fifth paragraph. The report was presented to the Board at its meeting on the 22nd inst., and the Chairman of the Committee (Mr. Alfred Pocock) was proceeding to move its adoption *en bloc*, when one or two members urged that the matters dealt with were of such importance that before the Board sanctioned the recommendations of the Committee the report should be referred to the various vestries and district boards of works for their opinion. After some discussion, it was decided to postpone the consideration of the report for six weeks, so as to give time for eliciting the views of the various local bodies in question. Seeing that these bodies are upwards of forty in number, what chance is there of unanimity of action in regard to such important matters of sanitary administration as those dealt with by the report?

LORD HENNIKER'S Railway Rates Committee has lost no time in discussing the course of action to be taken during the present Session, and will request the President of the Board of Trade to receive a deputation. The intimation conveyed in the Queen's Speech of the intention of the Government to deal with this matter was regarded as satisfactory and encouraging, and it will be interesting to see what success will attend the efforts of the Government to deal with a question which their predecessors have been unable to solve. The same subject occupied the attention of the Nottingham Chamber of Commerce at their meeting last week, when Mr. J. E. Ellis, M.P., while denouncing the Rates and Charges Bills of last year in no measured terms, urged that

Imperial legislation on the subject was imperative. When this matter was about to come before the House twelve months ago it was remarked by the *Times* that the railways had hitherto acted very much according to rule of thumb, but that, on the whole, rough equity had been done. Even if the latter part of this statement be true, and there are many who would not allow that it is so,—it must still be admitted that such a state of things is not at all satisfactory, and that there is no guarantee for this questionable equity in the present uncertain state of the law. It is certain, however, that the subject is much better understood than at this time last year, and we may look forward to practical results when it is again before the House.

In another column we report the result of the election of District Surveyor for the Western Division of the City of London, rendered vacant by the death of Mr. Rawlinson Parkinson. The appointment has fallen to Mr. Hugh McLachlan, to whom we offer our congratulations. He had been a candidate of long standing for such an appointment, and on previous occasions had been all but successful. The election which took place on the 22nd inst. was a little more exciting than usual, for it was rumoured that the son of a well-known member of the Board was likely to get the appointment, although this was only his second application. A proposal to vote by ballot on the six candidates selected from the thirty by the preliminary voting was negatived, and the voting proceeded in the usual way. The fact that the candidate in question received the highest number of votes in the preliminary voting was not reassuring, but when the second vote was taken it was evident that the majority of the members of the Board were not about to perpetrate an injustice. From the fact that the favoured candidate who has thus early obtained so good a place in the voting holds the certificate of competency granted by the Institute of Architects, it may be assumed that, technically, he is fully qualified to hold such an appointment, which we hope he may one day obtain; but we trust that the members of the Board will recollect that before this gentleman's turn comes there are other candidates considerably his senior, both in age and in length of candidature (to say nothing of experience) who merit consideration.

THE Plumbers' Company have, as will be seen by a report which appears on another page, succeeded in enlisting the earnest support of the plumbing trade of London in favour of the movement for the registration of all competent plumbers, whether masters or men. Although it is intended that the work of registration shall be confined to the City of London and seven miles round in the first instance (those being the limits imposed upon the action of the Company in its Charter), facilities for registration will be extended to all the large provincial towns with as little delay as may be. Pending the completion of these arrangements, however, it will be competent for plumbers from any part of the United Kingdom to be registered in London upon proof of their fitness. Although the meeting of the trade on Monday last was called at a very inconvenient hour for working men, the operative plumbers of London were well represented, but it was stated that, in consequence of the importance of the question, some of them had to leave their work to attend the meeting, "at the peril of the sack." Representatives from the provinces expressed the eagerness of the provincial plumbers to take part in the movement, and these expressions were repeated at the meeting of the General Council held on Wednesday afternoon, the Lord Mayor in the chair. From the resolutions adopted at both meetings it will be seen that there is some prospect of an early commencement of the work of registration. In the course of Wednesday's proceedings, Mr. Philip Magnus quoted some figures which showed that since this question of registration was mooted by the Plumbers' Company, the number of students of the technology of

plumbing has considerably increased. Mr. Magnus also referred to the excellent work, in the shape of technical education for plumbers, which has been initiated and carried on for some time in Dublin, by Mr. Maguire, of that city. Although the classes established by Mr. Maguire were originally intended solely for the benefit of his own workmen and apprentices, he has, in a very liberal spirit, extended their benefits to other workmen. It is satisfactory to see the masters and men of the plumbing trade vying with each other in promoting sound plumbing,—a branch of building work which, as the Lord Mayor observed, concerns us all very closely. Mr. George Shaw, the Master of the Plumbers' Company, has succeeded in enlisting the help of many well-known architects and sanitarians in this important movement.

THE question of a name for the new street, from Piccadilly-circus to Bloomsbury, was discussed at the meeting of the Metropolitan Board of Works on the 22nd inst. The proposal of the Works and General Purposes Committee to call the street "Piccadilly-road" was strongly opposed and ridiculed by some members of the Board, as it deserved to be. Equally absurd was the suggestion to call the new street "Piccadilly-east." It was pointed out that the new street ran north-east from Piccadilly-circus, and that, if any street in the vicinity was to be called "Piccadilly-east," that street was Coventry-street. To both names it was objected that the new street, cutting as it does through somewhat squalid neighbourhoods, had nothing in common with Piccadilly. The name "St. James's avenue" was suggested by Mr. Bonthron, the new representative for St. James's; a better name than this would be "Soho-avenue." Ultimately, the question was referred back to the Committee for further consideration. Now seeing that the Board at the same meeting decided to grant a site for a statue of the late Lord Shaftesbury in the centre of the circuit, which is to be formed at the intersection of the new street with the new street which it is to be made from Tottenham Court-road to Charing-cross, we think, with a correspondent of the *Times*, that the street may well be called "Shaftesbury-avenue." In this way, meant will be found for perpetuating the name of the distinguished philanthropist in that of the new street, which, it should be remembered, for pay of its length passes through a district (viz., S. Giles's) in which he took great interest.

AN important paper was read before the East India Association, on Wednesday last, by Mr. Henry Stanley Newman, on the subject "Water Storage and Canals in India: How far they are Preventive of Famine." Lord Harris, the Under-Secretary of State for India, presided, and in his address congratulated Mr. Newman on the exhaustive manner in which he had treated his subject, and in which he himself greatly sympathised, though he was unable to coincide with all the statements made. He added that he considered the lecturer had not appreciated all the difficulties with which the Government of India was beset, owing to the limits which were assigned to their borrowing powers, and the jealousy with which the House of Commons viewed expenditure in India, when he attributed to them failure in the vigorous prosecution of irrigating works. It was, of course, the duty of the Secretary of State to exercise a rigid scrutiny of the projects submitted to the Home Government for sanction, and that, rightly or wrongly, could only approve such as in the judgment of the Council appeared likely to advance the interests of the country without unduly adding to the burden of taxation which, in the opinion of those best qualified to judge, had nearly reached its possible limits.

FROM a report which is given in another column, we are glad to see that the Metropolitan Board of Works has at length shown a disposition to recognise the fact that there is a method of building walls of concrete, and to make by-laws to regulate, instead of regarding it as an unwarranted



and illegal proceeding. The determination comes rather late in the day, and seems to have been forced on the Board by the refusal of a magistrate to uphold the action of the Board's officials against a man who had dared to build in concrete,—a case on which we commented at the time.

IN the *Century Magazine* for February Mr. M. G. Van Rensselaer contributes an interesting article on recent architecture in America, illustrated by some very well-executed woodcuts. We recommend it to the notice of readers interested in architecture, professional or lay. There is plenty of evidence in the illustrations of the progress of a desire for originality and picturesqueness in architectural treatment in the States. Suggestions seem to be taken at present from the architecture of all times and countries, not always with the best judgment; but these elements may be harmonised in time into something like a distinct American style. In some cases, as in "Mr. Tiffany's House, Madison-avenue," there seems rather too obvious an effort to pose as "rough" and "picturesque." Certainly no one would imagine this was a town house in an entirely modern city; but it is better than being commonplace, at any rate.

A DISCOVERY of great importance to the chronology of vase-painting has just been made at Athens, and is reported in the *Εφημερίς ἀρχαιολογική*. Among some architectural remains, which are certainly of pre-Parthenon date, have been found buried certain fragments of pottery bearing the familiar signatures of the two famous potters, Hieron and Duris. It will be remembered that the vases bearing these signatures have been, so far, found exclusively in Italy. The great interest of the discovery lies, of course, in the fact that it fixes securely the date of the potters. Dr. Klein, in his brilliant essay "Euphronios," dated the whole group of potters connected with Hieron and Duris between 490 and 440 B.C., and here come the fragments themselves to give certainty to his conjecture. The same journal publishes some interesting fragments found in the excavations at Epidauros. Among them a young warrior; a head, probably of an Amazon, but much damaged; some figures of Nike, which have evidently surmounted acroteria, and, therefore, of great interest in connexion with the question of the Nike of Pæonios; two standing figures of Æsculapius; and a relief of a seated Æsculapius which Dr. Kabbadias (the new inspector of antiquities) thinks is a rough copy of the chryselephantine statue of Æsculapius in the sacred grove at Epidauros. Pausanias, it will be remembered, saw the statue, and describes it as "seated on a throne, and holding in one hand a staff, and with the other laid on the head of a dragon. A dog is represented at the foot of the statue."

THE Comptoir d'Escompte of Paris is sending M. Thevenet, an engineer, to China, to offer to the Chinese Government, on behalf of a syndicate of bankers, a loan of 800,000,000 fr. for the construction of 2,000 kilometres of railway. The resulting price, of nearly 26,000l. per mile, is about that of an average mile of railway in France, where the gross revenue averages 10·6 per cent. on capital cost. With the dense population of China better results may be expected on well-selected and well-constructed lines.

THE *Bulletin Epigraphique* (v., No. 4) reports the discovery of a long lost relic,—he so-called "stone of St. Thomas of Canterbury." It has turned up suddenly in the sacristy of the Domkirche of Siena. It is a rem about 3 centimètres long and 3 broad, and to it is attached a bit of parchment bearing the words, "De lapide super quem sanguis beati Thomæ Cantuariensis effusus est"; but the odd thing is that the gem itself bears the inscription, "Severi Anicetrum . . . spodium," which stamps the gem as the signet of a Roman oculist; so St. Thomas à Becket only allowed the relic with a second association.

UNDER the rather ambitious title of *Les Lettres et les Arts*, Messrs. Boussod, Valadon, & Co. (the successors of Goupil) publish in Paris a new illustrated review, commencing with the present year, and which includes illustrations, prose articles, poetry, and musical compositions. Among the contributors are M. Edouard Pailleron, who contributes a lively little story of the literary effort of two young "Poètes de Collège," who sent off their first manuscript play for the opinion of the greatest French poet, with the brief address, "Victor Hugo—Ocean"! (this was in the poet's Jersey days); M. Ch. Gounod, who writes a very interesting disquisition on sacred and secular music, to accompany an illustration of M. Dubufe's fine diptych picture "La Musique sacrée et la Musique profane"; M. Widor, who contributes a musical setting of a poem of Sully-Prudhomme's; and M. Jules Simon, who writes an interesting and thoughtful article on "Les Logements d'Ouvriers." The review is beautifully printed, with fine type and wide margins,—a "revue de luxe," in fact, but its great merit lies in the illustrations, which in beauty of execution, for work of this kind, could not well be surpassed. The new "Revue" does not aspire, we imagine, to occupy the rank of the more weighty periodicals; but from an artistic point it is a charming publication.

THE "Ereia" states that a new Central Museum is to be begun at once at Athens, and is to be reserved exclusively for such antiquities as are found within the limits of Athens itself and its immediate surroundings. Whether it is proposed in connexion with this new museum entirely to rearrange the already-existing museums, such as the Acropolis Museum and the Patissia Museum, and the collections of the Archaeological Society, is not yet stated. It would obviously be of advantage, both to students and archaeologists, if the distinctly Attic remains could be kept together. It is proposed that the museum should also contain Attic inscriptions and casts of Athenian antiquities in the possession of other nations.

THE Art-Union of London has issued to its subscribers this year, in lieu of the usual plate, a handsome edition of Scott's "Bridal of Triermain" (oblong folio), with fourteen plates, from sketches in black-and-white by Mr. Percy Macquid, R.I. The illustrations are reproduced in a very effective manner, but we cannot much admire the designs, which strike us as mostly very theatrical in style.

OUR American contemporary, the *American Architect and Building News*, in its issue for January 2, comments on a supposed act of injustice on our part to Messrs. Osgood, the publishers of a portfolio of Mr. Richardson's designs for Harvard University Law Schools, in not giving their name when we mentioned and reproduced some of the designs. It is a mere misconception. We were not aware that it was a publication sent for review by the publishers; we supposed that the architect, Mr. Richardson, had sent us a portfolio of his designs, and we asked his permission to reproduce two or three of them to show what was doing in American architecture, which he gave. Of course any book or publication sent for review by an American publisher would be duly credited to the firm that sends it.

THE collection of new French and Dutch pictures at the Goupil Galleries, in Bond-street, includes an immense picture by Benjamin Constant, covering nearly a whole side wall of the gallery, entitled "Justice in the Harem," and as remarkable for splendid colour and general power as for the sheer brutality of the subject. It represents a heap of more or less naked bodies of women who have been slaughtered, and whose blood lies about the floor of a gorgeous Moorish interior, and trickles into the basin of the fountain in the middle of the floor. For what sort of public are pictures of such hideous subjects,

on such a scale, painted, and who buys them? There are several good works by Bouguereau, among them one, "An Echo from the Deep," a well-nourished nymph kneeling in a sea-cave, and holding a shell to her ear, which as a piece of drawing and painting of the figure, is very fine, but has not a touch of sentiment: Bouguereau seems to reserve all his sentiment for his peasant subjects, and leaves us mere realism just where we look for idealism. "Loups-de-Mer" ("Sea-Dogs"), a large interior with figures of seafaring men, by Madame Demont-Breton, is a fine thing, a little in the manner of Israels,—rather too large, however, for its subject. There are one or two good landscapes.

THE so-called "Salon Parisien," which opened its second year's exhibition a few days ago at the gallery in Bond-street, exhibits less ability, and even more vulgarity, than last year, and the promoters have fairly succeeded in degrading art to the level of a "peep-show." The only things we saw there with any pleasure were two water-colour studies by M. Dubufe, junior, for decorative paintings, which are very charming, and worthy to be in better company.

#### METROPOLITAN RAILWAYS AND OTHER SCHEMES.

THE Bills in Parliament affecting the metropolis are much fewer in number this session than they have been for some years past, and seem to indicate that capitalists are seeking some other means of investment than railway or building schemes. The total number of these Bills is only thirty-one, as compared with fifty-seven last year, and fifty-five in the preceding year.

Three short lines of railway are proposed to be constructed within the metropolis, viz., the Bexley Heath Railway, which is about a mile and a half long, and two new junctions about a quarter of a mile long, near the New Cross Station of the London, Brighton, and South Coast Railway. There are eight new tramways about twenty-two miles long, two of which are proposed to be laid from the Archway Tavern, Holloway, to Finchley, along Highgate Archway. The South Kensington and Knightsbridge and Marble Arch Subway and Knightsbridge Improvement Company propose to construct an underground railway, or, as it is the fashion to call it, a subway, about a mile and a half long from Exhibition-road, South Kensington, under Hyde Park, to Oxford-street, near Park-lane, and to form two short streets near Knightsbridge Barracks.

By the Horse Guards Avenue Bill it is proposed to construct a new street from Whitehall to the Victoria Embankment. The house at the corner of Whitehall-yard, until lately the residence of Lord Carrington, and illustrated in the *Builder* more than a year ago [see vol. xlvii., pp. 200-201], is proposed to be removed, and the site thrown into the entrance to the new street, which will be between 89 ft. and 84 ft. wide at its western end, and for the remainder of its length 60 ft. wide. (For a plan of the proposed street see the *Builder* for Dec. 5 last, p. 803.) Power is reserved in this Bill to enable the Metropolitan Board of Works and other public bodies to enter into arrangements for carrying out the whole or any part of the works.

Two small street improvements, for widening Cold Harbour-lane, Camberwell, at its junction with Denmark-hill, and the extension of Munton-road to Rodney-street, New Kent-road, are included in the Metropolitan Board of Works (Various Powers) Bill. The Board also propose by the same Bill to provide a more direct communication between the Victoria Embankment and the Charing-cross foot-bridge by means of a flight of steps adjoining the Charing-cross Station of the Metropolitan Railway.

The Corporation of the City of London propose to convert the Central Fish Market into a market for fruit, flowers, vegetables, fish, meat, poultry, corn, hay, and other produce, and have introduced a Bill into Parliament for that purpose and for enlarging the existing market.

The Southwark and Vauxhall Water Company have re-introduced their Bill for the construction of a new service reservoir at Honor Oak-hill. This Bill passed the Committee of the House of



Lord's last Session, but did not reach the second reading in the House of Commons.

A Bill has been deposited for the enlargement of Hampstead Heath by the acquisition of Parliament-hill, Parliament-fields, the Elms, and East Park Estate, comprising an area of about 274 acres. It is proposed that the land shall be purchased by the Metropolitan Board, and power is given to enable the City and any of the Vestries or District Boards to contribute towards the cost of such purchase.

The Greenwich and Millwall Subway Company propose to take powers to raise further capital and to transfer their undertaking to the Metropolitan Board of Works.

#### THE SPANISH AND PORTUGUESE SYNAGOGUE, BEVIS MARKS.

At the well-nigh universal celebration which ushered in the 8th of Heshvan, 5645 (on Sunday evening, October 26th, 1884), being the centenary of the late Sir Moses Montefiore, the principal service in London was that which was held by the Rev. Dr. Hermann Adler, delegate Chief Rabbi, and others in the Spanish and Portuguese Synagogue, Bevis Marks.\* An elder thereof since 1814, Sir Moses had belonged to this, the Sephardic congregation for eighty years; and in their temple he was wont to offer up prayer before setting forth upon his several journeys to relieve his brethren abroad. The congregation claims to be the oldest in Great Britain, and to lineally represent the small band of Jews who, led hither by Rabbi Manasseh ben Israel, after his escape to Amsterdam from the Inquisition at Lisbon, were established here under Cromwell's favour (1655). It is on record that the Jews abroad had offered to Cromwell a sum of 500,000*l.* for a safe return, and certain privileges,—the latter to comprise the use of St. Paul's Cathedral for their own place of worship. But since 800,000*l.* was stipulated for, the negotiations fell through. Some writers date their general re-admission from the Restoration. According to their own chronicle the first Portuguese synagogue was built in King-street, Duke's-place, in 1655,—the existing synagogue was erected in Bevis Marks, and the learned Dr. Nieto appointed Chief Rabbi, in 1701. With an interior more imposing, though less capacious than that of its neighbour, the Great Synagogue,† this structure, whilst possessing no striking architectural beauties, is a pleasing specimen of real Queen Anne style; and is said to contain a beam presented by that sovereign. The fine central cablebrab, of old Dutch work, should not be overlooked. Its registers and vestry-room walls carry the names of Disraeli, Ricardo, Bernal, Lopez, Aguilar, and others that have contributed to the making of our history; besides some of purely Jewish note, such as Nieto and Abendana, the Rabbinites, with the Abarbanel who claimed descent from the royal line of David. Amongst the lists of those who have served as *Parnassim* is that of Benjamin Disraeli, with date 5577,—1817 A.D. He was probably Lord Beaconsfield's grandfather. About that time his son, Isaac, seceded from the congregation, and eventually from the communion, owing to a rupture on this very question of assuming office among the *Parnassim*. The oft-disputed date of his son Benjamin's birth stands in the register under date 1804, which can be taken as deciding the matter. We may here mention that, whilst his reckoning does not quite tally with our own, a correspondent, who should be well informed on this point, tells us that the synagogue is at this date exactly 204 years old.

But the poorer members of this community are gradually driven further eastwards; for their wealthier co-religionists a Spanish and Portuguese synagogue has been provided in (No. 57) Bryanston-street, Bryanston-square. It is contemplated to remove the synagogue and schools into the remotest East of London. The trustees,—albeit, so we learn, not unanimously,—have invited tenders for taking the property, either in whole or in portions, on building lease for eighty years from Lady-day next. The premises, being freehold and within the City, include Nos. 10, 11, 13, and 14, Bevis Marks; and Nos. 1, 2 (the girls' and the infants' schools and the almshouses), and 21 (the

\* Mrs. Rachel Prussac, a Jewish lady, aged 103 years, was present.  
† Established (1891) in St. James's (prince Duke's) place for German, with whom are now amalgamated the Polish, Jews. The present building dates from 1780.

Jewish baths), Heneage-lane.\* Covering an area in all of, say, 20,580 superficial feet, the ground lies north-east by south-west at the angle of Bevis Marks and Heneage-lane (facing an end of Duke-street), with frontages thereto of about 128 ft. and 208 ft. respectively. James-court, opening out of Bury-street, to the south-west, is a *cul-de-sac*, but could be converted into an additional approach; the frontage here is nearly 90 ft. An open courtyard surrounds three sides of the synagogue which, on the fourth side, abuts at right-angles against Heneage-lane. Access is gained thereto by the schools in the lane, and through the gates and cart-way between Nos. 10 and 11, Bevis Marks. We should observe that the City Commissioners of Sewers have agreed to acquire a slip off the now sites in Heneage-lane in order that this thoroughfare may be widened to a uniform width of 24 ft.

#### SOME LESSONS FROM OLD GLASS.†

It has been contended that to carry the picture, or whatever it may be, across the lights of a window is a practice altogether indefensible. But to confine the design of each separate light within the mullions is, in many cases, to insist either upon subjects on a very small scale, or upon single figures, standing each in its own little niche. Now the standing figure scheme, with its rows of saints ranged in solemn order round the church, is a very satisfactory one, and may, as in the clerestory at Bourges, be even imposing in its effect. It did good service, from first to last, throughout the Gothic period; and will serve for all time. But it is not all-sufficient; and one may surely aspire sometimes to subjects on a similar scale. Such subjects were evolved very naturally out of the foregoing scheme of single figures in separate lights. Two such figures might obviously bear some more particular relation one to another than that of a series of prophets, apostles, evangelists, or what not. They might represent (as they sometimes did) the Virgin and the angel Gabriel; and thus we have, almost as a matter of course, an "Annunciation" subject in two lights. If this chance to be enclosed in a two-arched canopy, with a central shaft bisected by the intervening mullion, no reasonable objection could be taken to such an extension of the subject.

Very often there was no such obvious acknowledgment of the stonework; but in any really decorative composition the mullion is acknowledged, by the very grouping of the figures and the arrangement of the accessories.

It would be hard lines, having once seen what breadth and largeness of style may be gained by over-stepping the limits of a single light, to have to go back to the rigid system of what may be called the separate-cell treatment. The mullion is to be acknowledged, but that is not to say that it is in every case to be emphasised by the glass-painter. It must be remembered, too, that in the actual window the mullion is a much less formidable division than it appears on paper.

The rightness or wrongness of it all lies in the way the thing is done. There are compositions in plenty which are quite unjustifiable as window designs, the work of men who did not care, perhaps who did not know, enough of glass to concern themselves greatly about mullions, any more than they bothered their heads about leads and saddle-bars. But in the hands of men bred up in the exercise of this particular craft, and who had always before them the effect of their design in the glass, it has been shown abundantly possible to produce a window in which the design is carried across a number of lights, and where the effect is not impaired by the mullions,—for the simple reason that they have been duly taken into account. If they do interfere with the design, then the design is in fault. That seems to me the simplest test of the fitness of the proceeding. Let those who can distribute their design, whether ornament or figure-subject, over as many lights as they please.

There is one practice of the pictorial glass-painters which seems to me not rashly to be followed. They were in the habit of filling the

window with a picture without any border or margin whatever to separate it from the stonework. Some sort of framing to the subject appears, however, to be absolutely necessary. For the actual mouldings framing the window go for nothing in the effect of the glass; the stonework tells only as shadow; and any design, therefore, which counts upon the masonry to frame it is bound to be disappointing in the glass. There are some windows in the Laurentian Library at Florence, by Giovanni da Udine, which illustrate very forcibly this defect. Relying upon the rather elaborate, canopylike, stone-framing of the windows he has simply treated the glass as so many panels, which he has painted with his usual grotesques and arabesques, glazed after the manner of the period, quarry-wise. In the drawing of the elevation this was, no doubt, a very well; but the glass has simply the appearance of being unframed.

Some sort of frame is as necessary to it as to a picture,—the nature of that framing is another question. It is in many, if not most instances, desirable that it should have some architectural character; but that is not to allow that it should be architectural. The everlasting canopy I look upon as a weak device of the architect (I had almost said of the Enemy), either because the artist was compelled by the master-builder to provide some sort of architectural setting to his figures, as in the funny little pent-houses which figure in the earliest glass, or because, as in the stupendous structures in the latest windows, the designer was an architect and must needs find room for architecture even in his glass.

It is a matter almost of course that, in making attempts in a comparatively unaccustomed direction, we should resort to the familiar expedients and devices which have served us so well under other circumstances: see how his her attempts at decoration the lady amateur resorts straightway to drapery, and all manner of derivatives from dress-making and millinery in which she feels herself at home.

The architect, inasmuch as he is an artist, produces something artistically fine, however ill-advised; but his architectural forms in glass are a misapplication as perverse as the flimsy feminine expedient of upholstery in house decoration.

The Early Gothic canopy in glass is to me childish. The Decorated canopy is a misproportioned monster, dwarfing the poor little figures it is supposed to honour. As to the Perpendicular canopy, which more nearly approaches the forms of stonework, or (as in Germany) those of metal-work, it is sometimes marvellously beautiful in effect, framing jewelled pictures in a setting of silvery white. But this effect is due largely to the quality of the white glass so abundantly employed; and, might, I believe, be equally arrived at by the use of ornament of more intrinsic interest and beauty. Certain Renaissance canopies,—some I remember at Rouen and some in Italy,—assist practically of arabesque ornament, just as, in taking the form of a canopy to be classed under that head. These are as satisfactory as they are successful, that is to say, in proportion as they are non-architectural.

The huge altar-like structures of the late glass-painters, the finest of which are those of St. Gildard, are effective at a quite exorbitant expense of light and brilliancy. The men were capable of designing them, could surely have obtained this much, and more, by means less open to objection.

The ready resort to the cheap expedient of the architectural canopy, seems to me to imply not a lack of invention, than at least a disinclination to take the pains to invent.

The framing cartouche of the seventeenth century, again, scarcely commends itself by results in glass. It depends for its force too much upon shadow to be of any great use to the glass-painter.

I would plead for the more abundant use of ornament as a frame for figures,—and, indeed, for ornamental design with little or nothing else. I am bound to confess that, apart from any significance or beauty of form in figure-work, it is usually more interesting than much ornament,—if only on account of its greater variety and unexpectedness of colour masses: it is so much easier in figure design to keep clear of that monotony which repeated ornament is perilously inclined to fall. Indeed, the difficulty with fig-

\* Stow says that Thomas Heneage and Sir Thomas, his son, held, since Bury Abbey was dissolved, the property here, which passed from the Bassatts to the abbots of Bury. Hence Bury's, or Bevis, Marks.

† Continuation of a paper, by Mr. Lewis F. Day, read before the members of the Architectural Association on the 15th inst. See p. 156, ante.



would be rather in observing symmetry of colour, were it needed.

The question arises whether this sameness is a sin inseparable from purely ornamental design?

I think not. But it is not easy to avoid a certain monotony in ornament pure and simple; and then the economy that is effected by frequent repetition of the same forms is a temptation, not perhaps irresistible, but seldom altogether resisted. Still less easy is it to say shortly how to get variety and interest of colour apart from figure design, which, so far as drawing is concerned, is in many windows thrown away. So far as its meaning is concerned, one might express enough of thought, even without figure-work or with very little of it; and, moreover, we are concerned now with the beauty of glass as it appeals to the eye: its sentimental, historical, or intellectual interest is a thing apart.

Ornament, undoubtedly, has a way of being too ornamental, or, I should say, too formally ornamental. It is difficult so to distribute it that its order shall not be too apparent, its symmetry too exact. The scheme of design that one can take in at a glance is too obvious to arouse any interest. There is nothing in it

tion which, with all its gush about "decorative art" does not in its heart care one single straw about ornament, merely for the sake of economy; and, that being so, the minimum is, of course, to be spent upon it. Figures if possible, good or bad; if not that, then birds and flowers perhaps; but as for ornament, who cares or knows anything about anything? It is so much padding. Yet it seems to me that architects at least, who must know something of it, might more often adopt glass of ornamental character, — not on account of its cheapness, but because, for the price of indifferent figure-design, they could get, if they but took the pains, good ornament; and because, whilst good figure-work is, and must be, exceptional, bad figure-work is even less endurable in the eyes of an artist than bad ornament.

The form of ornament adopted in glass must be, of course, in harmony with the surroundings of the window; but it need not, therefore, be in imitation of any past period. Good Renaissance glass in Gothic churches, and in Gothic windows, too, does not strike us as being out of place. The mistake that is made in modern attempts at "style" is in copying without selection the examples of that style, faults and all. Every vice is condoned by the

myself to such forms. Whatever is convertible into good glass seems to me fully to the purpose. I would glean ideas from whatever country and whatever period they were to be gathered, and take a hint from woodwork, inlay, tapestry, mosaic, embroidery, damask, or whatever else might be suggestive of an effect worth rendering in glass. On the walls are two or three studies in the way of "translation" into glass. There is one showing large pieces of varied ruby glass, framed in white, something after the manner of the marble wall-panelling of Venice. I do not see why we should not take advantage of the beautiful variety of colour which often occurs in a sheet of glass. Another sketch (see lithograph in last week's issue) is based on a somewhat similar idea, in which the central panel of coloured marble is replaced by a patch of red made up of flames and demons, — the kind of thing one would not dream of submitting to a sober "client," — but it amused me to do it. Then there is a scrap of ornamental glass (fig. 1), taken this time almost literally from old Spanish embroidery.

The adaptation of a panel (fig. 2) by Peter Flötner (designed presumably for engraving on metal) is meant to show how it lends itself to a kind of glazing in which the leads form, as it were, the skeleton of the design, and are lost in it. This kind of thing almost suggests itself, it is so obvious.

There is a certain common kind of modern work based on the same idea, in which the leads are made to form the stems and stalks of rather conventional foliage, with leaves and flowers springing from them. This is in theory so simple that one wonders almost that such was not from the beginning the ordinary basis of ornamental design. But the scheme is not so simple in execution as it seems. There occur, most likely, other leads not forming part of the design, and when some of the glazing lines are meant to count and others not, the result is slightly distracting.

It is, no doubt, possible to invent designs which include all the leads necessary for the purposes of construction; but that is by no means an easy solution of lead-line difficulty. It demands very great cunning in design, and it can be better done by the adoption of purely ornamental forms (such as Flötner used or the Arabs from whom his inspiration was derived) than with floral forms, which leave the designer so much less free.

Time fails to touch on the suggestiveness of Oriental art. There is something very significant in the Arabian treatment of coloured glass, to say nothing of Eastern pottery, metal work, jewellery, and lacquer. The Italians of the fifteenth and sixteenth centuries had the wit to borrow freely from all manner of fabrics introduced into Italy from the East. And it was from thence they derived the idea of geometric tessellated mosaic, the forms of which, being also ready-made to the glaziers' hand, they reproduced again very judiciously in glass. (There are instances of this at Assisi and elsewhere.)

But, after all, it was little enough of their energies that the great Italians devoted to the cause of glass-painting. One can imagine very many ways in which nineteenth-century Renaissance windows might be designed, inspired altogether by the work of the fifteenth and sixteenth centuries, and yet in no wise following the lines of the glass-painters of that period, who were more or less off the track of glass-painting, — what they might have done had they known or cared more about glass, but what they certainly did not do.

There, if we seek an ideal, is one worthy of the best of us.

The Chairman (Mr. C. R. Pink, President) in opening the discussion, having referred to the decay of ornamental art, said Mr. Day had several times mentioned the mosaic treatment of glass versus painted glass, and there was a great deal to be learned on that point, leading up as it did to the importance of lead outlines in stained glass. With old painted glass, much of the admiration which it evoked was due to the texture and quality of the ancient material. Until lately it was impossible to obtain any with the old texture and quality. In Winchester College Chapel could be seen a fine series of windows, but although, in general design, excellent fac-similes of the antique work, the result was disappointing, and was attributable, he believed, to the want of



Fig. 1.—Translation of Old Embroidery Pattern into Glass.



Fig. 2.—Showing adaptability of a Panel by P. Flötner to Glazing.

to keep up our expectancy. Now in figure-work we are sure to find patches of unforerseen colour which give point and interest to the underlying scheme. The patches of the ornamentist are apt to be more spots, recurring with irritating frequency and regularity.

A good scheme of colour is usually simple enough as it first occurs to the artist's mind. But he is a very simple artist who lets it too easily be seen in his finished work. It is the business of art to disguise the artifice, so that it takes time and patience to unravel all the secret of the colour whose charm one can feel from the first. And this process of mystification is much more difficult in ornament than in figure design, where the very nature of the subject suggests innumerable deviations from any set scheme of colour. (So also the introduction of coats of arms, and all manner of heraldic devices, is a never-failing source of variety and interest of colour.) But because it is difficult to get variety enough in mere ornament, it does not follow that it may not be done. I am convinced it might very well be done, and would be, if the artist were not always so tightly bound by the consideration of price.

Because ornament can be executed more cheaply than figures, it is adopted by a genera-

stylist, if only it is of the period. And because the Renaissance glass-painter happened not sufficiently to consider the nature of the material he employed, that is taken as an adequate reason why modern glass of Renaissance style should err in like manner. It is not a mere fancy of my own that the forms of a period may be adopted without following always the faulty manner of that period. Renaissance ornament in glass is sometimes glazed in a manner as strictly mosaic as any thirteenth-century glass could be; but this kind of thing is not "typical" enough for your imitator of the sixteenth century. If it is asked, is it then the exceptional instances that we should take for our example? I answer, yes: the best is always exceptional.

For my part, I would glaze up coloured work invariably, of whatever period, much as the early glass-painters did, without ever affecting any of their rudeness. In grisaille, on the other hand, and especially in domestic work, I would, except in very large windows, model my practice more upon the later artists, whilst avoiding their heavy painting and the florid forms of the debased period in which it was their misfortune to live. Because the men of one period borrowed the forms of stone or metal-work I would not on that account restrict



colour and texture in the glass. Now-a-days, however, it was possible to obtain glass of the old texture, and he might instance an excellent example, "shining with shapen shields," which was exhibited at the Health Exhibition, in the small Guildhall of Old London. Mr. Day had given wise advice as to the course of study to be pursued by the decorative artist in stained glass. He had insisted on the importance of cinquecento glass, and had dwelt upon the beautiful windows in St. Gudule, at Brussels, perhaps amongst the finest in Europe. The lecturer had also maintained that much might be learned from decorative art of every kind and date, though that of the sixteenth century was the best on which to base one's work. A great deal had been already done by Mr. Day and others to show that a new departure was possible. As an instance of this he might mention the magnificent St. Cecilia window by Mr. Burne Jones in Christ Church, Oxford, which showed good colour and drawing, with modern feeling, and yet with just the amount of conventionalism required in stained glass. Those who took part in last year's Excursion would also recollect some of Mr. Burne Jones's works at Middleton Cheney, which also showed the possibilities of new departures, though on old lines so far as sound and good.

Mr. William White, F.S.A., proposed a vote of thanks to Mr. Day for his interesting and exhaustive lecture. Mr. Day showed that he had applied his thought to all the details and principles, and the many paradoxes he had laid before them. These paradoxes struck one with great force when the defects and beauties combined in the same windows of the various periods were pointed out. The great leading feature Mr. Day had brought before them was that the exaggeration of fine-art painting in a window was wholly and entirely misapplied. The chief object of stained glass was to give grand effects of colour, but not in the style of fine-art painting, where one studied the picture, rather than enjoyed the satisfaction which good colour imparted. As shown by Mr. Day, he believed there was a large field open for the rising generation, and he hoped that those who took up the work would carry it out upon the lines which had been laid down that evening. It might not be so remunerative as some branches of art, but any one who thoroughly succeeded in painted glass would never find lack of employment so long as there was any feeling of admiration for art.

Mr. Leonard Stokes seconded the vote of thanks, adding that he was a little confused as to Mr. Day's remarks regarding the styles of glass. Most architects followed pretty closely the lines of the old work in the buildings they executed, and should not the same course be pursued in regard to the glass? Mr. Day, however, seemed to think that any style of glass would do in any type of building. He agreed with the lecturer that brilliancy, depth of colour, and translucency were most desirable in glass; the modern stuff was often dull and insipid, but if more white glass was used beautiful silvery effects would be produced, very suitable for our town churches. He had observed that when the sun shone through modern glass it cast its colours on the pavement, whereas the old glass gave no colour. This could be seen very clearly in the Chapter House at York, where all the windows but one were old. When the sun shone through the old windows it simply produced a white or general patch, whereas the new one threw a distinct colouring on the pavement.

Mr. White remarked that in inspecting a Kentish church some twenty-five years ago, he found some antique glass which cast a distinct pattern upon the pavement, although there was none of the colour of the glass itself, but merely a sort of neutral and almost complementary tint.

Mr. A. C. Bulmer Booth understood that the leading-up was the chief element in the labour. He remembered seeing two windows brought from Cairo by Sir Frederick Leighton, which were badly damaged in transit. The design of these windows was of a floral nature, the glass being made up in plaster. The windows were reproduced, and proved very charming, but the main point about them was that the greater portion was plaster, with but a small proportion of glass.

Mr. Stokes inquired whether Mr. Day objected to the use of enamel? He had seen very excellent effects produced in modern glass by its use.

Mr. G. H. Blagrove dealt with the cost of leading. A few years ago he perpetrated some designs in stained glass with patterns burnt in for domestic work, and he was desired to use as little leading as possible, because the proprietor of the house considered that it obstructed the light. He, therefore, had to make his designs in as large pieces as he could manage. In the end the cost was greatly enhanced from the risk incurred in firing the large pieces, so that it far outweighed the labour of leading.

Mr. Hampden V. Pratt remarked that Mr. Day, who was a worker in this as well as in other fields of decoration, had always treated things in a broad light. His desire had been that they should get out of the old grooves, and that as they advanced in decorative matters they might draw lessons from the past, taking advantage of the better means at their disposal to reproduce the old effects. In the last few years there had been a departure from the early archaic character of art, especially in church work. Mr. Day had shown that they could get what was appropriate without having recourse to archaic and crude forms in figure-work.

The vote of thanks was then put, and carried by acclamation.

Mr. Day replied, and added that, although he could not pretend to speak precisely as to the question of cost, he could say that if one had money to spend, it would go a long way in glazing. Common painting was as cheap as glazing, and nasty into the bargain; but elaborately glazed work might be done for a sum inconsiderable in the decoration of a church. As to the styles, he must not be supposed to mean that any style of window would do in any style of church. Personally he would confess that style did not trouble him much, and the architect would sometimes please him better if he bothered himself less about it; but that was his own affair. Suppose they set themselves the task of doing as the old fellows would have done! Did they affect any style? Not a bit of it. If they were fourteenth-century men, adding to thirteenth-century churches, they did not attempt to do thirteenth-century work. They took care, however, as every artist naturally would, that what they did should harmonize with the general character of the work added to. With regard to the whiteness of the light coming through, he had wondered whether it was in any way due to refraction as it passed through the old glass, which was riddled with holes and decayed like an oyster-shell. Indeed, old glass was like old wine, a great deal better the longer it was kept. As to the Eastern windows, the Arabs simply pierced small holes in the plaster, and filled in the glass, but, so far as his experience went, it was crude in colour. It was helped by the depth of the setting, but the material was faint and poor. Of course, something could be done with enamelling, but it was dangerous that he thought it better not to recognise it. The root of all evil was the shirking of the lead lines, and the chances were that any man who coquetted with enamel was on his way to the bad.

#### THE SURVEYORS' INSTITUTION. PRELIMINARY EXAMINATION 1886.

Or the candidates who presented themselves at the Preliminary Examination of the Institution, held on the 19th and 20th instant, the following satisfied the Examiners:—

Bagot, H. F.	England, W. F.	Michelmores, H.
Ball, J. B.	Elton, C. W. S.	Oakley, J. H.
Bateman, A. C.	Grimes, R. F.	Scandora, C. H.
Becher, E. J.	Grover, E. J.	Stainton, F. C.
Booth, G. W.	Haslam, D., jun.	Tilly, H. D.
Bowler, H. W.	Harding, F. A.	Tyler, J. W.
Brady, R. H.	Hawker, O. J.	Watney, D.
Bridgford, L. A.	Jessett, C. E. V.	Watson, R.
Cambridge, W. J.	Lynam, W. V.	Wheeler, C. T. O.
Chapman, G. H.	Martio, H. G.	Wilson, W. E.
Collins, A. C.	Melrose, F.	Wordley, G. G.
Davey, H. T.		

**Lambeth.**—A handsome brass eagle lectern has just been presented to the Parish Church of St. John, Waterloo-road. It is of Classic design, with richly foliated capital, and chased and engraved pedestal. The bird stands on a ball. The work was carried out by Messrs. Jones & Willis, of London and Birmingham, under the direction of the architect, Mr. Chas. Henman.

\* Passed at head of list.

#### THE REGISTRATION OF PLUMBERS.

A MEETING of the plumbing trade of London, convened by the Court of the Plumbers' Company, was held on Monday afternoon in the Seavers Court at the Guildhall. Mr. George Shaw, the Master of the Plumbers' Company, occupied the chair, there being a large attendance of masters and journeymen.

Mr. W. R. A. Coles (hon. Secretary to the Congress of Plumbers) read the resolutions of the General Council formed to give practical effect to the resolutions of the Conference of Metropolitan and Provincial Plumbers, held on the 31st of July last, with a view to secure greater efficiency of plumbing and draining work in connexion with dwelling-houses. These were published with the report of the Conference, given in the *Builder* for August 8 last, p. 185.

The Chairman congratulated the meeting on having assembled to discuss a subject which was so interesting to all of them, and another step in the movement which commenced in October, 1884. At the previous conference the chief questions affecting the efficiency of the plumbing trade, and the causes of and remedies for its defects, were discussed. Those meetings were representative of the whole United Kingdom, so that there was a general discussion and expression of opinion before anything was decided upon. The matter had been repeatedly and carefully considered by the Plumbers' Company, and a Council had been elected consisting not only of representatives of the plumbing trade, but of gentlemen associated in sanitary matters, architects, engineers, builders, medical officers, and others. They had felt the necessity of having as many sides of the question represented as possible, and this was the more necessary as the plumbers' craft held very much the same relation to the general trades as the medical profession held to the other professions. Any work unskillfully performed by doctors or plumbers brought in its train evils which they all wished to see lessened, and it was the desire of all plumbers that bad plumbing should cease to exist. They had no merely personal or special trade objects to serve, because that which would be of advantage to the plumbers themselves would also be of advantage to the public. The General Council included also masters and journeymen and representatives of both Houses of Parliament, as well as the Director of the City and Guilds of London Institute for the Advancement of Technical Education, to which body they must look for help in spreading the benefits of that class of knowledge. With such a Council it was reasonable to look forward to a general uplifting of the plumbers' craft, to the common benefit of its members and of the community at large. The proposed scheme of registration in London and seven miles round, but this was not intended to be the limit of its operations, which they hoped eventually to extend throughout the whole length and breadth of the country. An important matter to be decided would be the form of examination to accompany the registration, and which was necessary for securing men qualified to carry out any class of work in connexion with the craft. At present, it was open to any man to undertake the duties of a plumber without giving sufficient evidence of qualification, and that was a state of things not tolerated in any other profession or trade involving the security of the life and health of the public. The Chairman concluded by moving:—

"That the Plumbers' Company open a Register of Plumbers (Masters and Journeymen) on the basis of the resolutions of the General Council."

Mr. Lammas thought there should be a central institution in London, with branches all over the country.

Mr. Webb approved of the principle of registration.

Mr. Soper said he lived in a district in which the New River Company had lately enforced their requirements in connexion with a constant supply. This had led to the removal of a good deal of old work, much of which was of a grossly incompetent character, and this showed the necessity for plumbers being registered.

Mr. Timmas was in favour of registration, not only for the protection of the public, but also for the advantage of the workmen themselves. If the tradesmen were registered, it would put an end to the employment of men who called

\* See *Builder*, Oct. 4, 1884, p. 472; and Oct. 25, 1884, p. 563.







as the middle court. Then, in order to stimulate the men in the lower grades to larger and fuller studies, and, to elevate the trade generally, there should be a higher grade still,—an inner court,—for the men who, in addition to the knowledge requisite to gain admission to the lower or middle courts, possessed a more complete knowledge of the science of sanitary plumbing; men who can plan and direct the plumbing and draining work of a house in accordance with the principles laid down by the best authorities. And this grade might be distinguished by its members being allowed to use the letters "R.S.P."—registered sanitary plumber. The elevation of the trade to its rightful position is a noble work, worthy the best energies of its best men, worthy the resources of the Plumbers' Company; and every true well-wisher of the craft must wish Mr. Shaw success in his endeavours to establish a system of registration. We may not all see alike on many points, but I think we must all be agreed that the trade wants lifting up, and as registration is to be the lever let each one bring his weight to bear upon it; and then, with such a unity of purpose, it will not belong before the trade is lifted out of its present distrust and ignorance, and made to stand in a position of trust, dignity, and power.

A meeting of the General Council was held on Wednesday afternoon in the Library Committee-room, Guildhall, the Lord Mayor in the chair, when a report embodying the resolutions of the foregoing meeting was presented, and it was resolved that the twelve members nominated by the meeting of the plumbing trade be added to the Council, together with a number of other gentlemen. After considerable discussion, the following resolutions were also agreed to, viz.:

"That the form to be filled up by plumbers applying to be admitted to the Register be settled by the Court of the Plumbers' Company, assisted by three members of the General Council and the members nominated by the Plumbing trade of London."

That the General Council defer fixing the amount of the annual payment to be made by plumbers admitted to the Register until further information is obtained as to the expenses which the system will involve.

That the registration, in the provinces, of plumbers, and the organisation of Provincial Boards of Examiners of Plumbing Work, be deferred for future consideration, pending the opening of the system in the London district; but that the extension of the system to the provinces be not long delayed; and that provincial plumbers be allowed to register in London pending the formation of provincial boards for registration.

That the General Council consider the means of increasing the number and efficiency of classes of practical instruction for plumbers throughout the kingdom."

Another resolution was passed, affirming the desirability of promoting legislation with the view of securing a more efficient examination of plumbers' work in new buildings, and leaving it in the hands of the Council to take such steps in that direction as they might deem advisable.

#### ARCHITECTURAL SOCIETIES.

**Manchester Architectural Association.**—At the meeting of this society on the 19th inst., Mr. J. Murgatroyd, Past-President of the Association, addressed the members on the subject of "Fifteenth and Sixteenth Century Architecture in the Valley of the Loire." The address was illustrated by numerous photographs, some of them of large size, showing most beautiful and interesting architectural detail, carving, &c., and also by a few pen-and-ink sketches made on the spot by Mr. Murgatroyd. By means of a map of France to a scale of 30 miles to an inch he pointed out the physical features of this portion of that country, and then rapidly sketched the historical facts connected with England's former close relationship with France, and particularly with Touraine, and described to his audience his route from Paris through Chartres, Le Mans, Tours, Saumur, Chinon, Azay le Rideau, Amboise, Chenonceaux, Blois, Chambord, and the return through Orleans.

**Edinburgh Architectural Association.**—At the fortnightly meeting of this Association, held on the 21st inst., Mr. G. Washington Browne, President, in the chair, Professor Baldwin Brown read a paper on "Sir Christopher Wren" in the course of which he dwelt on the importance of the work of Wren to the modern student. The Medieval revival had passed, and Wren's churches could now be estimated without prejudice. They had now come to see that there is no salvation in special styles, that all styles were good when used with a right sense of their fitness for the purpose in hand, and that beyond and above all questions of this style or that there were the great universal

\* The three members of the Council elected were Mr. Philip Magnus, Mr. Hardeste, and Mr. Francis Chambers.

truths of art, to which, if their work conformed, it mattered comparatively little in what particular style it was planned. Wren's work was modern, and was done under modern conditions. His buildings had little to aid them in the way of beauty of material or ornament, in associations or surroundings. He worked without the aid of a tradition of style, and without artistically-trained subordinates. His success was due to his own native genius, his sense of grace and of proportion, and his direct, simple, business-like method of work. His life had for modern architects both encouragement and warning,—encouragement, because he did great things under the unpromising conditions which were much the same in their own time as in his; warning, because it was impossible to follow in Wren's footsteps without something of the true artistic spirit of the master.

**Dundee Institute of Architecture.**—At the meeting of the Dundee Institute of Architecture, Science, and Art held on the 21st inst., Mr. W. Stephenson gave a lecture on "Ancient Egypt and its Monuments." Mr. Jas. MacLaren, President of the Institute, was in the chair.

#### OBITUARY.

**Mr. Henry Masters.**—The death is announced of Mr. Henry Masters, architect and surveyor, Bristol, who died at his residence, Meridian-place, Clifton, somewhat suddenly, on the 19th inst., in the 65th year of his age. Mr. Masters devoted a great deal of attention to sanitary subjects.

**Mr. David Fraser,** the senior partner in the firm of Messrs. J. Fraser & Son, granite merchants and polishers, Aberdeen, died at his residence, Broadford House, Aberdeen, on Sunday last, from a fit of apoplexy. The funeral took place on Thursday, at St. Peter's Cemetery, Aberdeen, being attended by at least 300 of the leading inhabitants and those in the granite trade.

#### NATIONAL ASSOCIATION OF MASTER BUILDERS OF GREAT BRITAIN.

THE sixteenth half-yearly meeting of the National Association of Master Builders of Great Britain was held on Tuesday, the 26th inst., at the Bell Hotel, Derby, the President, Mr. W. H. Cowlin, in the chair. The report and balance-sheet were read and adopted, the retiring officers being all re-elected.

The report shows that sixty local associations are in connexion with this Association, and that the state of trade throughout the country is in a very depressed condition, intimations of a reduction in wages in several districts being reported.

The meeting was largely attended, representatives being present from London, Liverpool, Manchester, Birmingham, Hull, and other large centres.

In the evening the Derby builders entertained the Council and other friends at dinner, the chair being taken by Mr. Walker, the President of the Derby Builders' Association, who was supported by the Mayor of Derby.

On the following day a large party were, by the kindness of the managers, escorted over the wagon and locomotive works of the Midland Railway Company by Mr. Walker, where a most instructive day was spent.

#### COMPETITIONS.

**Proposed Town-hall, Motherwell, N.B.**—At a meeting of the Commissioners on Monday last, a design for the proposed new town-hall, burgh offices, &c., was decided upon. Fourteen architects had been invited to compete, four of whose designs had been laid aside as exceeding the stipulated cost, leaving ten under consideration. The first premium was awarded to Mr. John B. Wilson, A.R.I.B.A., of Bath-street, Glasgow, and it was agreed to adopt his design and instruct him to proceed with the work at once. The second premium of 25*l.* was awarded to Mr. H. B. Steel, of Glasgow; and the third of 10*l.* to Messrs. Wilson & Stewart, also of Glasgow. The adopted design provides a town-hall seated for over 1,200 persons, lesser hall, and court-room, Burgh Engineer's and Town Clerk's offices, two public offices, committee-rooms, &c., fire-engine store, caretaker's house, &c., the estimated cost being about 6,000*l.*

**Proposed Municipal Buildings at Christchurch, New Zealand.**—At a special meeting of the

Christchurch City Council, held on the 6th ult., the design of Mr. S. Hurst Seager, A.R.I.B.A., was selected from amongst those of other competitors for the contemplated Municipal Buildings. Mr. Seager proposes to use terra-cotta very largely in the exterior of the building.

**Proposed Baptist Chapel, Egremont, Cheshire.** The building committee of the Falkland-road Baptist Church in October last invited four selected architects to submit plans in competition for the proposed new chapel, school, &c., to be erected on the site at the corner of Falkland-road and Brighton-street. On the 8th of December four sets of plans were received. The committee, who were assisted by technical points by Mr. Wm. Parlow, F.R.I.B.A., having carefully examined the designs, decided to award the first place to those bearing the motto "Fides," the author of which proved to be Mr. James S. A. Mercer (Messrs. F. & J. Holme), Westminster-chambers, Liverpool.

#### ELECTION OF A DISTRICT SURVEYOR.

At the meeting of the Metropolitan Board of Works, on the 22nd inst., the first business proceeded with after the confirmation of the minutes of the previous meeting was the election of a District Surveyor for the Western Division of the City of London, in the room of Mr. Rawlinson Parkinson, deceased. There were thirty candidates, who were reduced to show of hands to six, viz., Mr. S. F. Clarkson, 23 votes; Mr. W. J. Harcastle, 29 votes; Mr. H. McLachlan, 33 votes; Mr. M. L. Saunders, 34 votes; Mr. W. L. Spiers, 23 votes; and Mr. H. W. Stock, 32 votes.

A proposal to vote by ballot on these selected candidates was lost. The voting, therefore, proceeded in the usual way, with the following results:—

	Second	Third	Fourth	Fifth	Sixth
	Vote.	Vote.	Vote.	Vote.	Vote.
Clarkson, S. F.	23	19*	28	19	1
Harcastle, W. J.	24	21	23	16	—
McLachlan, H.	30	31	31	31	3
Saunders, M. L.	20	20	18	—	—
Spiers, W. L.	19	—	—	—	—
Stock, H. W.	23	15*	—	—	—

Mr. McLachlan was therefore declared to be duly elected, and he tendered his thanks to the Board.

#### Illustrations.

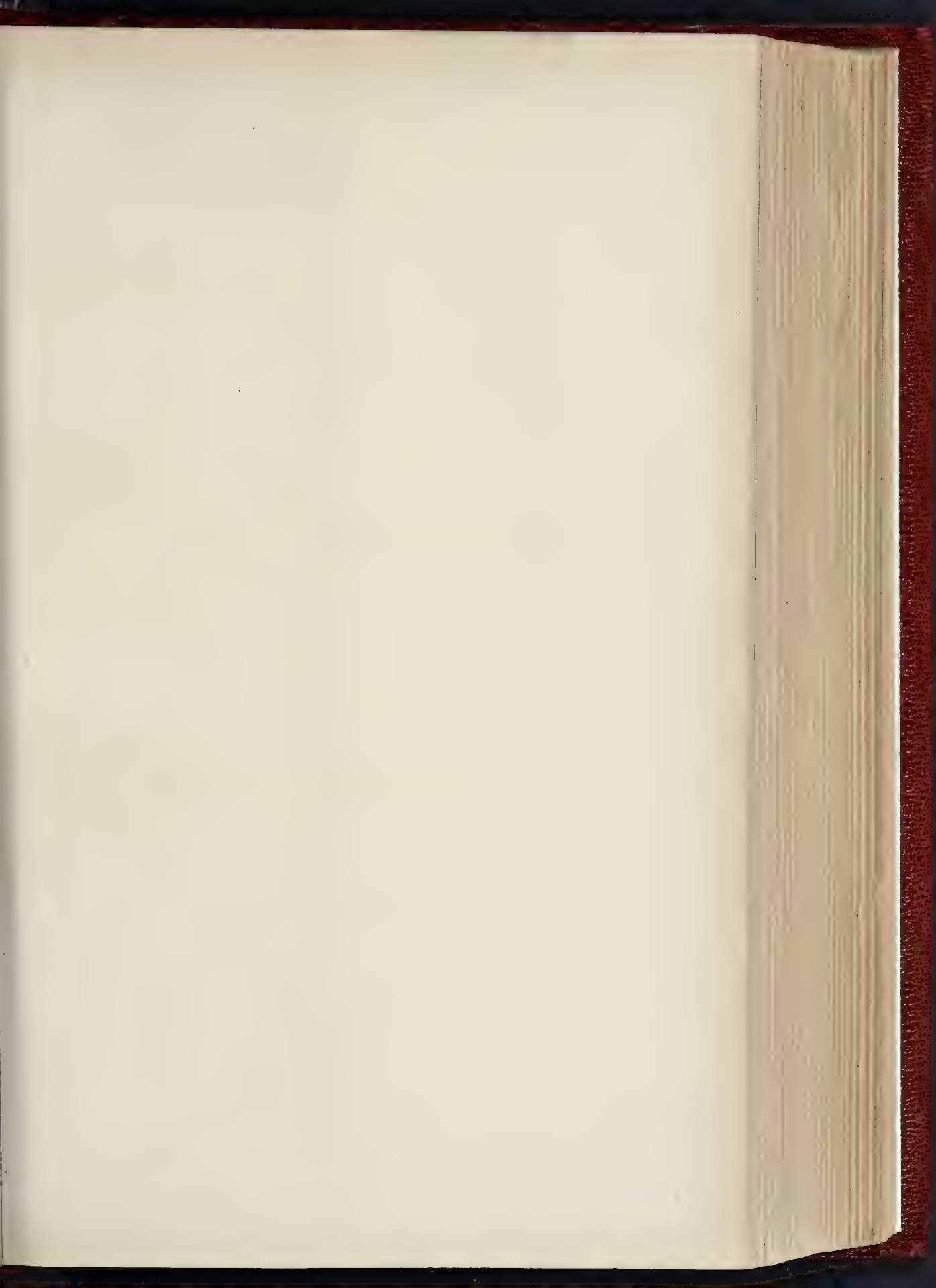
##### LIVERPOOL CATHEDRAL.

DESIGN BY MESSRS. BODLEY AND GARNER.

THIS week our lithographic illustration is all devoted to Messrs. Bodley & Garner's design for the proposed Cathedral at Liverpool. They include external views from the north-west and west, and the east, and south elevations. In addition we give a plan. For explanatory article, see p. 190 of this number.

**The Forth Bridge.**—A testimonial in the form of a handsome gold watch was, on the 21st inst., presented to Mr. P. W. Meik, resident engineer, who has during the last three years represented Sir John Fowler and Mr. Baker on the Forth Bridge Works, this period being the whole time that has been occupied in the construction of the foundations. The presentation took place in the presence of most of the subscribers, including Mr. Arrol and Mr. Phillips, partners in the firm of Tancoed, Arrol, & Co. (contractors for the bridge). Mr. A. Symonds, chief inspector of the works, was deputed to present the watch to Mr. Meik on behalf of the subscribers, and spoke warmly of the regard which they all felt at the termination of a professional connection with the Forth Bridge Works, and hoped that in his future professional career he would meet with great success, and always feel as comfortable about the soundness of the work as he now could about the foundations of the Forth Bridge. Mr. Carey spoke on behalf of the engineer's staff, Mr. Arrol on behalf of the contractor's staff, Mr. Middleton on behalf of the foremen, the latter presenting Mr. Meik with a handsome paper weight made from piece of the foundation rock of the Inch Garri pier. Mr. Meik, in responding, said he had never been on an undertaking where there had been more pleasant relations between those employed than on the Forth Bridge.

\* There being a tie here, these two names were put to a vote to decide which of the two should be retained for further voting. This vote was as follows: Clarkson, 21; Stock, 16. Mr. Clarkson's name was therefore retained.





THE BUILDER, JANUARY 30 1886.



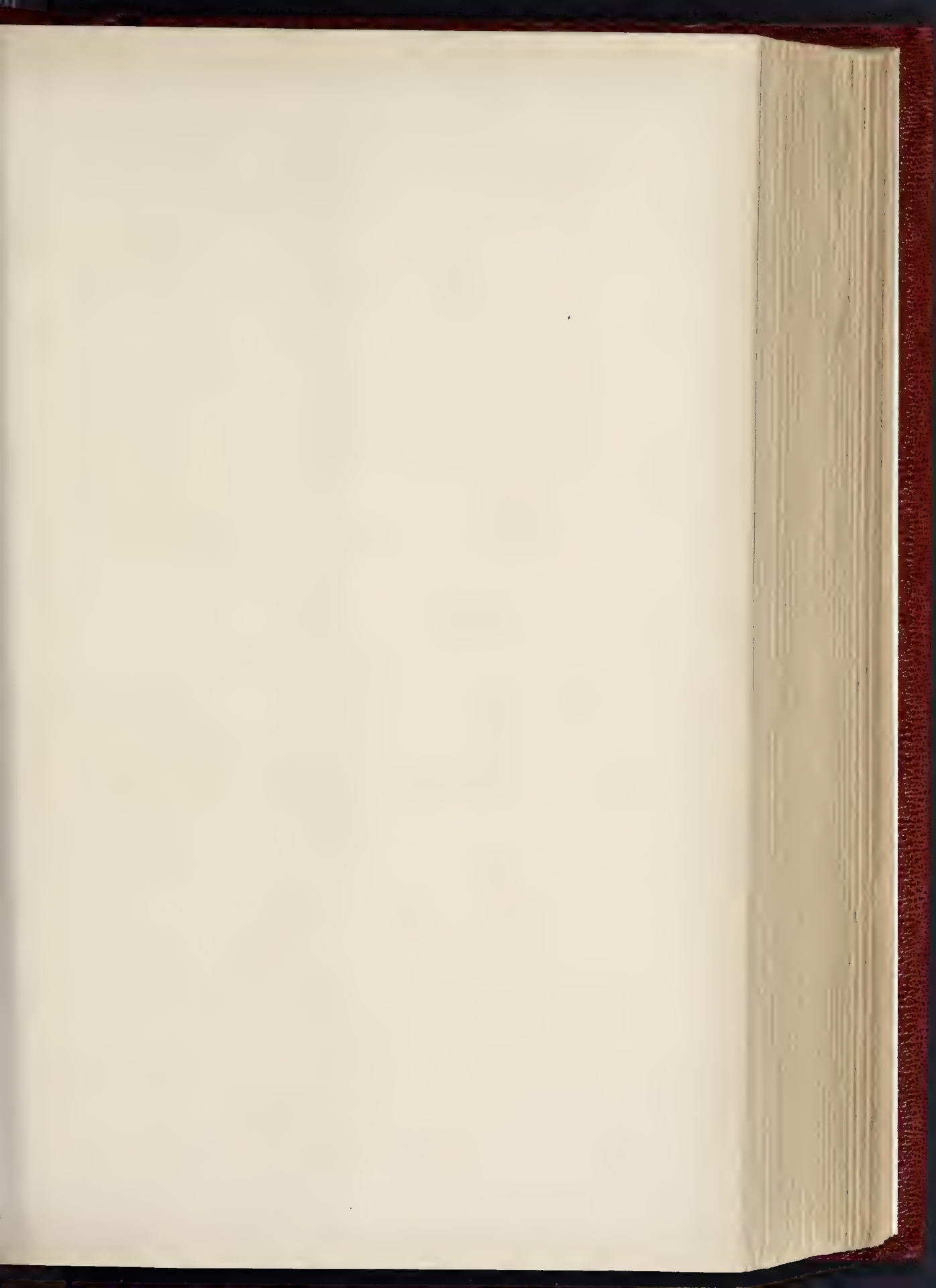


THE PHOTO SHOOTING & CO. LONDON

LIVERPOOL CATHEDRAL COMPETITION —DESIGN BY MESSRS. G F BODLEY, A.R.A., AND T. GARNER.  
VIEW OF WEST FRONT









THE BUILDER, JANUARY 30, 1896.





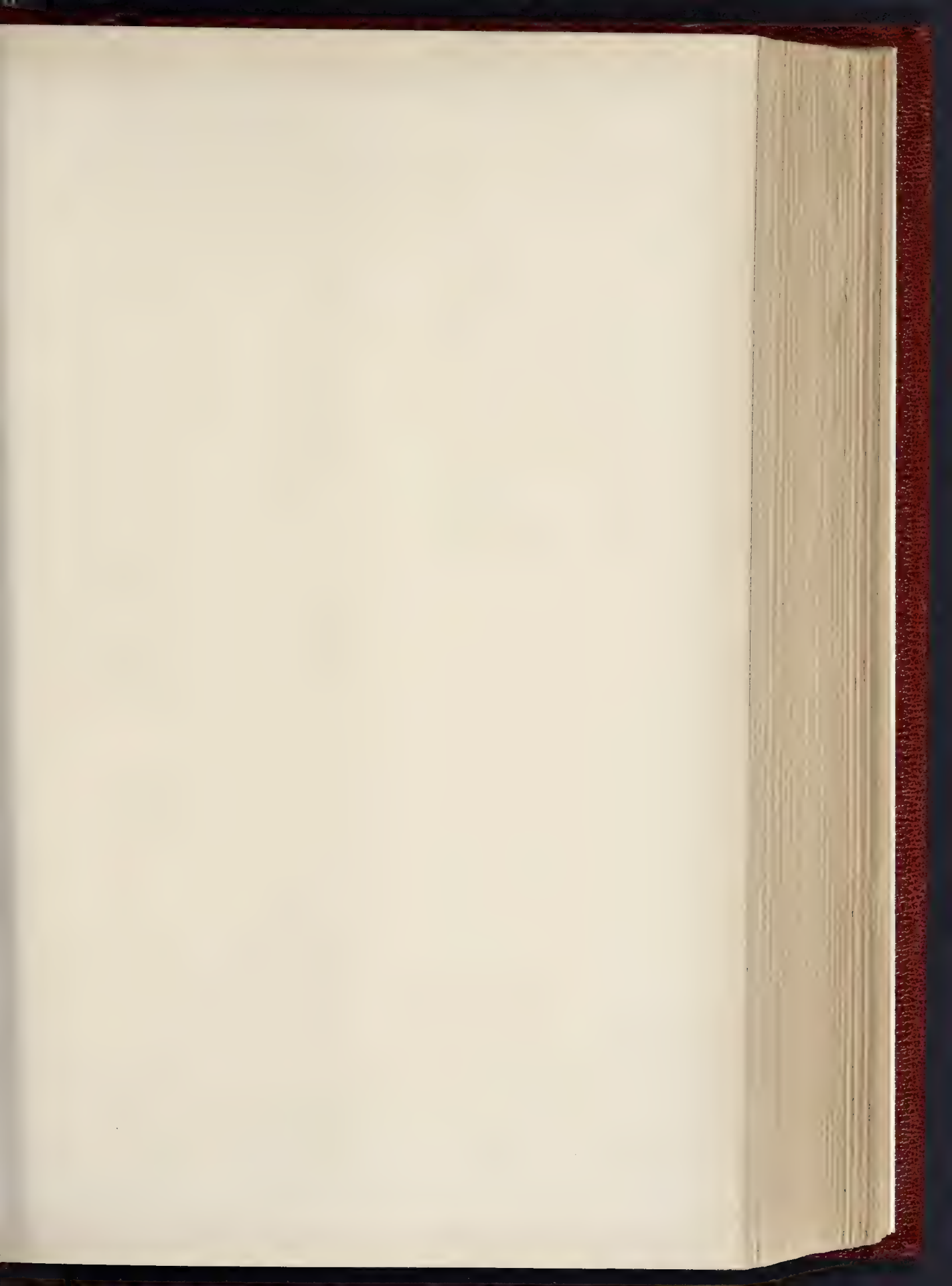
INK PHOTO SPRAGUE & CO. LONDON

LIVERPOOL CATHEDRAL COMPETITION.—DESIGN BY MESSRS. G. F. BODLEY, A.R.A., AND T. GARNER.

VIEW FROM NORTH WEST

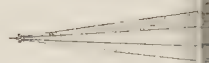


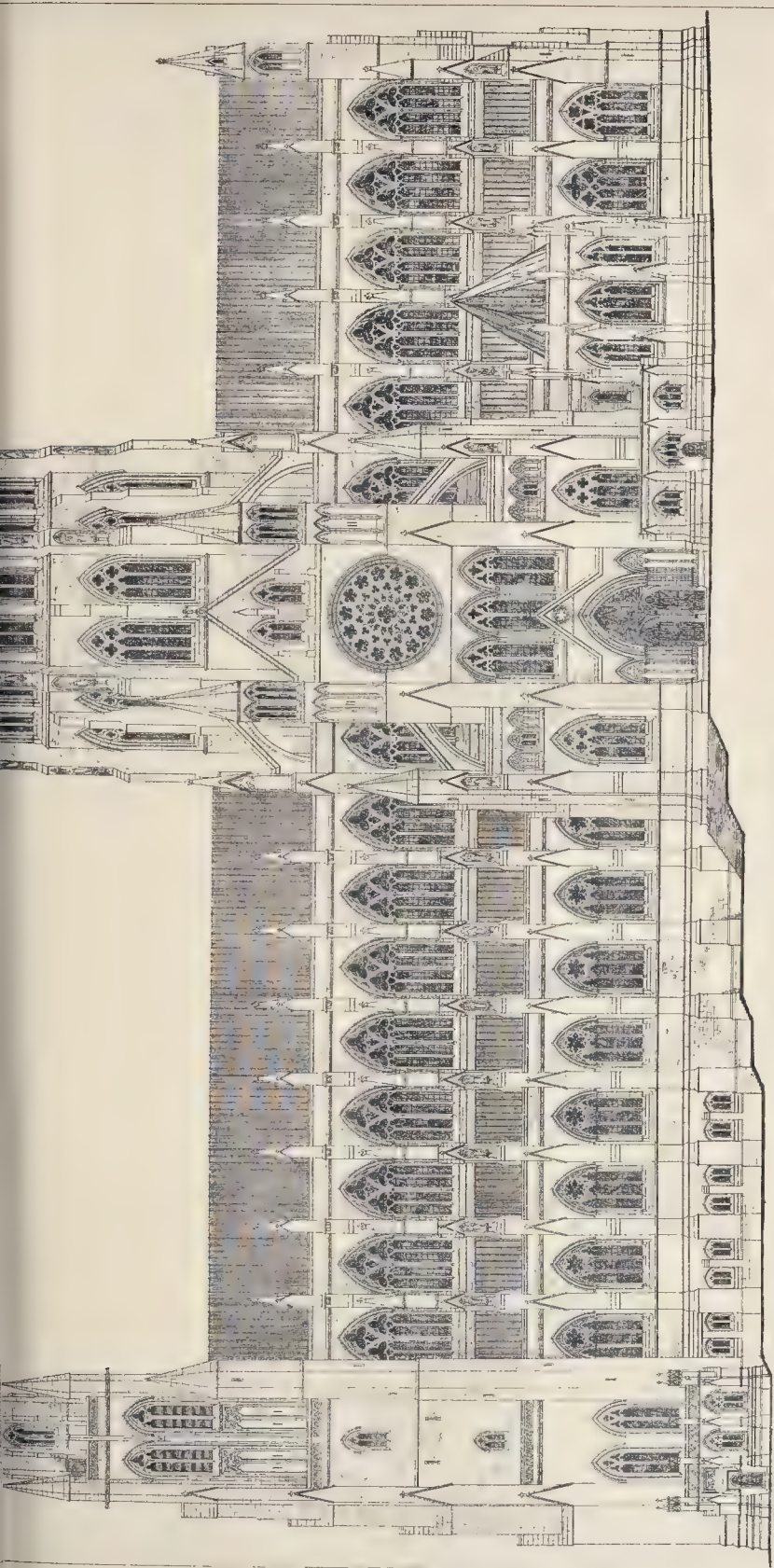






THE BUILDER JANUARY 30 1886





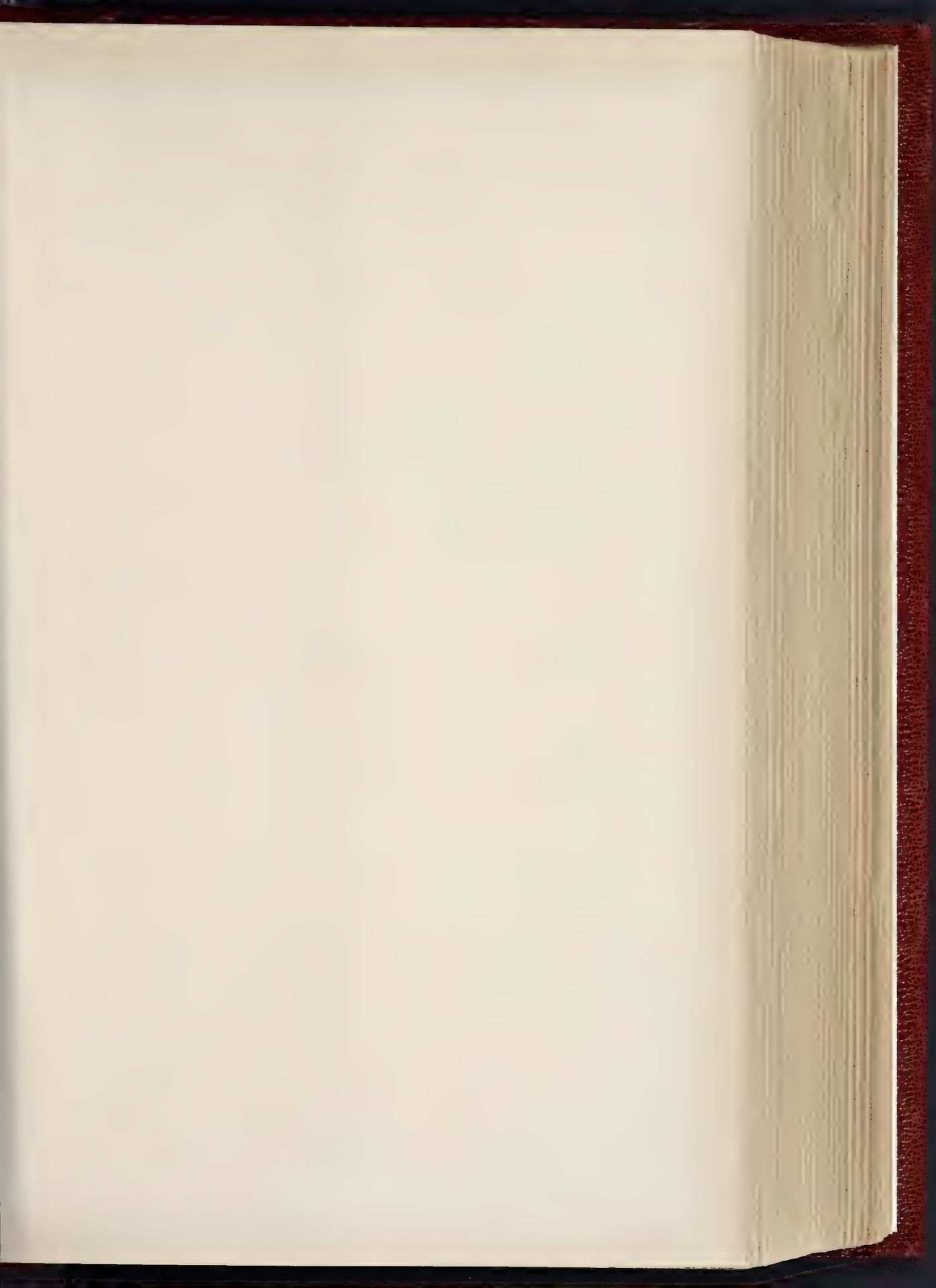
LIVERPOOL CATHEDRAL COMPETITION.

DESIGN BY MESSRS. G. F. BODLEY, A.R.A., AND T. GARNER.

SOUTH ELEVATION.

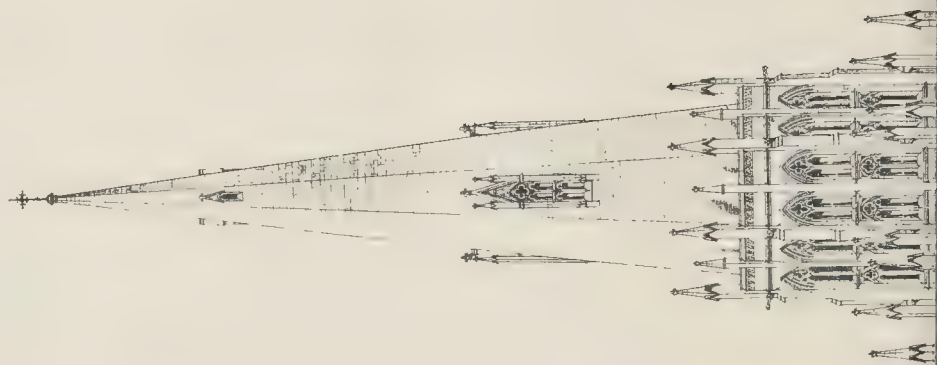


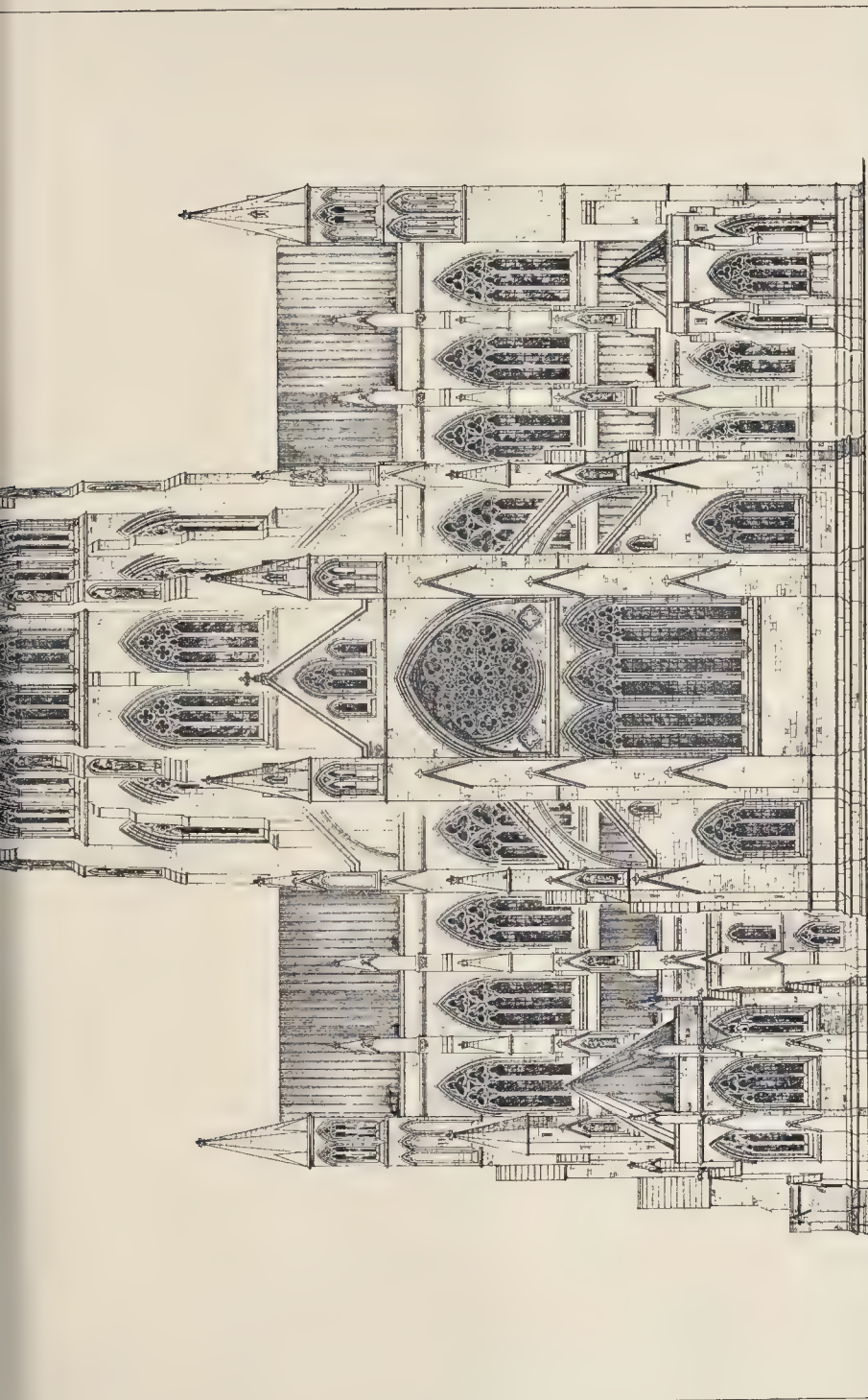






THE BUILDER, JANUARY 30, 1886





3, Castle St. Holborn London E.C.

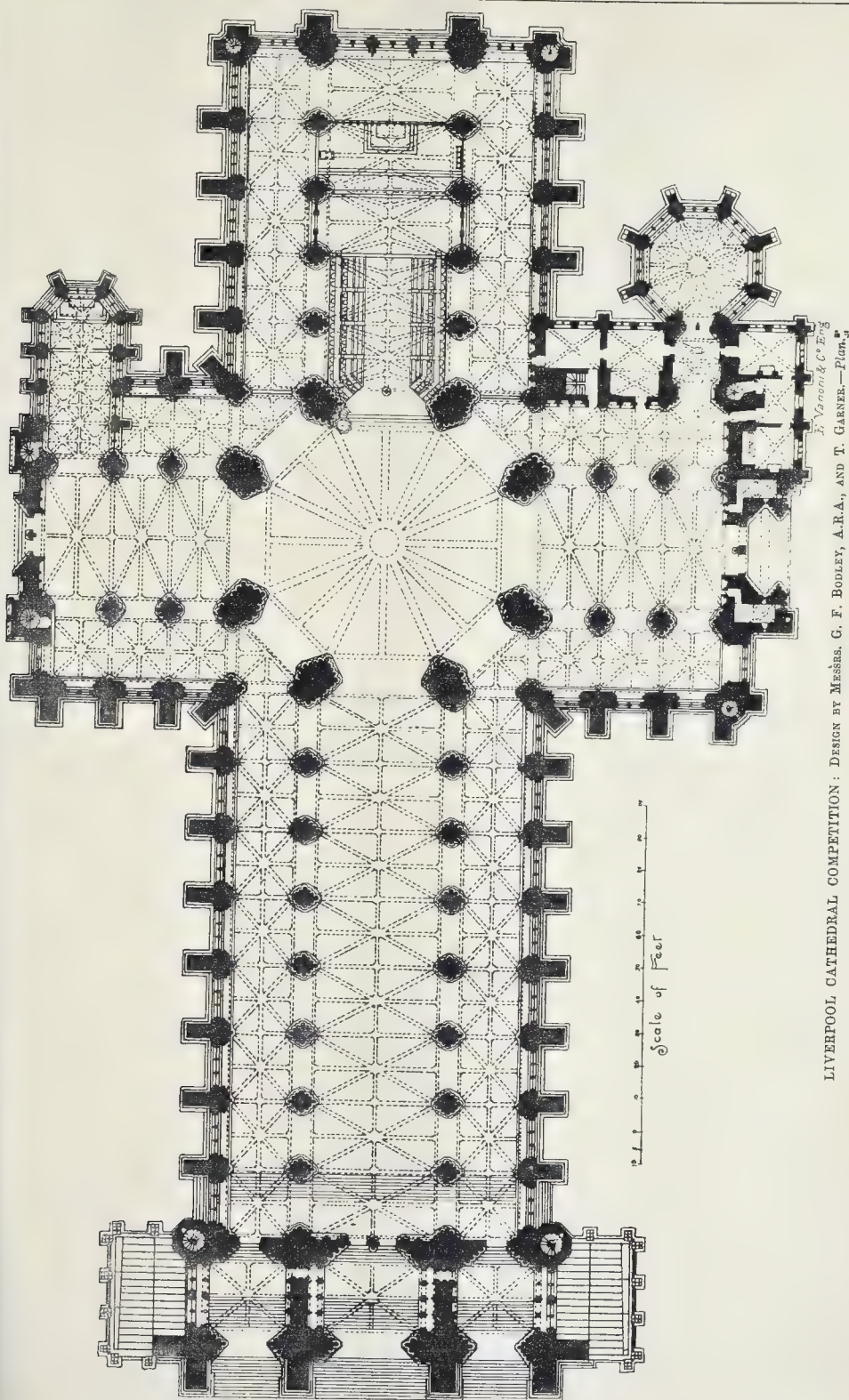
LIVERPOOL CATHEDRAL COMPETITION.

DESIGN BY MESSRS G. F. BODLEY, A.R.A., AND T. GARNER.

EAST ELEVATION.







LIVERPOOL CATHEDRAL COMPETITION. DESIGN BY MESSRS. G. F. BODLEY, A.R.A., AND T. GARNER.—Plan.  
H. Vernon & Co. Eng.



## THE MERSEY RAILWAY.

We briefly mentioned last week (p. 187) the opening of the Mersey Tunnel and Railway for passenger traffic, and now give a few particulars of the undertaking in addition to those which we gave in our number for March 15, 1884 (p. 365), where the method of executing the work will be found described, together with sections showing the method of draining the tunnel. In addition to the railway tunnel a parallel driftway was driven by the Beaumont boring machine for the purposes of ventilation. This ventilation heading is 2,300 yards in length, and is connected with the railway tunnel in eight different places by means of cross cuts, which, being provided with suitable doors, enable the air to be conducted to the fans from a number of points. The ventilation is effected by means of four Guibal fans, two on the Birkenhead and two on the Liverpool side of the river. One, 30 ft. in diameter, is placed in Hamilton-street, Birkenhead, to ventilate the length of tunnel between the Central or Borough-road Station and Hamilton-square Station, and is throwing 186,000 cubic feet of air per minute. The fan at Shore-road is 40 ft. in diameter by 12 ft. in width on the blades, and this draws the air from the tunnel at the centre of the river through the ventilation heading up to the fan itself. According to the *Liverpool Daily Post*, the principle aimed at in the scheme of ventilation is that fresh air shall enter the stations, and travel inwards in either direction into the tunnel to the respective fans, thus keeping the platforms as free as possible from smoke. The fans at Liverpool are similar to those at Birkenhead. That of 30 ft. in diameter ventilates the portion of the tunnel between James-street and the Central Station, whilst that of 40 ft. draws its air from the tunnel at the centre of the river. The quantity of air thrown by all four fans is about 600,000 cubic feet per minute, so that the entire air of the tunnel is changed every seven minutes. The fans and fan engines have been constructed by Messrs. Walker Brothers, of Wigan. An ingenious improvement has been introduced into these fans, which consists of a  $\Delta$ -shaped regulating "shutter," by which the air passes in a continuous current into the chimney instead of intermittently, as formerly the case, thus rendering the fans noiseless.

The deep underground stations at James-street and Hamilton-street (of which illustrations appeared in the *Builder* for Feb. 28, 1885) are connected with the stations at the street level above by large hydraulic lifts, which may in a way be looked upon as vertical branch railways. In each of these stations there are three lifts, each capable of raising 100 passengers at a time, and as the time occupied on the vertical journey will be about one minute, it will be possible when all arrangements are completed, to raise a heavy train-load of 300 passengers from below to the surface in one minute. Each lift consists of an ascending-ramp, 20 ft. long, 17 ft. wide, and 8 ft. to 10 ft. high, constructed with handsome panelled sides of oak and American ash, and lantern roof surrounded by mirrors, with a central gas lamp. There are seats on each side for those who care to rest during the short journey. This cage is supported on a very stiff frame of iron girders, riveted to a central forged steel cross, which, at its centre, is fitted to a hollow steel ram, 18 in. diameter, which rises and falls in a very strong hydraulic cylinder, suspended in a boring sunk beneath the tunnel level. The lifts at James-street rise 76 ft. 6 in. and those at Birkenhead 87 ft. 6 in. In a tower at each station, at a height of about, 120 ft. above the pavement, a supply-tank, holding 10,000 gallons of water, will be placed, and at a depth of about 60 ft. below the pavement is a waste-tank of similar capacity. When any lift has to ascend, the attendant in the cage, by means of a hand-rope near the door, opens a valve, so that the water pressure from the upper tank presses on the bottom of the 18 in. ram above mentioned, and the lift will then rise rapidly. On reaching the top, it automatically reverses the hand-rope, and comes to rest with perfect quietude, though the total weight in motion, when a lift is fully loaded, is about 28 tons. For descending, the hand-rope is pulled in the opposite direction, and the starting-valve then opens, to allow the ram to force out the water beneath it into the waste-tank above mentioned. All the working parts are made enormously

strong in proportion to the loads upon them, and all connexions are so guarded that if any detail should fail there is something else to take up its duty. The hydraulic pumping machinery is fixed on a floor in immediate communication between the upper and lower booking-hall in each station. In the engine-room at James-street there are three marine boilers, and three pairs of Messrs. Easton & Anderson's patent duplex pumping-engines, each of which is capable of raising 30,000 gallons of water per hour from the waste-tank below to the supply-tank in the tower above. These engines are also so connected that they can supply the lifts direct, either acting in unison with the supply-tank, or without such tank at all. At present they are working direct without any supply tank, as the towers for receiving them are not yet completed. A very ingenious arrangement of interchangeable valves and pipes in the engine-room enables any main pipe, pumping-engine, or lift, to be shut off readily, without disturbing any other part of the whole system. The lifts were severely tested by General Hutchinson, of the Board of Trade, on the 29th of December, with loads equal to about 140 passengers concentrated on one side of each cage, and they stood these tests most satisfactorily, and ascended and descended with the test loads. The whole of these hydraulic appliances have been designed and constructed by Messrs. Easton & Anderson, of London, under the supervision of Messrs. Brunlee & Fox, the engineers of the railway. Mr. Rich, one of the partners in the manufacturers' firm, has devoted the greatest personal attention to the strength and security of every detail, and the work of erection at the stations has been carried out by Mr. C. R. May as their resident representative.

With regard to the Mersey Tunnel itself, we are informed that it is lined with Staffordshire blue bricks, supplied by Mr. Joseph Hamblet, of West Bromwich. The white and other coloured glazed bricks, of which an immense number were used, were all supplied by Mr. J. C. Edwards, of Runcorn.

Concerning the stations it may be added that all the booking-halls, waiting-rooms, &c., in connexion with the four stations have been laid with patent wood block-flooring, supplied and laid in his preservative composition by Mr. Roger Lowe, of Farnworth, near Bolton. The glass and zinc roofing has all been executed by Mr. T. W. Helliwell, of Brighouse, on his patent systems.

Messrs. Waddell & Son were the general contractors, Mr. Prentice being their resident representative.

## NEW BY-LAWS FOR CONCRETE-BUILDING IN THE METROPOLIS.

At the meeting of the Metropolitan Board of Works on the 22nd inst., the Building Act Committee brought up the following report:—

"Your Committee have had under consideration the question of the power of the Board to regulate, by new by-laws, the use of concrete in buildings. Your Committee reported, on the 2nd of October last, the decision of the magistrate, dismissing a summons which had been taken out by the District Surveyor in respect of certain artisans' dwellings in Zoor-street, Southwark, and the Board then authorised the Solicitor to give the District Surveyor the necessary legal assistance upon the appeal. Upon further consideration, the Solicitor has thought it inexpedient to proceed with the appeal, and your Committee have had before them the general question of the power of the Board to deal with concrete buildings. The Board has jurisdiction in the matter under the existing by-laws, which were sanctioned in 1879, so far as the foundations of houses and buildings are concerned; but the Solicitor is of opinion that the Board has at present no power to make by-laws as to concrete buildings generally. Your Committee have therefore prepared, in conference with the officers, new by-laws relating to concrete walls, together with clauses as to the duties and remuneration of the District Surveyors in connexion therewith. Printed copies of the proposed by-laws have been forwarded to the members of the Board, and your Committee now submit them for approval, and recommend that they be approved by the Board, and be sent to the Home Secretary for confirmation; also, that a copy of such by-laws, together with notice of the Board's intention to apply for confirmation of the same, be advertised; and that copies of such by-laws and notice be delivered at the office of the Royal Institute of British Architects and of the Institution of Surveyors, as required by the 16th section of the Act."

\* For a report of this case see *Builder*, Sept. 19, 1885, p. 409.—Ed.

## BRICK-MAKING MACHINERY AND BRICK MANUFACTURE.

This was the subject of a paper by Mr. William Johnson, of Leeds, read at the meeting of the Inventors' Institute on Monday evening last. We extract some portions of it:—

Brick-making machinery may be divided into two distinct classes, the pugging or plastic, the what is called semi-dry, but ought more properly to be called dry process,—and the semi-plastic process. There are some clay that will give most satisfactory results by one of the processes, whereas in the other they will be an entire failure; and the failures which have been experienced with machinery arising from endeavours to work the material by processes unsuitable to it.

Brick-making machine manufacturers have invariably confined themselves to one class, and being able to point to very satisfactory results in their anxiety to do business have urged their speciality upon purchasers for whom, on account of the peculiarity of their material, it has been totally unsuitable, and has therefore been a failure.

As a brick-manufacturer by birth, I may say, and also having been connected with brick-making in its various branches all my life, I have had an experience of the varying character of clays, and the necessity there is for their having a treatment peculiar to themselves, having witnessed many failures and great losses. I never contemplated myself having a genius for invention until I had a series of continuous losses for the space of seven years in brickwork, which I commenced through the impossibility of getting machinery that would work the material profitably. I tried one machine after another, all the best known, and of the most expensive kind, but in each case with the same result,—continued loss. I tried every expedient I could think of, and eventually succeeded, and entirely overcame my difficulties.

I at once cleared the whole of my machinery out regardless of its cost, and replaced it with my own inventions, which, I need not say, have given me an ease of mind to which I had long been a stranger, and also turned my loss up into working into a handsome profit.

*The Advantages of the Various Processes.*—In the plastic system of brick-making, there are scarcely any kinds of brick-making machinery which cannot be successfully worked, and where there is any doubt of the success of the other processes, I always advise this. But the cost of production by the dry and the semi-plastic system is 40 per cent. less, which makes it very desirable to adopt one of the latter where the material is favourable, as profit, after all, is the great consideration.

There are comparatively very few clays unsuitable to the dry process, where it is desired to obtain a firm and non-absorbent brick, and indeed this process is fast dying out on account of the porousness and looseness of the bricks produced, and must of necessity decline more and more. But the semi-plastic has many advantages over the previous two, the bricks by this process being less porous and stronger, and having a greatly increased breaking strain even over the plastic material, and with the extra recommendation being produced at 40 per cent. less cost labour. Most kinds of clay can be worked by this system, and where its advantages are understood it must be adopted. The material for it must be naturally dry enough to allow being made into bricks in a stiff and firm condition; the clay, if out of shale, marl, or of a hard refractory nature, must be reduced to a granulated state, or if it be a strong bituminous material it may be prepared by horizontal crushing rollers. Succeeding so as I had with my inventions, I patented it and decided to manufacture and sell them.

I notice first my improvements in plastic brick and tile-making machinery. By a special arrangement of wings or cutters in the ram and the mode by which I provide for taking the backward pressure, I have very considerably reduced the power for driving, have fully doubled the pugging or kneading power of the machine. I have also acquired the sole control of a patent die, which in the kind of clay will insure a perfectly-formed column of clay being delivered. By these improvements the air is thoroughly expelled which accumulates in the clay during working and a well-formed and strong brick is produced. *Semi-Plastic Machinery.*—One of my patents



is for preparing the clay, and the two others have reference to making and pressing the bricks. In my system for semi-plastic brick-making two machines are used. In the view of two or three persons to whom I have represented these, it has seemed to them a needless complication and waste. My reply to this is, that, as a brick-maker, and having had an experience with all the best machinery in use, my experience has been that in combining the two processes of making and pressing in one machine too much has been attempted and not accomplished, and in ninety per cent. of the machines now at work combining these, a second machine has had to be added for finishing the bricks. It therefore appeared to me an entire and useless waste to complicate a machine, which greatly added to the cost in wear and tear, and in working, in order to gain a result which the experience of years had proved to be practically impossible. By "impossible" I mean to produce the desired quality of bricks that would be commercially profitable. The great weight of material to be dealt with for a small result of value is a consideration of much importance. It is easy to make a picture, both on paper and in iron, but the vital question is the amount of profit it will yield; engineers will say that the combination of the two processes is possible in one machine. I allow this, but it will be got at the sacrifice of profit. Therefore, having these facts before me, I started out with the object of accomplishing the result desired by two processes instead of one, and designed a very simple arrangement of machine by which I could form a dense and square brick, which was then passed by the attendant boy within reach of a second machine, which took hold of it and delivered it finished in the best possible form. The brick-making machine is provided with a hopper, into which the ground clay is delivered. The bottom of this hopper constitutes a feed-box, one side of which is formed by a die cylinder, which rotates intermittently. By the action of this cylinder the clay is kept in continual agitation, and is prevented from sticking or clogging. Within the feed-box there works a reciprocating ram, which at each forward stroke forces a portion of clay into a die or mould in the cylinder. The action of filling one mould propels the previously formed brick out of the diametrically opposite mould of the cylinder, and delivers it on a table. The ram is worked from a crank, and is so arranged that its stroke can be regulated to give the exact pressure that is required, according to the nature of the clay under treatment. The crank shaft is driven by a spur wheel and pinion from the first motion shaft, upon which are the pulleys which receive the belt from the engine. The mould cylinder is rotated intermittently by an arm worked by a crank pin on the outside of the main spur wheel. The other end of the arm operates a kind of ratchet wheel, consisting of a pair of discs, between which it rests, and our studs or pegs. For each revolution of the crank shaft the cylinder is turned one-fourth of the revolution. When required by the special nature of the clay, the hopper and feeding-ram arrangements can be substituted by a pugging arrangement for feeding the mould. The brick-pressing and briquette machine mainly consists of a very solid powerful bearing standard, which supports a balance lever beam, which is alternately lifted and depressed by connecting-rod from the crank-shaft. The short end of the lever works a ram die, which is kept vertical by travelling in a grooved bed on the face of the standard connected with the lever by a simple parallel motion gear. In this manner an enormous leverage with least friction is obtained. The ram comes down on mould in the centre of a planed table; the pressed brick is then raised from the die by a finger worked from a cam on the crank-shaft, and is then pushed forward by an arm which is operated by an eccentric on the same shaft. The pressure can be increased or reduced at will to suit all kinds of clay by an arrangement of detached plates being slid underneath the mould beds. The labour or attendants required are three boys to these machines, one to attend the hopper, keeping it full of the mud clay, one to pass the bricks to the second machine, and one to load the bricks as delivered out of the second machine on to the row or wagon to be taken direct to the kiln. Some slight alterations I adapt the pressing chine for making bricks by the dry process. There has hitherto been a great prejudice

against bricks made by machinery for fire-resisting purposes, on account of their being too close and compact; but I believe that with my improvements this objection is fully met,—that I can retain the openness or light compactness of the brick, which is thought to be necessary for resisting intense heat. Only recently a patent has been taken out for the manufacturing slate debris into bricks for building purposes, which promises to give considerable commercial value to an article that hitherto has only been an expensive encumbrance to the slate-quarrying trade. This material makes up into a most dense brick, with a crushing strain of double the weight of one made from ordinary clay, and is, therefore, specially adapted for engineering purposes. The bricks, so far, have been made by the dry process, but it fails to bring out the advantages which this material gives for the purpose of brick-making. The patent semi-plastic machinery is specially calculated to meet this difficulty, and at the same time reduce the actual cost of their manufacture very considerably.

There is also an important manufacture which I believe is destined to expand and grow year by year. I refer to the manufacture of white and coloured glazed bricks; these have been made, so far, by hand-labour only. The reason assigned for this is that the quality requires to be so high, that it is impossible to obtain it other than by the most careful hand-work. I am satisfied that with the improvements I have introduced, this work can be done equally well, and at fully one-tenth of the cost of hand-labour in forming the brick.

Bricks enter so largely into our most important enterprises, those employed in their production are so large a community, and there is such a large amount of capital invested in their production, that I claim for bricks an interest equal, if not exceeding, that of many of the subjects which engage the attention of thoughtful men.

#### IS A TIMBER STAGE A BUILDING?

MESSRS. ALLEN & SONS, builders and contractors, of Palmerston-road, Kilburn, appeared before Mr. De Rutzen, at the Marylebone Police-court last week, on an adjourned summons taken out by Mr. Thos. Blashill, District Surveyor for Hampstead, for, in or about July, 1885, not enclosing a timber-stack with walls or brick or other incombustible material.

Mr. Blashill conducted his own case; and Mr. T. C. Earle defended.

Mr. Blashill said the defendant had erected a building of two stories in height for the stacking of timber. The erection was about 72 ft. by 32 ft., and had a number of posts fixed into the ground. The first-floor was of wooden joists, and the floor-boards properly tied. The cover or roof had on it zinc with rolls, and, in fact, had all the appearance of the roof of an ordinary building. The question was whether or not the structure was a building within the meaning of the Act? He contended that it was, because there was everything which would constitute a building, except that it had no walls.

In cross-examination, the complainant said it was true that he called the structure a timber-stack in his notice to the defendant, but he now called it a building.

The Magistrate asked, if all the timber was removed from the structure, would that which was left be a building?

To which Mr. Blashill replied that it was an ordinary place with ordinary roof.

Mr. Earle, in addressing the Magistrate on the case, submitted that there was no distinction between this case and other cases where it had been held that a timber-stack was not a building within the meaning of the Act, and that the matter of there being a roof did not affect the question at issue. He then cited the case of *Harris v. Pinner*, in deciding which Mr. Justice Chitty was reported to have said that "any ordinary person with a reasonable knowledge of the English language would not interpret the words in the Act to mean an erection known as a timber-stage." He contended that the Act should be interpreted in its largest sense, such as Mr. Justice Chitty had interpreted it. The Act did not give any definition of what was a building, and therefore he urged that the words of the Act should be understood in their ordinary sense, and, were that done, he was certain that no person would venture to call Messrs. Allen's timber-stack a building.

The Magistrate said he regarded the case as one of some importance to the public, and he would therefore hear Mr. Blashill again on the subject.

The complainant then said that he relied upon the wording of the Act, that a building must be enclosed by walls. The structure in question was, in every sense, a building, with floors and roof, and, in fact, complete in every way except that it was

without walls. It was no ordinary skeleton structure. Referring to the zinc cover, he contended that it was similar in every respect to an ordinary roof with rolls and hips, and was not originally made for storing on, to which purpose it had latterly been turned to account.

Mr. Earle then called Mr. J. Allen, the defendant, who said he intended when putting the structure up to store hard woods, such as oak and mahogany, on the zinc roof. He had already put some up, and intended putting more there. The object of stacking timber was to dry it by the air having full play on it in a covered place, but were walls to be put up and the air kept out his (defendant's) object would be frustrated, and the stack would be useless. As to the floor being covered with boards, that was only done for the convenience of the workmen going round stacking the material, and to prevent their falling through the joists.

In giving his decision, Mr. De Rutzen remarked that he had once before given a decision on the subject of timber-stacks and although there was a difference between that and this case, still it helped him on the present occasion. Looking at the case before Mr. Justice Chitty, and having regard to the scope of the Building Act and the Prescription Act, he should hold that the erection in question was not a building, and the summons would be dismissed. The matter was of some public importance, and he should be glad to grant a case for appeal if one was asked for.

#### THE EXAMINATION IN ARCHITECTURE.

SIR,—I have no intention of entering into a personal controversy with Professor Kerr, and therefore am content to leave the observations in his letter of last week [p. 182] unnoticed; but the interests of intending candidates render it necessary that the misleading statement, "nearly a hundred books are catalogued as representing part of the reading required," should not be allowed so to pass without comment.

In the application paper to be sent in by each candidate he is required to select one period with the architecture of which he will be expected to show a thorough acquaintance; the "list of selected books" is intended to enable him to ascertain the best and most accessible standard works on that particular subject, to the study of one or more of which he will then apply himself. Thus, should he select Greek, his attention would be directed to Stuart and Revett, Wilkins, Cockerell, Penrose, &c. Should he have preferred a Mediæval period, he would select from the list under that head such books as would best satisfy his requirements, and obviously would not need to trouble himself about the others further than from such as may be accessible to him to acquire such knowledge of the other styles as may be desirable.

The Examination is intended as a test of the knowledge the candidate may possess of the professional subjects set out in the programme; the sources from which that knowledge has been obtained may be widely various, and, from whatever source obtained, a reasonable acquaintance therewith will carry the candidate through.

Although the wider range of study indicated by the "advice" is most desirable, candidates whose chief source of book knowledge has been "Gwilt's Encyclopædia" have passed creditably, and have expressed their appreciation of the "list of selected books" as useful for guidance in their future studies, rightly considering that passing the Examination was not the conclusion, but rather the commencement of earnest study.

The limit of age for admission to the Institute is, according to the Charter, twenty-one years, but it is not expected that many candidates will offer themselves at that age. In paragraph 1 of the "Regulations and Programme," the candidate is recommended not to enter himself for examination under the age of twenty-three years. Some have come forward before this age,—even soon after attaining twenty-one years,—and passed well, but at twenty-three the Examination should be passed with comparative ease.

Different opinions are held as to the expediency of publishing the examination papers, some thinking such a course as likely to mislead rather than to assist; the subject has been under consideration, and some course will probably be adopted which will be satisfactory to future candidates.

I may take this opportunity to express my regret that steps have not as yet been taken to establish a preliminary examination for younger students (such as existed in connexion with the Voluntary Examination). Its necessity is be-



gining to be admitted; its consideration will, I hope, at no distant day, come before the Council, and a scheme be submitted for adoption by the Institute. Then, following this, student classes connected with the Institute, and under the guidance of the Architectural Association, and of local societies, could be formed in London and the provincial centres; the young pupil at his entry into the profession, whether in London or the provinces, would be brought into direct relation with the Institute, and follow the course of study prescribed by it, which would lead naturally from student to "Associate," and then, in due time, to "Fellow."

The Institute would thus surely bring within its influence and enrol among its members the great body of the profession throughout the country. It would soon become really the Institute of British Architects, and the status of the profession would be materially improved.

With reference to my letter in your issue of the 16th inst., I can only repeat the offer therein made, and assure intending candidates that whatever reasonable assistance and advice it may be in my power to afford to them will at all times be freely given, and with much pleasure.

ARTHUR CATES.

7, Whitehall-yard, S.W., January 25, 1886.

SIR,—It is with great surprise that I read in your issue of last week a letter on this subject from one whose name is familiar to most students in architecture, and who, presumably, in his professional capacity, is interested in their welfare.

My surprise is the greater when I recollect that but a few weeks ago Professor Kerr so ably championed the cause of the younger members of the profession during the consideration of the new Charter of the Institute, thereby winning their gratitude, which I, for one, sincerely hope is not misplaced.

The ingracious language of the letter towards the action of one who has for so long identified himself with the educational works of the Institute seems to me singularly inopportune, for, however opinions may differ as to Mr. Cates's line of action, I think none who know anything of him, either in public or private, will question the unselfish and, indeed, generous spirit of the offer made by him as a member of the Examining Board.

That the advice of a successful professional man is valued, is evidenced by the fact that several young fellows have already, to my knowledge, consulted Mr. Cates on the Examination question since the publication of his letter, and my advice to others is that they should do the same.

There having been of late a very general wail in all parts of the country on the discursiveness of the ordinary architectural education, surely any advice from one having wide experience, and who is constantly meeting professional men with the most varied practice, should be welcomed rather than repelled.

I hardly like to suggest that Professor Kerr fears there may be here an encroachment on the special functions of the professor in the Chair of Architecture at King's College, and a certain jealousy as the source of his complaint, but it seems to me the policy of the Examining Board, as criticised, is merely a side issue.

Professor Kerr comments on the number of books recommended for study. These, it will be found, are classified under different heads, and as to certain subjects but one section is taken up by the candidates at the examinations, the number is at once reduced materially. Surely, anyone will see the utility of a wide selection of books, when the loan collections are limited, and, to many, certain of the more costly standard works almost inaccessible.

I, for one, would wish Professor Kerr more enjoyment at the *stanzas* of the Charter Committee, but cannot help thinking that if he evinces the same spirit on those occasions as he does in his letter, the rest of the Committee cannot sit on a "bed of roses."

FRANCIS HOOPER.

No. 1A, Craig's-court, London.

#### "PLUMBERS AND PARLIAMENT."

SIR,—Your correspondent "F. M." [p. 182] will see from the letter addressed to the Plumbers' Company, written at my suggestion by Mr. Henshaw, that the sneer he has been pleased to use at the Central Association of Master Builders was quite uncalled for.

The Association watches with the keenest interest all questions likely to affect the trade, but does not consider it wise, for the sake of superficial effect, to dabble in a noisy and ostentatious manner in matters which are being dealt with by others.

If representatives from this Association can co-operate usefully with the Plumbers' Company in accomplishing an improvement in that particular branch of the building trade, which

I think they can, we shall be happy to do so, but if the Company are indifferent to any help we can afford, I think, speaking for myself, that is no valid reason for our opposing one of the old City Guilds from exercising their proper vocation and setting a good example to the other guilds to do likewise.

Whether their seeking legislative interference is wise or not is, to my mind, a very moot question. I should have imagined that they can, as a guild, render all the assistance that the trade needs in the way of examination and granting certificates without power from Parliament.

It is obvious that now the public are so keenly alive to sanitation they will recognise the importance of having properly-qualified workmen to carry out the most important part of sanitary work.

From the tenor of Mr. Shaw's letter in your issue of the 16th inst., I infer that the communication of our Secretary has been overlooked. Whether that be so or not, he will see, from the tone of the correspondence which has taken place on the subject, how desirable it is that the inconvenience pointed out by the "C. A. M. B." should be considered and provided for in any new arrangements which may be agreed upon.

F. J. DOVE,

President of the Central Association of Master Builders of London.

SIR,—Your correspondent, "F. M.," asks a very pertinent question. "Why do not the Masters' Association take up the matter of the hours worked by the plumbers?"

I would point out to him that the Association is hampered by two parties who would combine to frustrate its efforts. I find on inquiry that on Nov. 23rd, 1874, after much arrangement and negotiation, a conference was held, at which, however, only two representatives of the plumbing trade attended, to discuss the hours worked by plumbers, arising out of a strike. After anxious discussion it was found that no action could be taken, through the unwillingness of the master plumbers to disturb the relations, although then strained, existing between them and the men. In fact, a courteous, but so decidedly firm, opposition was shown to take any steps at all, that the matter was dropped.

With regard to Mr. Shaw's letter, I cordially agree with him in a desire to increase the efficiency of the plumbers' trade, for it must be admitted that there is plenty of room for it. It is strange that this very virtuous resolve on his part has been delayed so long; but still more strange, in fact, is a coincidence,—that the strengthening of the Company by a large influx of working plumbers (I suppose to make it look more representative), this alliance with experts and architects, should be simultaneous with a growing practice on the part of architects to make plumbers' work, in builders' contracts, a provisional amount, the result being that some architects employ their own pet plumbers, and the British public has to pay accordingly for the privilege. Not having seen Mr. Shaw's scheme, I cannot, of course, "recognise" "his object." I dare say it is a very good one, and I would ask him to take us into his confidence, and to divulge what it is.

Mr. Henshaw's letter answers Mr. Shaw's remarks as to his desire to co-operate with the builders. I would only remark that I have made inquiries, and can find that only the late Master of the Tybers and Bricklayers' Company was invited to a dinner, not to the conference.

C. A. M. B.

#### SEWAGE PURIFICATION

SIR,—Chemists, Engineers, Sanitary Authorities, and all those who are engaged upon the science of sewage treatment, as well as the general public, should feel indebted to Dr. C. Thresh for his excellent article published in your journal [p. 115, ante] on "Sewage Purification."

The four tests and general formulae laid down by him are exceedingly to the point, and I am desirous of endorsing his views, namely, that all therein demanded must be satisfactorily met by any method of sewage treatment, or it is quite unworthy of adoption.

As Public Analyst for the Borough of Guildford, I believe I am reliably informed when I state that no real and serious idea of adopting Mr. Conder's process was ever entertained by the authorities of that town. I am very glad that Dr. Thresh has taken upon himself to publish the particulars of the trials made, seeing that so much was claimed and so little done. Articles appeared in various organs enlarging upon the wonderful discovery made by Mr.

\* Our correspondent will be able to inform himself on the subject if he will read the report of the plumbers' conference which appears on another page.—ED.

Conder, that small quantities of ferrous sulphate produce marvellous effects upon sewage, and it would appear from them that all those who are now labouring in this field of research may cease to work, and consider the great problem as completely solved by that gentleman.

ARTHUR ANGELL, Ph.D., F.I.C., &c.

#### TIMBER MEASUREMENT.

SIR,—I thank "Godalming" and Mr. Staines for their letters [p. 143, ante]. But I am not quite sure that all timber measurers know so much about the subject as they do. If I had found it so, I should probably have troubled you with a letter. Certainly, to whom I showed my calculation (put as clearly as possible), replied, "It can't be done so. The content is 75 ft. 11 in." (i.e., according to his tables).

Another, steward to a large estate, replied, "I am very pleased with Hoppus's measurement of timber. These seemed to me to show ignorance of the subject."

A gentleman connected with H.M. dockyard said, "We never measure sap." Of course he spoke only of oak; but Hoppus's tables are for all timbers, therefore, it is not sap he deducts 20 per cent.

"Godalming," in his first letter [p. 147, ante], shows how Hoppus may have been led into the mistake; but I think it would have been more creditable to a compiler of tables if he had tested carefully, before assuming, that a rough-and-ready rule which has been proved false for a rectangle held good a circle. To me it seems that Hoppus was a blockhead. "Godalming" reminds me that the old quart bottles hold only a pint and a half, I remember public attention being called to this some years since, and I often now see bottles stamped "Imperial quart," so that the public may see if they keep their eyes open.

I agree with Mr. Staines that Mr. Hoppus's measure is a fair mean between the gross content and the squared timber; but Hoppus does not use this, and I see no reason to think he meant. Besides, why do we want a mean? In such a matter, let us have either one thing or the other, and not the mean, which is neither.

Hoppus's rough measure might do in the day when the crowning test of arithmetical knowledge was what "Godalming" tells us; but surely is not suited for an age when a Board school can show its accuracy. It is quite as convenient to use tables founded on truth as on error.

Of course, the trade may know that Hoppus gives 20 per cent. under the actual content, and a value accordingly; and if correct tables were substituted for the present ones, prices might have to be adjusted; but it seems to me that it would be more satisfactory both to buyer and seller to do this than to continue to deal on a false system of measurement, which ought long since to have been given up.

J. WARDLAW.

\* This letter was sent too late for appearance in our last issue.

**British Archaeological Association.**—The meeting held on the 20th inst., Mr. G. Wright, F.S.A., in the chair, several interesting objects of antiquity were exhibited, various members, among which may be named a series of drawings of Moulton Church, Northants, by Mr. E. Law, showing recently discovered window, apparently Saxon date, over the arcade of the north aisle, which is of early thirteenth-century work, the window having existed previously on an older wall. Foundations have been found of a still earlier church which had a 14 ft. wide and a chance. Mr. Loftus B. F.S.A., pointed out that the present church of the existing church still occupied the same position as that of the first small church erected on the site. While the building has been rebuilt several times and greatly enlarged, the position of this arch had never been altered. The first paper was by Mr. Syer Cuming, F.R.S., on the old traders' signs in Westminster Hall. For fully a century and a half the signs were employed as a sort of bazaar, the signs being rented by booksellers, law stationers, sempstresses. The danger of such an occupation was pointed out, the magnificent hall has barely escaped destruction in consequence, and on February 20th, 1630-1, it was actually on fire by the burning of the little shops. Reference was made to many old authors, and quotations relating to the sale of wares were quoted, the anomaly of these sales close to the Courts of Law being dwelt upon. There is a drawing by Gravett dated 1755, which shows the arrangement of the courts being at the end of the Hall, and a line of shops or stalls each side. The second paper was on the History of the Church at Barnack, commenced in notes by the late Rev. — Haig to Rev. Canon Argles. Both papers were read by Mr. W. De Gray Birch, F.S.A.



## The Student's Column.

## FOUNDATIONS.—V.

**W**HEN a building of considerable weight has to be erected on a site that is known to be, to some extent, unsound, the whole site is sometimes covered with concrete, and that is usually an effectual precaution. But there is a case in which a large building that was erected upon a bed of concrete 6 ft. thick has gone over rather considerably, owing, as it seems, to the greater thickness, or perhaps the greater softness, under one side of the site, of the marshy subsoil on which the whole building stands. Such cases show the utility of examining the soil under several parts of a site; and, as it is impossible to calculate the extent to which such settlements may go, it is best where great irregularity exists to sink through such a soil to something that is more solid and reliable. When a building leans to a considerable extent the question whether it is dangerous or not is one for those who know the nature of the subsoil and are familiar with the effects produced by such irregularities as have been indicated. The existence of these irregularities is generally a matter of notoriety locally, but an acquaintance with geology renders one better able to judge of this matter with such help.

A soft subsoil underlying a thin layer of hard surface soil occurs where the silt or mud of a former lake or estuary has become covered with a bed of clay. This bed will, according to its thickness, support a building of more or less weight, and this can best be judged of by reference to other buildings in such a locality. Where the clay is 4 ft. or 5 ft. in thickness a very considerable weight may be placed upon it, so long as the surface is not cut into or disturbed. In some places it is the practice to refrain from removing even the turf from such a site, the brickwork or concrete being put directly upon it, as evidently appears to have been done in beginning the walls of many of our old churches. An instance of failure is usually more instructive than one which has resulted in success. An architect who was building, for the first time, on such a site, being determined to form his foundation in the manner to which he was accustomed, ordered nearly or quite through the stiff upper stratum in order to make the trenches for concrete. As the walls and piers of his church rose they sank down more or less according to their weight, so that wide cracks appeared at their junctions. The bed of clay actually existing would have carried such a building very well, though it would not have carried a heavy tower, for which a more solid foundation would have had to be found below the bed of silt by piling or otherwise.

When a tower or other structure unusually heavy is part of the same undertaking with a building of ordinary size, and the nature of the ground is such that the foundations for the two structures must be made in different ways, they should be built separately, even if they must be in close contact, in which case they should not be united until they have had time to settle, each to the extent due to its weight and foundation; but it is better to build the tower of a church or the chimney of a factory quite clear of the lower building when the soil is of such limited capacity for support. In the last parts of Italy the campaniles, or bell-towers, were usually placed at some distance from the churches, and the same arrangement has been carried out in this country, in both ancient and modern times, though not always for the reason above named.

In the construction of large chimney-shafts extensive works are commonly undertaken in order to provide foundations, unless they can be built on the solid rock. Concrete beds of such dimensions as 30 ft. in diameter and 5 ft. or 6 ft. in thickness are provided with the object of spreading the weight and also diminishing the risk of inequalities in the subsoil. But where serious inequality exists the site is unfit for a building of this kind, as no means exist for precisely calculating the effect of such inequality, or can the evil that may result be remedied with any degree of certainty. One of the most serious disasters of recent times was due to the sinking of a large chimney partly over the disused shaft of a mine which had been filled up, at without the use of sufficient means, otherwise to render the whole area of the foundations uniform.

An architect who is at liberty to exercise his

own judgment will, by choice, avoid placing a tall building upon a soft or irregular site, and will spread his design over a wide area rather than get the required accommodation by means of several stories. If that could always be done there would be but little art in the formation of foundations. The great use of such art is found in dealing with problems that are difficult, and are imposed upon us by a masterful necessity. Yet it may be said of the use of concrete on such soils and for such purposes as come within the experience of architects that the matter is well within the powers of any one who will take reasonable trouble and use good ordinary judgment. With all that may be laid down as to the proper composition of concrete and its proper application, it is very rarely indeed that an instance of failure occurs in a foundation that has been designed and carried out on the system in everyday use. It may be strongly suspected that, where the concrete is sufficient in quantity, but of very bad composition, its sufficiency as a foundation is due to a principle altogether different from that which is aimed at by us when we try to make a trench of concrete act as a rigid bar fitted to and carried by the bottom soil.

A trench of sand formed in a very soft or spongy foundation will, in such a position, be a better support than a bed of solid concrete, for the effect of it is to spread the weight of a wall over the sides as well as upon the bottom of the trench. It is necessary, however, that the soil shall be so retentive as to prevent the escape of the sand from the trench. The sand acts under these conditions very much like a fluid. Some notion may be formed of its effects by recalling to mind the accidents that occasionally happen through the muzzle of a gun getting stopped with a little sandy earth, when it is made to burst upon being fired, owing to the pressure of the soil against the inside of the barrel, instead of being forced directly out of the muzzle. The same thing may be studied experimentally by burying in loose sand any small disk with a string attached to its centre, and noting the force that is required to draw it up owing to the pressure being exercised, not only on the sand immediately above, but upon an inverted cone of sand spreading out as it rises upwards from the disk. The same principle has been applied in making foundations in soft ground by driving down in many places under the walls a model of a pile and then carefully withdrawing it and filling the cavity with clean sand. Though there is no reason to doubt the result of these operations, they are probably never actually brought into use in this country, but we may see by their means how concrete, which might be so very slightly cemented as to crush, would, in its disintegrated condition, act by pressure on the sides of the trench. Indeed, there is no doubt that a trench or a bed of clean gravel would, in proportion to the roundness and smoothness of its materials, act in the same way as a trench or bed of sand. It would, however, be well that any one trying this experiment should try it with a building of some capacity for accommodating itself, as a timber-framed building would do, to any slight movement in the sand or gravel, while it was gradually settling down tight into the trench.

**Separate Sewage Systems.**—At the Parkes Museum of Hygiene, Margaret-street, Regent-street, on the 21st inst., Mr. R. F. Grantham, M.I.C.E., delivered a lecture on "The Working of the Separate Sewage System." The chair was occupied by Professor W. A. Corfield, M.A., M.D. (Oxon), who briefly introduced Mr. Grantham. The lecturer commenced by referring to the opinion expressed by Sir Joseph Bazalgette in 1865, in a paper on "The main drainage of London," in which he objected to the theory of separation of rain water as impracticable in the case of London. While, having regard to the opinion held at that time, and to the general knowledge of the subject, it was impossible to deny the soundness of the reasoning upon which the present system of sewerage London was more than twenty years ago carried out, yet the system of separating the rain water from the sewage has been steadily gaining ground, until the Royal Commissioners on Metropolitan Sewage Discharge, impressed with the difficulties of the complete carrying out of the separation theory, advised that some middle course might have been found.

## RECENT SALES OF PROPERTY.

## ESTATE EXCHANGE REPORT.

JAN. 18.	
Camden Town—115, Arlington-road, freehold.....	£765
JAN. 19.	
Bethnal-green—22 to 23 even, Ux-street, freehold	1,135
Willesdon—The Craven Park—new, 9 years, ground-rent 5l.	1,295
By THURGOOD & MARTIN.	
City, Great Tower-street—Ground-rent of 123l., reversion in 76 years.....	3,220
Finsbury Park—113 and 115, Mosey-road, 78 years, ground-rent 12l. 12s.	510
By DEBENHAM, TAWSON, & CO.	
Snarebrook—Improved Ground-rents of 57l., term 70 years.....	1,020
Wanstead—A Plot of Land, 6a. 1r. 17p., term 70 years, no ground-rent.....	330
By DRYDEN & CO.	
Hyde Park—35, Craven Hill Gardens, 48 years, ground-rent 35l.	2,750
By F. W. GLASIER.	
Battersea—6, Victoria-road, 88 years, ground-rent 7l. 10s.	430
By HORNER & MORTON.	
East Dulwich—1, Heber-road, 88 years, ground-rent 8l. 8s.	310
JAN. 20.	
By HOBBS, RICHARDS, & CO.	
Kensington—25, St. Mary Abbott's Terrace, 19 years, ground-rent 13l. 10s. 10d.	810
Wandsworth—4, Rose Villas, 91 years, ground-rent 6l.	270
By G. A. BRISTON.	
King's-cross—34 to 44 even, Britannia-street, 61 years, ground-rent 30l.	2,100
By FARRINGTON, ELLIS, CLARK, & CO.	
South Hampstead—14, Fairfax-road, 69 years, ground-rent 10l. 10s.	670
JAN. 21.	
By DALY & SON.	
Mile End-road—Nos. 473 and 475, 16 years, ground-rent 28l.	380
By BALL, NORRIS, & HADLEY.	
Haverstock-hill—130, Adelaide-road, 68 years, ground-rent 10l. 10s.	675

## MEETINGS.

SATURDAY, JANUARY 30.

St. Paul's Ecclesiastical Society.—Annual meeting. 2.30 p.m.

MONDAY, FEBRUARY 1.

Royal Institute of British Architects.—(1) Announcement of Royal Gold Medalist. (2) Mr. Wyatt Papworth on "The late Professor Donaldson's connexion with the Institute." (3) A short Memoir of the late Professor Donaldson will be read by Mr. E. A. Grainger. 8 p.m.

Royal Academy of Arts.—Lectures on Sculpture: Mr. A. S. Murray on "The Principles of Bas-Relief as observed in the best age of Greece." 8 p.m.

Society of Engineers.—Inaugural address by the President, Mr. P. F. Nuresey. 7.30 p.m.

Society of Arts (Cantor Lectures).—Professor H. S. Hele Shaw on "The Mechanical Applications of Friction." 8 p.m.

Architectural Section of the Philosophical Society of Glasgow.—Mr. James Cairns on "The Planning and Sanitary Requirements of Farm Steadings." 8 p.m.

TUESDAY, FEBRUARY 2.

Society of Biblical Archaeology.—Mr. I. W. Simpson on "The Tower of Babel and the Birs Nimrod Surgesons as to the Origin of the Mesopotamian Tower Temples." 8 p.m.

Royal Institution.—Mr. R. Stuart Poole on "Nauclatis." 11. 3 p.m.

Institution of Civil Engineers.—Discussion on Mr. C. E. Stromeier's paper on "The Injurious Effect of a Blue Heat on Steel and Iron." 8 p.m.

WEDNESDAY, FEBRUARY 3.

Society of Arts.—Mr. George Simonds on "Artistic Bronze Casting." 8 p.m.

British Archaeological Association.—The Rev. C. Collier on "The Excavations now in progress at Winchester Cathedral." 8 p.m.

Builders' Foremen and Clerks of Works' Institution.—Ordinary Meeting. 8.30 p.m.

Institution of Civil Engineers of Ireland.—Mr. W. B. Maguire on "Technical Education for Artisans." 8 p.m.

THURSDAY, FEBRUARY 4.

Royal Academy of Arts.—Lectures on Sculpture: Mr. A. S. Murray on "The Later History of Bas-Relief in Greece." 8 p.m.

Institution of Mechanical Engineers.—Annual General Meeting: "Description of Tensile Tests of Iron and Steel Bars, by the late Mr. P. D. Bennett, of Tipton." 7.30 p.m.

Society for the Encouragement of the Fine Arts.—Professor Kerr on "The Art Scapism of the Day." 8 p.m.

Parkes Museum of Hygiene.—Dr. G. A. Heron, on "How it is shown that living things cause some of the diseases of man." 8 p.m.

British Archaeological Institute.—The Rev. J. R. Boyle on "The Crypt of St. Wilfrid's Church, Repton." 4 p.m.

Edinburgh Architectural Association.—Mr. Frank W. Simon on "Wood Carving, with special reference to Germany." 8.30 p.m.

FRIDAY, FEBRUARY 5.

University College.—Professor C. T. Newton, C.B., on "Greek Inscriptions." 11. 4 p.m.

Royal Institution.—Mr. T. Priggin Teale on "The Principles of Domestic Fireplace Construction." 8 p.m.

Institution of Mechanical Engineers.—Annual General Meeting continued. 7.30 p.m.

SATURDAY, FEBRUARY 6.

Association of Public Sanitary Inspectors.—Mr. T. Buckworth on "The Sale of Food and Drugs Acts." 6 p.m.

Election of an Associate of the Royal Academy.—At a general assembly of the Royal Academy, held on Wednesday evening, Mr. J. Seymour Lucas, painter, was elected an Associate.



## Miscellaneous.

**Panama Canal.**—The Paris correspondent of the *Times* informs us that M. de Lesseps has started off, with a staff of delegates from the principal chambers of commerce, engineers, and secretaries, to examine into the present state of the Panama Canal works, and place himself in a position to reply to the criticisms that have been made upon it. We fear there is little doubt that things have been represented in too *couleur de rose* a manner; but M. de Lesseps is of a sanguine temperament, and perhaps has been himself deceived in his calculations. At all events we shall be very glad to hear that he is able to refute his adversaries. M. de Lesseps is now eighty, and informed the *Times* correspondent that he "could not die before opening his second canal," and we are very much disposed to believe him.

**St. Paul's Ecclesiastical Society.**—In the seventh annual report of this society, to be presented at the annual meeting to-day (Saturday, Jan. 30) the council congratulate the members upon the position and prospects of the society. Ten meetings have been held at the Chapter House since the last report, and the following papers have been read:—By Mr. H. Roumieu Gough, on "Some Ecclesiastical Antiquities, English, Irish, Scotch, and Welsh"; by Mr. Arthur Taylor, on "The History of Stained Glass"; by Mr. Charles Browne, on "The Ecclesiology of the Roman Catacombs"; by Mr. Somers Clarke, on "Some Churches of North Germany"; by Mr. E. F. Loftus Brock, entitled, "Some Notes on London Churches"; by Mr. G. H. Birch, on "The Ecclesiology of Paris"; by Mr. W. H. St. John Hope, on "Medieval Chalcas and Patens"; by the Rev. C. L. Acland, on "The most remote Church of Great Britain"; by Mr. Spenser Nottingham, on "The Common-sense Use of the Church's Plain-Song"; and by Mr. H. Roumieu Gough, entitled, "An Architect's Views on Modern Church Building." The following afternoon visits were made during the year:—To the churches of St. Giles, Cripplegate, and St. Sepulchre, Snow-hill, where papers were read by Mr. G. H. Birch; to Merton Abbey, and the Churches of Merton and Morden, under the guidance of Mr. Arthur J. Style; to the old and new parish churches of Chelsea, and to Chelsea Hospital Chapel, which were described by Mr. Somers Clarke; to Chaldon, where Mr. J. G. Waller read a paper on the Wall-painting, and Merstham, where Major Hesles read a paper; and to Heston and Cookham, under the guidance of Mr. Montague Hopworth. Excursions were also made to Chichester, where Mr. Gordon M. Hills received the members, and acted as guide; and to Peterborough, where the Rev. W. D. Sweeting conducted. The balance-sheet shows the financial position of the society to be satisfactory. There are now 329 members on the register.

**A New Metropolitan Police-Station.**—A new police-station has just been erected in Trinity-road, Upper Tooting. The building has a frontage to Trinity-road 58 ft. in length, with a return frontage in St. Nichol's-road 54 ft. long. It is faced with red brick and Mansfield stone, and contains three floors. The apartments on the ground-floor consist of the inspector's office and private rooms, the charge-room, writing-room, waiting-room, and cells. The first floor contains the officers' day-room, mess-room, and dormitories for unmarried members of the force, the second floor also containing similar dormitories and bath-rooms. The building and exercise-yard occupy an area of about 10,000 ft. Mr. John Butler, architect to the Metropolitan Police authorities, designed the buildings; Messrs. Carless & Co., of Richmond, being the contractors, and Mr. John Roberts general foreman of the works.

**Wrought-iron Casements and Frames.**—Messrs. Burt & Potts, of York-street, Westminster, have sent us their new illustrated catalogue of the excellent wrought-iron casements and frames manufactured by them. These casements are absolutely water-tight, and have stood the test of long experience. Section No. 9 may be particularly recommended. The catalogue will be found very useful for reference both by architects and builders.

**Paving.**—The tender of Wilkes's Patent Metallic Paving Company has been accepted by the Great Eastern Railway for paving the whole of the platforms at their Norwich Thorpe Station, upwards of 5,000 square yards in extent.

**The Local Government Board and "the Mortlake Scheme."**—The inhabitants and owners of property in the district of Kew Gardens and the neighbourhood have sent a memorial to the Local Government Board urging it to refuse its sanction to the sewage scheme which the Richmond Vestry and the Rural Sanitary Authority of Richmond are promoting for the drainage of the parishes of Richmond, Kew, Barnes, Mortlake, and Petersham. Objection is taken principally to the site, known as the "Mortlake Site," of the proposed sewage works, and, as the memorial sets forth, on the following grounds:—"1. The establishment of sewage works in the immediate vicinity of a large and rapidly-growing residential district, covered to a great extent by houses of considerable value, would become a great nuisance, and considerably depreciate the value of property. 2. That the proposed site is, owing to the nature of the land, from the best opinion that the petitioners have been able to obtain, altogether unsuited for sewage works. 3. That owing to the proposed works being only a quarter of a mile from Kew Gardens Railway Station, the popularity of the gardens will diminish, and the pleasure of many thousands of visitors will be seriously affected if the proposed works are erected. 4. That the selected site for the sewage works is identical with that which Parliament has rejected. 5. That several alternative, better, and less costly schemes have been prepared for dealing with the sewage, which are not open to the serious objections of the scheme selected by the Richmond Vestry. 6. The site selected for the sewage works by the Richmond Vestry is one adjoining a most attractive part of the river Thames, which, if the works were established, would be irretrievably injured." Notwithstanding the opposition which the announcement of the adoption of the scheme has aroused, the Richmond Vestry has resolved to proceed with the matter; and a Local Government inquiry will be held, at which not only the representatives of the inhabitants of the above-mentioned districts, but counsel for the Duke of Devonshire, one of the owners adjoining the site, will be present to oppose it.

**An "Immense" Granite Slab.**—America is, as everybody knows, the land of "big" things, and every day, almost, we hear of fresh marvels of bigness. As our contemporary *Iron* remarks, it can be "no easy task to separate from the main ledge a slab of granite 354 ft. long, 3 ft. to 4 ft. thick, and 11 ft. wide. But this, it appears, has been accomplished at the Flynt Granite Quarries, Monson, Massachusetts, and by the means usual in all quarries for separating slabs or blocks from the main ledge. A row of wedges were set, several hundred in number, and the workmen, beginning at one end, gently and carefully tapped the wedges, moving by degrees down the line until the other end of them was reached, when the same operation was repeated. In this manner, by careful and patient application, aided by favourable conditions of the weather, the slab of the above phenomenal size was successfully separated from the main rock." We are informed that the value of this immense slab, "if it could have been transferred safely to one of the large cities of the United States, at not too great a cost, would have been several thousand dollars. It seemed almost sacrilegious that it was necessary to cut it up into smaller blocks for transportation, and to finally use it for ordinary building purposes: but it had to be done. The possibility of getting out a slab of such size without breaking it shows that the grain of the Monson granite not only runs evenly, but that it possesses great tenacity."

**Free Lectures to Artisans.**—A second course of eight free lectures to artisans and others connected with the building trade is announced to be given on Wednesday evening, at eight o'clock, at the Carpenters' Hall, London Wall, on "Matters connected with Building." The first of the course will be given on February 17th, by Mr. Thomas Blashill, F.R.I.B.A., when the subject will be: "Timber; its growth, seasoning, and preparation for use." Tickets, admitting to the course and naming the subjects, may be obtained at the Hall after February 2nd.

**Royal Academy of Belgium.**—Sir Frederick Leighton has been elected an Associate of the Royal Academy of Belgium in place of the late Mr. Louis Haghe, and Mr. A. Waterhouse has replaced the late Mr. Donaldson in the section of Architecture. *—Athens.*

**Royal School of Mines.**—Prof. Warington Smyth, F.R.S., in continuing his lectures upon Mining, in the theatre of the Geological Museum, Jermyn-street, discussed the various considerations necessary before entering upon operations in detail. The matter of partnership and the conditions under which the miners may be removed are necessary preliminaries, then comes the matter of machinery, and the nature of its power, and if water, whether it can always be obtained upon the spot, or whether it will be necessary to collect it in reservoirs, or convey it for a long distance by the means of carriage to or from the mine, and the probable necessity of forming new means of communication; together with the yield of timber in the neighbourhood for working of the mine, as well as other fuels for smelting operations when necessary. The matter of wages then becomes an important item, and, in the connexion, the skill of the men in the district and proximity of their dwellings, and the possible necessity of erecting temporary barracks. Then management must be considered, as nothing is easier than to spoil a good mine by bad management, and when a mine has been thrown into bad shape, it is very difficult to get it into good form again. Lastly, the provision of stores and the accommodation of them is necessary, so that a man may not have to travel long distances in order to get a wheel repaired. If the value of the workings is estimated without taking all the points into consideration, the financial outlook will be a poor one.

**The Iron, Hardware, and Metal Trade Pension Society.**—The forty-third annual general meeting of the Iron, Hardware, and Metal Trades' Pension Society was held at the offices of the Institution on Wednesday last. Mr. Robert Henry Pearson, Vice-President and Treasurer, presiding. The president, trustees, and London, Birmingham, Sheffield, and Wolverhampton committees were severally re-elected with the addition to the Birmingham committee of Mr. Wm. Tonks, and the following gentlemen were elected vice-presidents and vice-presidents respectively:—Vice-Presidents: Mr. J. Smith, of Barrow-in-Furness; Mr. R. W. Mosely, Southwark; and Mr. Henry Gallimore, Sheffield. Vice-Presidents: Sir Henry Bessemer, F.R.S., and Mr. W. G. Ainslie, London. At the seventh general election of pensioners, which subsequently took place, the successful candidates were:—John Stones, Sheffield, 578 votes; William Cooke, Sheffield, 379; William James Fortishead, 357; William Smithers, London, 323; Mary Ann Durham, London, 1,924; and Mr. Ann Wilson, Birmingham, 1,521. Lord York, being the highest unsuccessful candidate, received the gratuity of five guineas presented at each election by the Falkirk Iron Co.

**The Green Dragon Tavern, Fleet-street** has just been rebuilt. The building is 76 ft. in height from the street-pavement level, a contains six floors. The ground floor is faced with red Aberdeen polished granite pilasters and columns, the materials of the upper parts of the facade consisting of Portland and Corshill stone, the last-named materials forming the most prominent feature. Above the ground floor there is a bold cornice, with a balcony the foot of the first-floor windows. At the angle of this floor there are pilasters, whilst the centre is a large elliptical arched window and on each side smaller arched windows. The second floor has a central bay window, which is continued upwards to the third floor, and surmounted by a balcony. The fourth and fifth floors are entirely faced with Portland stone. Messrs. Frenn & Keogh, of Hart-street, Bloomsbury, are the architects, and Messrs. Colls & Sons, of Moorgate-street and Cambridge, were the contractors.

**"The Ancient Agrigentum."**—In the *English Illustrated Magazine*, Mr. H. D. Tyndal writes a pleasant article on a month in Sicily, touching on its architectural remains, but, with any special knowledge. Some of our fellow-travellers knew still less, however, as relates how a young Englishman informed a bride, as they approached the station, that "Girgenti is the ancient Agrigentum." "Y dear," replied the lady, demurely; "but w is the ancient Agrigentum?" and got no reply.

**The Hygeian Rock Composition.**—Mr. William White, of Abergavenny, the patentee of this composition, announced that Messrs. Haward Bros. & Co. have opened a depot for its sale at Manor House Wharf, N. Elms.



Royal .....	708	0	0
Spencer & Co. ....	740	0	0
Ward & Lamble .....	687	0	0
Hyde (accepted) .....	673	0	0



LONDON.—For building a front block of offices and chambers at No. 63, Lincoln's Inn-fields, London, W.C. Mr. William Simmons, architect, Long Acre. Quantities by Messrs. Nixon & Raven, Dartmouth-street, Westminster:—

	A.	B.	C.
Ansell & Co. (Westminster).....	£12,648	£508 less	£228 less
W. Oldrey (Westbourne Park).....	11,687	270 less	150 more
Pawley.....	11,485	130 less	210 more
Drake & Co. (Battersea Park).....	11,037	23 less	124 more
W. Marriage (City).....	10,597	equal	equal
J. Chappell (Pimlico).....	10,778	200 less	118 more
John Bottrill, Reading.....	10,765	76 less	260 more
Mark Gentry, City.....	9,975	45 more	185 more

\* Likely to be accepted.  
A.—Amount if the plastering throughout be in Robinson's patent cement.  
B.—Amount if the plastering be in stucco covered with cement angles.  
C.—Amount if the whole of the plastering be in Keene's cement.

LONDON.—For rebuilding No. 162, Aldersgate-street, for Mr. Woolf Hyman. Mr. J. D. Mathews, architect.—Kilby & Gayford (accepted).....£2,760 0 0  
[No competition.]

LONDON.—For repairs to Nos. 272, 274, and 276, Hackney-road, for Mr. Matthews. Messrs. Gordon & Lowther, surveyors, 40, Aldersgate-street, London, E.C.:—

Dye.....	£224 0 0
Taylor.....	209 0 0
Wyatt.....	177 0 0
Thomson & Son (accepted).....	177 0 0

LONDON.—For alterations to the Marquis of Argles's Public House, Devonshire-street, Lisson-grove, Mr. R. A. Lewcock, architect, Bishopsgate-street, London, E.C.:—

Walker.....	£438 0 0
Roome.....	383 0 0
Anley.....	363 0 0
Pringle.....	370 0 0
Burnum.....	368 0 0
Sharr.....	359 0 0
Jackson & Todd.....	347 0 0

LONDON.—For proposed chambers, 38, Maiden-lane, Covent garden, W.C. Mr. W. Stair, architect.—Perry & Co. (accepted).....£3,750 0 0

LUTON.—For the alteration and addition to the Crown Inn, Market-hill, for Mr. E. L. Beckham, Northampton. Mr. W. J. Pearson, architect. Quantities not supplied:—

C. Wright.....	£1,640 0 0
Smart Bros.....	1,010 0 0
Neville Bros.....	935 0 0
Benning & Sons, Maidstone.....	983 0 0
Rance Bros.....	887 0 0
D. Dunham & Son.....	890 0 0
Slough Bros.....	862 0 0
D. Perkins.....	862 0 0
Cox Bros.....	860 0 0
G. Fryer.....	850 0 0

NORTHFLEET.—For the erection of new Board schools, for the Northfleet School Board. Mr. A. L. Guy, architect:—

W. Nightingale, Gravesend.....	£4,798 0 0
Benning & Sons, Maidstone.....	4,650 0 0
H. Knight, Dover-road, Northfleet.....	4,540 0 0
Jonas Hill, The Terrace, Gravesend.....	4,304 0 0
T. Knight, Sidcup.....	3,992 0 0
W & E. Wallis, Felham-road, Gravesend.....	3,748 0 0
Balsam Bros., Old Kent-road.....	3,630 0 0
Russell & Homersham, Swanscombe.....	3,129 0 0

NORWICH.—For dwelling-house, shop, and workmen's rooms in Queen-street, Norwich, for Messrs. W. Todd & Co. Mr. E. P. Williams, architect, Norwich. Quantities by Messrs. Vinall & Kennedy, Guildford-street, Russell-square:—

Puzy & Lumley, Castle-street, Long Acre.....	£4,500 0 0
Wykin & Wilkins, Grapes-hill, Norwich.....	4,319 0 0
Downing, Victoria-street, Norwich.....	3,947 0 0
Youngs, Norwich.....	3,750 0 0
Hawes, Duke-street, Norwich.....	3,620 0 0
Wedge, St. George's, Norwich.....	3,524 0 0

PUTNEY.—For shop-fronts at Putney, for Mr. Sawday:—

C. Jeffreys, Hatton-garden (accepted).....	£195 0 0
--	----------

STOKE NEWINGTON.—For alterations to No. 1, Truman's-place, Stoke Newington. Mr. R. A. Lewcock, architect, Bishopsgate-street, London, E.C.:—

J. A.ley.....	£290 0 0
Jackson & Todd.....	283 0 0
W. Pringle.....	167 0 0
S. Goodall.....	160 0 0

WALTON (Suffolk).—For the erection of Foresters' Hall and two shops, with dwelling-houses under, at Walton, Suffolk. Messrs. Robert T. Orr & Son, architects, Ipswich. Quantities not supplied:—

P. J. S. Cooney, Dovercourt.....	£1,100 0 0
C. Borrett, Ipswich.....	1,045 0 0
E. S. Smith, Ipswich.....	1,090 0 0
C. A. Wyatt, Ipswich.....	1,038 0 0
D. Thurman, Walton.....	1,464 8 0
J. R. & F. Bennett, Ipswich.....	1,400 0 0
A. Cox, Ipswich.....	1,362 10 0
T. Wawman, Felixstowe.....	1,295 0 0
Fox & Wallis, Walton.....	1,250 0 0
T. Ward, Felixstowe.....	1,125 0 0

SPECIAL NOTICE.—Lists of Tenders frequently reach us too late for insertion. They should be delivered at our office, 46, Catherine-street, W.C., not later than four p.m. on THURSDAYS.

#### TO CORRESPONDENTS.

Registered Telegraphic Address, "THE BUILDER, LONDON."

P. M.—H. G. G. F. T. W. F. (the writers of the letters you refer to were not "interested parties"). T. C. C. G. W. L. B. J. H. B. (illegible)—Shops, Harlequin (list received, but without reader's name).

All statements of facts, lists of tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

Note.—The responsibility of signed articles, and papers read at public meetings, rests with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond news letters) which have been forwarded for other journals, are NOT DESIRED.

All communications, not advertisements, and all notices should be addressed to THE EDITOR. All communications relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

#### PUBLISHER'S NOTICES.

Registered Telegraphic Address, "THE BUILDER, LONDON."

THE INDEX AND TITLE-PAGE for Volume XLIX. (July to Dec. 1885) was given as a supplement with our issue of January 9th.

A COLOURED TITLE-PAGE may be had, gratis, on personal application at the Office.

CLOTH CASES for Binding the Numbers are now ready, price 2s. 6d. each; also

READING CASES (Cloth) with Straps, to hold a Month's Numbers, price 2s. each; also

THE FORTY-NINTH VOLUME of "The Builder" (bound), price Twelve Shillings and Sixpence.

SUBSCRIBERS' VOLUMES, on being sent to the Office, will be bound at a cost of 3s. 6d. each.

CHARGES FOR ADVERTISEMENTS.

SITUATIONS VACANT, PARTNERSHIPS, APPRENTICESHIPS, TRADE, AND GENERAL ADVERTISEMENTS.

Six lines (about 100 words) or under..... 3s. 6d.

Each additional line (about ten words)..... 6s. 6d.

Terms for Series of Trade Advertisements. Also for special Advertisements on front page, C. competitions, Contracts, Sales by Auction, &c., may be obtained on application to the Publisher.

SITUATIONS WANTED.

FOUR lines (about 100 words) or under..... 2s. 6d.

Each additional line (about ten words)..... 3s. 6d.

PREPARATION IS ABSOLUTELY NECESSARY.

\* Stamps must not be sent, but all small sums should be remitted by Cash in Registered Letter or by Money Order, payable at the Post-office, Covent-garden, W.C. to

DOUGLAS FOURDRIN, Publisher, Addressed to No. 46, Catherine-street, W.C.

Advertisements for the current week's issue must reach the Office before THREE o'clock on THURSDAY.

The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c., left at the Office in reply to Advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

SPECIAL.—ALTERATIONS IN STANDING ADVERTISEMENTS OR ORDERS TO DISCONTINUE same, must reach the Office before TEN o'clock on WEDNESDAY MORNINGS.

PERSONS Advertising in "The Builder," may have Replies addressed to the Office, 46, Catherine-street, Covent-garden, W.C. free of charge. Letters will be forwarded if addressed to the Office, and sent, together with sufficient stamps to cover the postage.

#### TERMS OF SUBSCRIPTION.

"THE BUILDER" is supplied direct from the Office to residents in any part of the United Kingdom at the rate of 12s. per annum. To all parts of Europe, America, Australia, and New Zealand, 20s. per annum. To India, China, Ceylon, &c. 25s. per annum. Remittances payable to DOUGLAS FOURDRIN, Publisher, No. 46, Catherine-street, W.C.

#### Best Bath Stone, for Winter use.

WESTWOOD GROUND, For Ground, Dried, Combe Down, Corsham Down, and Summer Farleigh Down, &c. RANDELL, SAUNDERS, & CO., Limited, Corsham, Wilts. [Ad.]

#### Box Ground Stone

is the best for use in all exposed positions being a well-known and tried Weather Stone. 50,000 ft. cube in stock. PICTOR & SONS, BOX, S.O., WILTS. [Ad.]

#### Doubling Freestone.

The stone from these quarries is known as the "West Bed," and it is of a crystalline nature, and doubtless one of the most durable stones in England. It is of the same crystalline nature as the Chelchyn Stone, but finer in texture, and more suitable for fine masonry work.

#### FAM HILL STONE.

Greater facilities have been provided working these quarries, and the stone can be supplied in large quantities at short notice.

Prices, and every information given, application to CHARLES TRASK & SON, Norton-sub-Hamdon, near Ilminster, Somerset.

London Agent—Mr. E. WILLIAMS, 16, Craven-street, Strand, W.C. [Ad.]

#### Doubling Free Stone

For prices, &c., address S. & J. STAFFORD, Quarry Owners, 86, BLUE LIAS LIME

and Lime Merchant, Stoke-under-Hill (Ground or Lump), Ilminster. [Ad.]

#### Ham Hill Stone! Ham Hill Stone!

For Ham Hill Stone of best quality and workmanship, apply to JOHN HANN & SON, Quarry Owners, Montacute, Ilminster. Established 1837. Agents, MATTHEWS & GEARD, Albion Wharf, Regent's Park Basin, N.W. [Ad.]

#### Asphalte.—The Seyssel and Metallic L

Asphalte Company (Mr. H. Glenn), Office, Poultry, E.C.—The best and cheapest material for damp courses, railway arches, warehouse floors, flat roofs, stables, cow-sheds, and m

rooms, granaries, tun-rooms, and terraces. [Ad.]

#### Asphalte.

Seyssel, Patent Metallic Lava, and White Asphaltes.

M. STODART & CO. Office: No. 90, Cannon-street, E.C. [Ad.]

#### EVERY DESCRIPTION OF

SEASONED WOODS AND VENEERS IN EXTENSIVE QUANTITIES.

#### B. J. HUDSON & SONS,

Millbank Sawmills, Grosvenor-road, S.W. Whitfield-street, W.

And Store-street, London, W.C. Telephone No. 3,152, and Private Wire connecting Business Premises.

# BANNER FENILATORS.

The Strongest Exhaust Ventilators for all Buildings, Public Halls, Churches, Billiard-Rooms, &

HIGHEST PRIZES at all the most important Exhibitions

## BANNER SYSTEM OF SANITATION AND SANITARY APPLIANCES

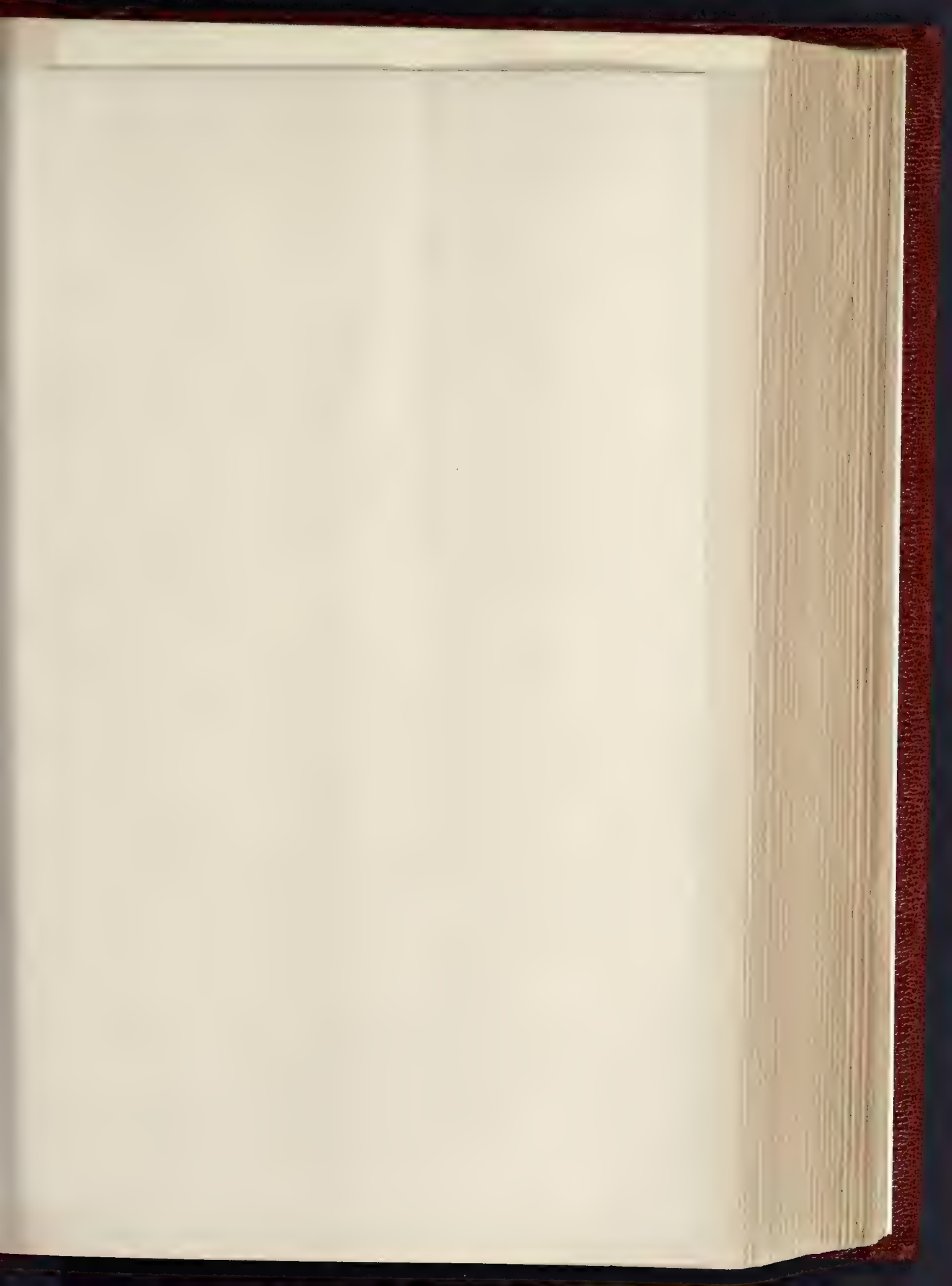
WERE AWARDED AT THE

International Health Exhibition, 1884, one Gold Medal, Three Silver Medals, and One Bronze.

For further Particulars and Prices apply to

## BANNER BROS. & CO. Sanitary and Ventilating Engineers

11, BILLITER SQUARE, LONDON, E.C.







LIVERPOOL CATHEDRAL, COMPLETION—DESIGN BY J. H. STUBBS  
VIEW OF NORTH TRANSEPT AND CHOIR, SEEN FROM ST. GEORGE'S HALL

PHOTO BY THE SPENCER & CO.



## ILLUSTRATIONS.

Liverpool Cathedral Competition: View of North Transept and Choir, showing Position of St. George's Hall.—Design by Mr. James Brooks, Architect .....	232-237
Liverpool Cathedral Competition: View from South-East.—Design by Mr. James Brooks, Architect .....	240-241
Mr. Brooks's Design for Liverpool Cathedral: Elevation of West Front, showing Cloister, and St. George's Hall; Transverse Section, looking West .....	244-245
Sections and East Elevation of Mr. Brooks's Design for Liverpool Cathedral .....	246, 249

## CONTENTS.

New Light on the East Frieze of the Parthenon .....	223	Society of Engineers .....	230	Sewage Purification at Guildford .....	239
Railway Goods Classification .....	224	Obituary .....	230	Cheltenham Grammar School Competition .....	233
Notes .....	225	Cathedral Facades .....	231	Swindling Builders .....	233
Letter from Paris .....	227	Fatal Fall of Walls in Holloway-road .....	231	The Student's Column: Foundations.—VI .....	234
Royal Institute of British Architects .....	227	Payment for Quatities: M Lachlan and Another v Grant .....	232	Recent Patents .....	234
New By-laws for Concrete Building in the Metropolis .....	229	Government Tenders .....	232	Recent Sale of Property .....	235
A Modern Ironworker's Forge .....	229	The Examination in Architecture .....	232	Miscellaneous .....	236
Mr. Colvin and the Cambridge Slade Professorship .....	230	The Registration of Plumber .....	232	Royal School of Mines .....	237
Liverpool Cathedral Designs .....	230	"Plumbers and Parliament" .....	233	Prices Current of Building Materials .....	237
Architectural Societies .....	230	The New Street from Fidelity to New Oxford-street .....	233		

### New Light on the East Frieze of the Parthenon.



FEW months ago (*Builder*, Oct. 3, 1885, p. 452) we had occasion to speak in detail of Dr. Loeschke's new and ingenious interpretation of the so-called Thalassa and Aphrodite of

the western Parthenon pediment: this theory of Dr. Loeschke's was avowedly a development of what we may call the "topographical" theory. We then expressed our conviction that this topographical school of interpretation, built as it is on a simple and natural basis, was likely to stand the shock of adverse criticism. We are now interested to find that from Professor Duhn, of Heidelberg, a weighty authority in all archaeological matters, there comes additional evidence to the soundness of the "topographical" principle,—evidence the more remarkable because it is in a sense undesigned. "Topographical" interpretation arose with the necessity in relation to pediment compositions. Professor Duhn now applies it to the elucidation of the long-disputed twelve gods of the eastern frieze. The full weight of his testimony we can only appreciate by following his argument somewhat in detail.

He approached the subject with no *a priori* predisposition to one school of interpretation, nor, indeed, as he tells us, with any desire to revolutionise the complete scheme of attribution: he was simply troubled by difficulties as to the received attribution of one particular figure, the one which goes by the name of Poseidon. The slab containing the Poseidon (for so, provisionally, we must call him) is, it will be remembered, not in the British Museum at all, but stands still on the Acropolis, not *in situ*, but in the small Acropolis museum. Special interest attaches to it because of its excellent state of preservation. Not only the figures and drapery, but the faces of this slab, are still clearly cut, so that the character of the persons intended should, it seems, be here if anywhere unmistakable. The head of the Poseidon figure is, indeed, clearly characterised, but how? The hair is short, well swept, neatly confined by a band, the beard well trimmed, the whole appearance compact and orderly, the expression of the face with the widely-opened eye quiet and benevolent. In order to call this benign and peaceful figure Poseidon, archaeologists have been driven to reshifts. Mrs. Mitchell ("History of Ancient Sculpture," p. 338), following the traditional explanation accounts for the unwonted aspect

of her "Poseidon," writes thus,—*"We see first Poseidon, the ruler of the seas, his head bound about with a sacred fillet, and his locks falling as though wet and clinging to his neck. The strongly-developed forehead, the arched upper lid almost touching the eyebrow, as well as the widely-opened lower one, give the god an air of self-sufficiency; but his attitude is not that of easy repose: leaning forward, as well becomes the stormy-sea god, he seems to force himself to reserve and quiet."* Now, all this is not even *"ben trovato."* If Phedias had meant Poseidon he would have characterised the stormy god of the unruly sea in plain, straightforward fashion, according to traditional treatment, and not have left him to pose as the wolf in sheep's clothing. What the traditional figure of Poseidon was is happily clear enough. We have only to pass in review the representations of Poseidon in Overbeck's *"Kunst Mythologie"* to see that in more than fifty monuments that remain to us his characteristics are uniform,—he is an unruly form of Zeus; he has the leonine hair of Zeus, only tangled in disorder; his beard is rich and full, but unkempt; specially we note that at the sides of the temples and at the back of the neck the hair falls long and free. In the "Poseidon" figure of the frieze, the hair at the back of the head is short and curled; but not indeed so close-cropped as modern fashion prescribes, but still short enough to show that the Greeks of the time of Phedias felt that civilised man should not conceal, with a disorderly tangle, the junction of head, neck, and shoulders. Fortunately for comparison, Dr. Overbeck figures this so-called "Poseidon" on the same page with a collection of undoubted Poseidon heads; the contrast of the nape-hair growth is thus rendered very striking. It is a curious instance of the way in which it is possible to accumulate facts without focusing thought into the clear vision of generalisation, that Dr. Overbeck never misdoubted the Poseidon attribution.

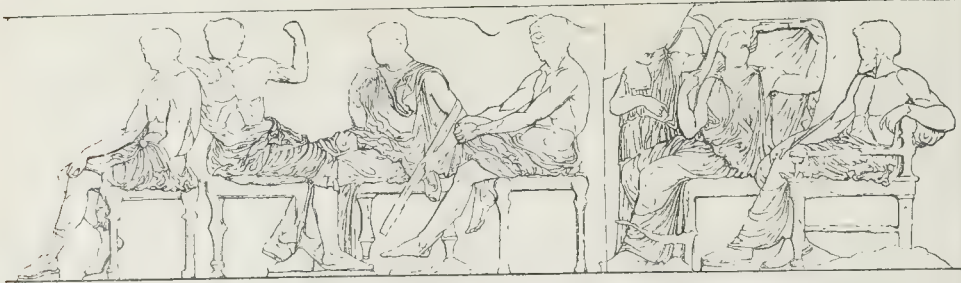
If not Poseidon, who then is the figure? No doubt the Zeus-like type of the face and hair misled the first interpreters. It could not be Zeus, on the ground of family likeness; it must then, they argued, be his brother Poseidon. But there remains a third alternative. Zeus had a grandson, late-born in time,—a gentle, civilised god, in fashion and feature much resembling himself,—Asklepios (*Æsculapius*), the god of healing. In works of ancient art, especially in the reliefs recently discovered in large numbers, and now preserved in the annexe of the Acropolis museum, we find Asklepios thus characterised as a milder Zeus, and, indeed, in two of the reliefs (published *Mittheilungen*, ii. Taf. 14, 15), the head of Asklepios bears the closest analogy to the head of the so-called Poseidon. The

uplifted hand has been usually restored with a trident, for which we must now substitute the simple citizen's staff. Asklepios was, of all gods, most human, because most pitiful: he dwelt as a man among men.

But the most interesting part of Prof. von Duhn's theory is yet to come. The attribution of Asklepios suggests a wholly new view of the entire assemblage of the twelve gods who await the coming of the procession, a view which yet falls in, in a very conclusive and convincing way, with all that has been so far *certain* in former explanations. We have been beginning of late to see that this concourse of gods was not fortuitous, and still more that the twelve were not chosen on the mere ground of rank. In an assemblage that awaits the coming of the Panathenaic procession we must have gods not so much of higher Olympian rank, but of long-standing local prestige. Among the twelve some few are decided beyond doubt. No one questions that Zeus heads the left-hand group, and that by his side, with her attendant maiden, Hera is seated; nor can it be doubted that opposite Zeus on the right hand is Athene; the bearded figure next her, seated and leaning on a staff by most archaeologists allowed to be Hephaistos; not only did he set free the goddess at her birth, but in their quality as artificers they are the male and female counterpart of each other, and had a common festival, the Chalcæia; their joint son, Erichthonios, founded the Panathenaia. Thus we have the four central deities firmly fixed; Zeus and Hera correspond to Athene and Hephaistos. With this attribution Prof. von Duhn now interferences,—he rather confirms it by lending to it a new unity and significance. He emphasises a point with respect to it that other archaeologists have dwelt on but little, or not at all. The two centre groups are spaced off, clearly and evidently, from the remaining four gods seated at either side. This must have had a meaning, and Prof. Duhn takes the simple and obvious, but hitherto wholly neglected meaning, of actual *topographical* remoteness. The two centre groups of gods are gods worshipped actually on the Acropolis; the remainder spaced off are, according to his simple view, gods who have temples on the slopes *adjacent* to the Acropolis,—gods more remote from the centre, but nearer to the oncoming procession which they await.

Now, turning to the right side of the remoter gods, let us proceed with Prof. Duhn's attribution; one figure about which there can be no dispute sits at the end of the assembly,—Aphrodite with her son Eros,—this may serve as a test of the probability of his line of interpretation. We ask at once, had Aphrodite a shrine on any slope adjacent





to the Acropolis? Assuredly in ancient times, one reared by Phaedra for the love of Hippolytos,

πίτραν παρ' αὐτῇ Παλλίδος κατ' ὄψιν  
 γῆς ῥῆσ' ἰαυὸν Κίπριδος ἱκαθίστατο  
 [ἔρως ἔρωρ' ἱέμερον]

In the time of Pausanias there seems to have been a shrine to Aphrodite Pandemos worshipped conjointly with Peitho and Themis. The temple of Themis, Dr. Köhler thinks, has been made out in the recent excavations on this side of the Acropolis; no traces of the shrine of Aphrodite have as yet been brought to light. The last figure of the seated gods to the right is, then, certainly Aphrodite. The next is either Themis or Peitho, whose shrine was adjacent; which of the two Prof. von Duhn does not attempt to decide. We pass to the two seated men. The first to the right is, we have seen, Asklepios, and his shrine, the Asklepieion has been laid bare for us close to the Themis temple by the excavations in 1876-78. This is not the place to enter into details of this discovery, now familiar to every archaeologist; the inscriptions and reliefs given back to us by this discovery have left us a lively picture of the ancient medical world. Asklepios then was in very deed and truth standing on the south slope of the Acropolis by the side of Aphrodite, and watching the procession as it came in sight. By his side is a young, beautiful god. According to Prof. Duhn's method, we must ask, what god has a shrine adjacent to the Asklepieion? The answer is easy: close to the terrace of the temple of Asklepios is the temple and great theatre of Dionysos. It is he who, near neighbour and close friend, is seated quietly talking to the great physician. The remoter right-hand group are then the gods whose shrines lie on the southern slope, interested in, but not absolutely implicated with the cults of the Acropolis proper. Turning to the left-hand remoter group, Professor von Duhn sees in them the divinities whose shrines are on the northern slope; they seem to fall also naturally into their places. Next to the Acropolis is the great hill of the Areopagos, and so the youth, carelessly clasping his right knee, turns out to be, as most archaeologists have supposed him to be, Ares; near to the Areopagos, recent excavations have shown, was the Eleusinion, so the full matronly figure next to Ares is naturally Demeter. To the very foot of the Areopagos extends the Agora, with its local gods, Apollo Patroos and Hermes Agoraios,

and Hermes, without doubt, it is who closes the seated assemblage to the left; his flat cap on his knee has long left this attribution without doubt.

Thus, an interpretation of one isolated figure, started by an almost technical difficulty, revolutionises, or perhaps rather re-creates, our whole feeling towards this eastern portion of the frieze. A more or less fortuitous concurrence of gods becomes an assembly of keenly-interested actual spectators, and becomes also a topographical setting to the Panathenaic procession. So suggestive and so exceedingly happy and easy is the solution, that we are tempted to feel it is too good to be true, and yet, as with all true things, conviction grows by contemplation.

Professor Duhn's paper appears in the "Archaeologische Zeitung Jahrgang," xliii., 2nd Heft.

#### RAILWAY GOODS CLASSIFICATION.

It was stated in the House of Lords during the debate on the Railway Bills last year, that the Railway Clearing House Classification (which would be the basis of the revision of freight charges on goods) contained no less than 2,300 different articles. In the new edition for 1886 this number is still further increased, and there are now upwards of 100 pages, simply classifying goods, but giving no actual rates, nor indicating in any way how the rates in any of the classes are arrived at. The Bills prepared by the companies last year so far improved upon this system as to place side by side with the classification a table of the maximum rates to be applicable to the various classes at per ton per mile. Unfortunately, the improvement was limited to the mode of publishing the tariffs, the proposed classification and scale of rates being open to such serious objection as to lead to the abandonment of the measures altogether.

This side of the subject was glanced at in our article of March 7th last reviewing the arguments for and against these bills, and it is again brought into prominence by Sir B. Samuelson's report on the railway tariffs of Germany, Belgium, &c. It is clearly shown that, however deficient the Continental systems may be in the matter of speed and accommodation, they manage much better in regard to tariffs than we do at home. We have often been told that we were at a disadvantage in regard to rates and charges when compared

with these countries, but this has never before been so fully demonstrated. In Belgium the traffic is classed under four heads, and in Germany seven, the whole of the tariff regulations being published in a concise and handy form. A table showing actual charges in all the various classes gives traders the advantage of being readily able to ascertain for themselves the carriage on any description of traffic for any distance. This, with us, is simply impossible, either under the antiquated Acts which nominally fix the classification of goods or the Railway Clearing House book which does so in reality, for the rates have been made in such a haphazard fashion that we have no principle to guide us in making an estimate. For instance, the rates in each of the five classes for a distance of 200 miles is something like the following:—(1) 35s., (2) 40s., (3) 50s., (4) 60s., (5) 75s. Now it by means follows that the rates between all places 200 miles distant from each other agree with these figures, though it is difficult to see why they should vary. Some will be found under others over this average, whereas with a system like that described by Sir B. Samuelson there would be no such variation. The most inexplicable thing in connexion with the subject is, that the relation of one class rate to another seems to be subject to no rule whatever. Take for example the figures just quoted by which it will be seen that the third-class rate is 25 per cent. higher than the second. One would naturally suppose that, whatever other variation there might be in the rates, the third-class rate would always bear the same proportion to the second. But it is not so; respective rates bearing an entirely different proportion in different cases. The first and second class rates between half a dozen different points may be the same, and yet all the rest entirely different, and so on. This necessitates every station being provided with a book of rates containing some 200 pages, whereas a mileage table of rates would answer the purpose, and in the absence of any guiding principle the rate can be estimated either by proportion or otherwise, even when in possession of the rates by which one might expect to be able to calculate, but the rate-book must be referred to in every case. It cannot be denied that this is a great disadvantage, and would, if so, however reasonable the charges might be; for traders ought to be in a position to calculate freightage as easily as any other expense. Nor should we have been any better off in this respect had the old



been superseded by the measures brought in last Session, for the sums per ton per mile given in the latter were obviously too high in many cases to be taken as a basis for the rates, and would not have been enforced. They were intended more as maximum figures beyond which the companies should not go, but on which they could rely to enforce any rates which came below them. This may be taken as proved by the fact that it is claimed that they seldom exercise the full powers conferred by the existing Acts, while the maximum rates provided by the latter are lower in many instances than those given in the Bills of 1885. The uncertainty in which the rates were left by these measures was increased by the proposal to add terminal charges,—indefinite and varying,—to the mileage rates. The terminals in the States visited by Sir B. Samuelson are fixed sums prescribed in the same manner as the mileage rates, and are, moreover, very moderate. In England they are fluctuating and uncertain, and would have remained so under the proposed new regulations, as the latter were to confer upon the companies the right to add to the prescribed rates "a reasonable sum" for these services. Although the clause provided for the publication at each station of its own terminals, and admitted of appeal to the Railway Commissioners when considered to be excessive, it could not be regarded as satisfactory. The views of the Companies and their customers as to the reasonableness of their charges, differ very widely, particularly now that it is seen how excessive they are when compared with those of other countries, but for all that many people would pay and protest rather than to the expense of contesting the charges.

The rates in the various classes under the scheme formulated last year,—computed, as before, for 200 miles,—would be as follows:—(1) 29s. 2d., (2) 37s. 6d., (3) 45s. 10d., (4) 54s. 2d., (5) 66s. 8d., these figures being exclusive of the terminals. The latter, according to a statement published by the Railway and Canal Traders' Association, vary from 6d. per ton to 12s. 4d. These amounts were ascertained in the case of *Berry v. London, Chatham, and Dover Railway*, when it was stated that at a small country station they ranged from 6d. per ton in the lowest to 4s. 2d. in the highest class, while in the case of a London terminus the relative amounts were 1s. to 12s. 4d. These figures serve to illustrate the uncertain nature of these charges on our lines, while on the Continent the trifling variation that exists is governed by the distance the traffic is conveyed, and is, therefore, quite easily understood. There is this much to be said in favour of the Railway Clearing-house classification, that it is very comprehensive. It is imperative that it should be so; or it is an understood rule that anything not enumerated shall be charged at the fifth, or highest rate. This is the explanation of many of the discrepancies observable in railway accounts. A builder will, perhaps, have two consignments of enamelled slates in one month from the same place, and find one lot charged half as much again as the other, though both weigh the same. The class in which this traffic is placed is third, and that rate would be charged if the contents of the case were specified on the consignment note; whereas, if this was omitted, the highest rate in force could be applied. With regard to inconsistencies in the classification itself, perfection is not to be expected in dealing with such a multitude of articles. But it would hardly be supposed that anomalies to which attention was drawn seven or eight years ago would be allowed to remain unaltered. Yet, in commenting upon this subject in 1878, the late Mr. Parsloe pointed out that whereas garden rollers were in Class 1, field rollers were in Class 3; that umbrella-sticks were in Class 3, and walking-sticks in Class 4, and several similar cases.

An examination of the present classification shows that the whole of the articles enumerated by Mr. Parsloe are still in the same classes as they were when he exposed this "discrepancy without a difference." The anomalies

were all kept up, too, in the schedules which Mr. Oakley of the Railway Association assured us had been compiled with so much care and deliberation last year. Perhaps, after all, to persist in having these inconsistencies remedied would only lead to the favoured articles being "moved up," and it may, therefore, be advisable to let well alone.

It may be noticed, in conclusion, that by the Bills of 1885 it was proposed to raise various articles higher in the classification. Straw, for instance, was to be advanced from class 3 to class 5,—and a glance at the example rates given will show that this would mean an increase of nearly 50 per cent.—and timber and deals were also advanced a class. A correspondent to the *Times*, writing under the name of "Sugar," remonstrated very strongly against these alterations, and we notice that all the articles he named retain their old places in the new classification.

## NOTES.

THE subject of the insufficiency of the present House of Commons to accommodate its members has been brought forward again in a letter from Mr. Mitchell Henry in the *Times*. Mr. Henry says, and correctly, that the only alternative is the construction of a new House, though he rather over-estimates the importance and thoroughness of the report of the Committee of 1868 on the subject. The plans appended to that report are of considerable interest and value, but the report itself is a good deal occupied with evidence of an inconclusive and unsatisfactory nature, and illustrates principally the difficulty of arriving at any precise expression of opinion from those who were regarded and examined as "experts." The plans then submitted by Mr. E. M. Barry provided for a nearly square house, only with the angles cantoned off, over the Commons Court, which was to seat 419 members on the floor and 150 in the galleries. Mr. Mitchell Henry proposes a similar but larger house over the Star Court; in both cases the present House of Commons to form a lobby to the new one. A grand lobby or entrance *salon*, with the access to the main chamber on one side of its length, will be an awkward affair from an architectural point of view. The subject demands careful consideration; but we may observe that if it is intended to provide accommodation for all existing members simultaneously they must all be on the ground floor. Members in a gallery are almost as good as out of the House, for purposes of joining in the debate. The theatre form, we believe, will be found the best for giving accommodation without too much extending the area of the house; and though we do not want the "tribune" system, still, as all members theoretically address the Speaker, the arrangement of a semicircular theatre with the Speaker at the centre is sufficiently in accordance with facts. In connection with this subject we observe that the *Times*, as usual, avails itself of an opportunity to sneer at architects, implying that "Sir Charles Barry's costly building" stands condemned, because, forsooth, the house is now too small for its needs. The building was planned in reference to the then existing numbers and habits of attendance, and it was a point of practical wisdom to get as small a house, for acoustic reasons, as would give the necessary accommodation; and as to wanting "better ventilation," the House of Commons is one of the best ventilated rooms in the kingdom, only M.P.'s never think themselves well enough used.

EVERY English architect, we imagine, will approve of the recommendation of the Council of the Institute of Architects, that Mr. Charles Garnier should be offered this year's Royal Gold Medal. If it is the case, as was suggested at the meeting, that it is, strictly speaking, the turn for the presentation of the medal to an English architect, it is no less true, as Mr. P. Anson observed, that the claims of M. Garnier to such a compliment from his

professional brethren in England have been long and, to our thinking, most unaccountably forgotten.

THE modernisation of Rome, deplorable as it is in many respects to the lovers of its ancient grandeur, is, at all events, yielding some rich harvests in the way of antiquarian remains. Another mausoleum has just been discovered in the quarter of Testaccio, not unlike the one that was recently exhumed at Palazzuolo. On the principal façade is inscribed the name of the person to whom it was erected, viz., Servius Sulpitius Galba. At first it was thought by archaeologists to have belonged to the Emperor Galba, but this could scarcely be, as that ruler was greatly detested by the populace, and when he died his body was cut to pieces, and his head carried through the streets at the end of a lance. The mausoleum might, however, have been the property of an ancestor; for there was a Servius or Sergius Galba, who was Consul B.C. 144, and who was said by Cicero to have been the best orator of his day. It is intended to re-erect this building in an adjacent locality, to be called the Piazza Sulpitius. A short distance from Frascati is the old abbey of Grotta Ferrata, celebrated for some magnificent frescoes by Annibale Caracci and Domenichino, which have been allowed to fall into decay. These the Government propose to restore to their former beauty. Caracci's frescoes are more than ordinarily interesting; for he introduced his own portrait into the group, as also those of Guido and Guerino, his fellow-workers; and in addition to these, he contrived to immortalise his mistress in the same composition, by painting her as a page in the train of Otho III. A very curious fresco has been discovered also, during some alterations in the Via Firenze, forming the decoration of a kind of catacomb in which was celebrated the worship of Mithra,—the twenty-seventh building dedicated to that god which has been found in Rome. It is not unnatural that such should have been the case, seeing that Mithra was the principal Providence who was responsible for all increase and fertility in the world. The fresco is supposed to represent Mithra, who is depicted as a young man in a Phrygian bonnet and red tunic, in the act of sacrificing a bull. To turn to things of modern date, a fine mosaic has just been placed in the American church, from the designs of Mr. Burne Jones, the subject being a very large-sized figure of Christ blessing the earth. Four fountains issue from the throne into a crystal sea, allegorical of the universality of the Christian faith.

WE are glad to observe that the suggested design for the Liverpool Cathedral by Mr. Jas. Hay, of that city, which was brought forward at a meeting of the Liverpool Architectural Society, and the block-plan of which we published a fortnight ago [p. 182], has been hung in a room in the Walker Art Gallery, adjoining that in which the invited designs are hung: a very proper compliment to a clever and energetic local architect. Examination of the drawings, however, leads to the conclusion that Mr. Hay has rather overstepped the line in his endeavour to combine the features of several styles. Externally, he has Classic porticos intended to repeat the design of St. George's Hall. Above the western façade the towers rise in square masses from the purely Classic basement on either side of the portico, and when they get to a certain height in the air they break out into Gothic pinnacles and spires. This is very cleverly managed, and, in spite of a certain hardness and wiriness in the Gothic detail, it is more successful and less *bizarre* in appearance than might have been imagined. But in the lower portions of the design, the interposition of purely Gothic tracery windows between the large and purely Classic pilasters most assuredly will not do: no eye can accept this; and when on turning to the longitudinal section we find a purely pointed Gothic nave leading to a "St. Sophia" dome not very happily treated in its union with the substructure, we feel that this is not "fusion" of styles, but simply discordant juxtaposition.



The plan is the strong point of the design; it is more distinctly a Protestant Cathedral plan than any of the others; but it would never bear carrying out in the way suggested. We may observe that the exhibition of the cathedral designs seems to be attracting great interest, and is full of visitors of all classes. Last week it was thrown open for working-men in the evenings, and on Saturday evening 800 working-men visited the gallery.

THE millennium of peace which weak-minded individuals believed to have been inaugurated by the era of universal exhibitions, appears to be as far off as ever, if we are to judge of the increasing tendency to erect fortifications everywhere. Even Switzerland, which one would think was sufficiently protected by its own rugged mountain chains, is seriously contemplating the fortification of the St. Gothard Pass and Railway, and also of the Furca and other passes, making the little Alpine village of Andermatt a central garrison, and shutting off the mouth of the tunnel by a thick iron door. In our own direction, too, the French are exercised (a not uncommon incident) by a report that we are about to erect defences on the Ecrehous, a little group of rocks only a few acres in extent, about five miles from the Jersey coast facing France. To those who have ever seen these same islets, it is ridiculous to fancy that any fortifications placed thereon could be a menace to Cherbourg, as our neighbours pretend, as the only possible use that could be made of them would be to command the passage of a fleet between Jersey and the Brittany coast. It is the more absurd inasmuch as the real menace to Cherbourg is, of course, the island of Alderney, where millions have been wasted in constructing fortifications that were pronounced to be useless, even before they were finished. More public money has been thrown away in the Channel Islands than in any other part of the world, considering their limited area. In addition to Alderney, a very large amount was spent in a useless extension of works underneath Elizabeth Castle in Jersey; while, in the same island, the long breakwater and pier at Fliquet Bay, opposite Cartarets, will for ever remain as an example of engineering incapacity and public works muddle on the largest scale.

THE Great Eastern Railway, in spite of a decline of 1,815*l.* in the published receipts to December 27, has maintained the rate of dividend of the last half of 1884, carrying forward a balance of 21,000*l.*, in place of a balance of 18,637*l.* The directors of the Metropolitan Railway report an increase of 2,994*l.* in the income, and a decrease of 2,297*l.* in the expenditure, for the half-year, the totals given being 320,165*l.* and 126,277*l.* respectively. This shows the low co-efficient, for an English line, of 39·4 per cent. of working expenditure. The Manchester, Sheffield, and Lincolnshire Railway, with a decrease of 13,479*l.* on a half-year's receipts of a little over a million, divides at the rate of 3½ per cent. per annum, with 2,490*l.* to be carried forward, against 4 per cent. per annum in 1884, when 2,980*l.* was carried forward. As nothing was paid for the first half of 1885, the distribution for the whole year is thus only 3½ per cent., against 4½ per cent. for 1884. The directors of the London and South-Western Railway, with an increase of 14,600*l.* in the revenue for the half-year, recommend a dividend at the rate of 6½ per cent. per annum on the ordinary stock of the company, carrying over a balance of 5,843*l.* This compares with 6½ per cent. for the second half-year of 1884, with a balance of 11,930*l.* The directors of the Great Northern Railway, with an increase of 26,600*l.* in the revenue for the half-year, are asking for 184,000*l.* pre-preference 4 per cent. debenture stock, involving an additional annual charge (if taken at par) of 7,340*l.* on their net revenue. The North-Eastern Railway Company, with a decrease of 128,000*l.* on a half-year's income of 3,125,000*l.*, propose a dividend at the rate of 6½ per cent. per annum against 7 per cent. for the corresponding period in 1884.

AT the meeting of the Metropolitan Board of Works on the 29th ult., upwards of twenty designs and tenders were received "for the construction of a vessel capable of conveying from the sewage outfalls in the Thames out to sea 1,000 tons of sewage sludge." This is a proposal to which we have several times referred. It may be remembered that the Board, in inviting tenders for the vessel, stated that in the event of the Board not accepting any of the tenders, "a premium of 500*l.* will be given for the design which may be selected as thoroughly suitable and the best," such design in that event to become the property of the Board. The amounts of the various tenders were not announced, the whole of them, with their accompanying specifications and drawings, being referred to the Works and General Purposes Committee and the Engineer for consideration and report. We mention the subject now because we think it advisable to call attention to the somewhat lax manner in which the majority of the Board acted on the occasion in question. The advertisement inviting tenders, designs, and specifications to be sent in was explicit as to the date, yet at the meeting when they were received it was actually resolved to give an extension of time till the following Monday to one firm who applied for it by letter. Mr. Jones and Mr. Phillips strongly protested against this proposal, which they characterised as being grossly unfair to other competitors; but on the proposal being put to the vote, there were only nine dissentients. So that, as matters stand, the competitor who was three days late in sending in his design will have the same chance of success as those who, at whatever inconvenience, sent in their designs at the stipulated time.

THE Society for the Protection of Ancient Buildings has recently addressed a memorial to the Governor of Bombay calling attention to the condition of the numerous historical buildings in that Presidency, and in particular to the celebrated tomb of Mahomed (the Gol Gumbaz) at Bijapur, which Mr. Fergusson pronounced to be the most extraordinary and complex example of dome construction yet attempted anywhere. It appears that the Government grant for the preservation of the monuments at Bijapur is only about 1,000 Rs. (100*l.*) a year, a sum which is evidently insufficient for the purpose, and the Society urges upon the Governor the need for a liberal increase in this grant. There seems to be some doubt as to whether this money is always judiciously expended, the Curator of Ancient Monuments, in his Report which was recently presented to Parliament, referring frequently to works of restoration, renewal, and renovation with approval. The most urgent need at Bijapur appears to be the preservation of the cornices of the buildings, which are of the most delicate and fragile construction, and the details of which have been evidently copied from woodwork, the stonework being fitted together with mortises and tenons. These cornices are gradually perishing from the action of the weather, and their proper protection and conservation are matters which should seriously engage the attention of the Indian Government.

WE have received a little pamphlet, entitled "Hints for Land Transfer and a State Land Bank." Such a publication is interesting as showing how public opinion is beginning to take up the land question. But this pamphlet also shows how useless it is to discuss this great question inadequately. We are all agreed that we wish to be able to transfer land cheaply and quickly, but we cannot do this by means of hints, however sagacious. What those who have studied the subject should do is to formulate really elaborate and well-thought-out plans, which may have a material bearing on the issue before the country. There are few subjects in regard to which the details are more perplexing, and the object in view plainer. The author of the pamphlet in question would establish a State Land Bank "for the purpose of receiving sums of money on deposit from the investing public, at fair

interest, and lending out the same at small profit on freehold mortgage security." As the number of would-be lenders on freehold mortgage security at moderate interest is even now quite sufficiently large for the wants of borrowers, we fail to see what good will be done by a State Land Bank.

MR. G. C. CUNNINGHAM, M.Inst.C.E., has laid before the Institution of Civil Engineers a valuable study "on the Energy of Fuel in Locomotive Engines." The mode of investigation adopted has been the comparison of the duty done by a locomotive with the fuel consumed. The results, taken from four Canadian and American railways, are tabulated; and while they possess a certain independent value are such as to show that further research may here open a new and very important field of discovery. The chief defect of the table is the want of a reduction of the fuel consumed into the two elements of the frictional resistance, and of that due to gravity overcome. The outcome of the table shows an average consumption of 0·98 lb. of coal per ton of passenger train, and of 0·273 pounds of coal per ton of freight train, per mile; the difference being attributed to the much higher rate of speed of the former. Of the Canada Southern Railway the average of the whole line is said to be equal to a gradient of 5 ft. to the mile, raising the resistance to haulage from 9 lb. per ton, due to friction on the level, to 11 lb. per ton. The fuel consumed in the freight trains is 0·15 lb. per gross ton moved one mile; exclusive, apparently, of the weight of the engines. This is equal to 0·1225 pounds of coal per mile for resistance to running friction alone, independent of gravitation. It is desirable to show how closely this result fits with those due to the gradients of the other lines; one of which rises to a consumption of 0·37 lb. per ton per mile. That there is ample room for improvement is shown by the statement that only 3½ per cent. of the theoretic energy liberated by the consumption of the coal is actually utilised. This remark, however, seems to overlook the work done in the movement of the engines themselves. Of course it would be idle to expect that any useful data on the subject should be accessible on the English railways.

WE have received the first two numbers of Dr. Dresser's "Modern Ornamentation," which is intended to supply art-workmen with designs and hints for designs in their various trades; at least this is one object prominently put forward in the prospectus, as we have before mentioned. The designs are the work of a thoroughly-practised hand, who has material from many different styles at his fingers' ends, as is illustrated in the plates already published, which are certainly sufficiently diverse in style and motive, and perhaps rather diverse in value also. What we take to be the author's own style, more especially, is exemplified in plate 3, with conventionalised what-are-they?-standing on a leg, with rosettes for eyes, amid conventional scrollwork of spikey and angular proclivity; this, and some others of a similar bearing, ingenious, no doubt, and show facility of pencil, but we do not think the taste of the first-rate. They look "knowing," a quality we do not like in ornament. However, it is "Modern Ornamentation," and "models" these undoubtedly are. In plate 7 Dr. Dresser has given one of those examples of ornament with a meaning in it, in a circular panel called "Night," which he has been fond of playing with before, and which represent a veil ornament that might be more worked than is. Plate 4 shows some charming patterns derived from Persian models, and plate 9 a number of suggestions in one page, of borders, &c., most of which are good. But cannot admire much the style of some of the work, although the drawing is admirable, the principle of each design consistently carried out. The plates have been very well illustrated by Messrs. Kell.



NO decision has yet been arrived at with regard to the Fulham Vestry Hall competition. We are informed that the Committee have disagreed with Mr. Currey's award, and are in favour of giving the premiums to three designs other than those selected by Mr. Currey. This, we understand, was in accordance with the recommendation of a sub-committee appointed by the Committee to go into the subject in detail. The recommendation was adopted by the Committee, and brought before a full meeting of the Vestry, who referred the subject back to the Committee for re-consideration. We hear that the Committee are to give their final decision this Friday evening, Feb. 5th, and that their report will come before the Vestry on Tuesday evening next. From what we hear, the "tale of jobbery" of which we have already expressed forebodings is likely to be fulfilled unless the members of the Vestry as a whole are very vigilant. Some ugly things are being whispered as to the way in which the affair is to be "arranged." We can hardly believe what we hear; but before the Vestry ratifies the decision of the Committee we hope it will make full inquiry as to some of the allegations which, as we are informed, are rife in the neighbourhood.

## LETTER FROM PARIS.

CONTEMPORARY art has suffered a great loss in the person of Baudry, who was a man not only of great talent but of high and generous character, despising the rivalries of artistic coteries, and employing his powers upon subjects in the region of pure idealism. When his reputation was made, instead of devoting himself to coining money, like too many of his contemporaries, he sacrificed everything to art, and gave ten years of his life to the decoration of the Opera House. It was, so to speak, at the point of the sword that he conquered each step upward in his artistic career; and when he, the son of a poor old sabotier in a Breton village, came to Paris to study, the subvention which the Municipal Council of Roche-sur-Yon allowed him just prevented him from starving. He pushed on his course, however, with perseverance and tenacity; gained the second "Prix de Rome" in 1847, the "Grand Prix" in 1850, and then became at the Villa Medici the inseparable friend of Chas. Garnier. He was made Chevalier of the Legion of Honour in 1861, officer in 1869, member of the Institute in 1870, and Commander in the Legion of Honour in 1875, and obtained, four years ago, the "Grande Médaille d'Honneur" for his design for a ceiling painting, "La Glorification de la Loi," intended for the Cour de Cassation.

Among his works, we may recall his "Jean Baptiste," "La Supplice d'une Vestale," "La Fortune et l'Enfant," "Charlotte Corday," "Amphitrite," "La Perle et la Vague," the portraits of Madeleine Brohan, of Beulé, of Guizot, and Chas. Garnier, and also the curious and little-known decoration of the Hôtel Paiva, in the Champs Elysées. But his great work, and that by which he will be remembered, is his decoration of the Opera House, which the action of gas and smoke had blackened and rendered almost invisible. Thanks to his friend Garnier, the work is to be carefully cleaned, and will re-appear, it is hoped, in all its details. It would have been a consolation to poor Baudry, before quitting the circle of friends who surrounded him with such affection and respect, to have known that his great work was to be restored, thanks to the care of another great artist, so as to remain as a permanent evidence of his genius.

There was an illumination of his work in the Opera House on the evening of his funeral, and the audience thronged into the foyer to indulge their admiration. There was a great charity fête at the opera that evening, of which a word may be said, and in which architecture played its part as well as music, drama, and dance; artificial architecture, be it understood, consisting of decorations intended to place before the spectators the idea of the history of the theatre from its origin till the eighteenth century.

In a piece imitated from *Æschylus*, the organisers of the fête endeavoured to show in the first instance the Greek theatre, its entrances and decorations. The chorus were here, no doubt, and various details were given

with more or less of archaeological probability, but the architecture presented in no way realised the ancient Scene as described by Vitruvius, and which, with the help of the existing remains of various theatres, might certainly have been realised. The same partial fidelity and absence of real knowledge was shown in the presentation of the Roman theatre. We say nothing of the theatre of the Middle Ages, consisting of a few boards put on trestles. The whole was unfortunately a superficial kind of attempt. The scene which took the public, in this series, was that of the Théâtre du Marais under Louis XIII., in which "local colour" had been respected, and for which the Mobilier National had lent some of the decorations which had once been used by the "Comédiens du Roi."

An interesting evening, in spite of criticism, and one which produced 100,000 francs for the benefit of the poor; and M. Alphonse, the indefatigable organiser of these charity fêtes (which are to continue to the 16th of May), is to be congratulated on the result so far. In view of the historic processions which are to defile through Paris on the 7th, 8th, and 9th of May, there is some talk of having a public competition at the École des Beaux Arts, for the designs from which the costumes of corporations and the allegorical cars will be made. This idea has caused great excitement among the pupils of the school.

It is to be regretted that the same piety towards the works of the departed artist which M. Garnier showed to those of Baudry does not prevail in all cases. Recently, the work at the Church of the Sacred Heart at Montmartre was suspended, by the order of the Cardinal Archbishop of Paris, under the pretext that the continued rain rendered the suspension necessary. This was a pretext, and the truth is that M. Daumet, the successor appointed by M. Abadie to carry on the work, has apparently desired to put something of his own into it, and has commenced to carry out a modification of the plans of his predecessor. He wishes to increase the height of the building, to raise the walls  $\frac{1}{2}$  metres, to give to the cupolas the usual form of those of the seventeenth century, to replace the clock-tower designed by Abadie by a construction destitute of character; and, in one word, to put on one side the original conception in order to replace it with his own. Thereupon follows an energetic opposition of the Committee, the veto of the Cardinal Archbishop, the suspension of the jury of arbitrators composed of MM. Bailly, Vaudremer, and Garnier, to settle the question. The judgment of this jury was very decided. It was, in effect, that the design of Abadie had been selected from among seventy-seven designs submitted in competition; that his idea must be respected by his successor; who was, in fact, his testamentary executor, bound in consequence to carry out his last wishes and to realise his grand conception. M. Garnier also expressed his opinion that the design as left by Abadie was a superior one to the proposed modification. The arbitrators thought there was no necessity to modify the subdued effect of the lighting of the choir, which M. Daumet wished to illumine boldly, while Abadie wished for the rich gloom and shadow of St. Marc or St. Front. But in thus recalling the new architect to respect for the deceased artist and his work, the arbitrators wished also to bear testimony to the ability of M. Daumet, who was most worthy, for his former works and his known professional erudition, to attach his name to the completion of the basilica of Montmartre.

Reference has already been made in the *Builder* to the exhibition of the designs of the late M. Magne, which were got together by his son, M. Lucien Magne. In this very interesting exhibition we notice the design made by Magne in 1871, in the competition for the Hôtel de Ville. As an artist much in love with the elegant forms of the Renaissance, Magne would have respected religiously the façade of Boccador, which he showed raised on a large flight of eighteen steps, like a jewel in a setting. The idea is that of an artist. It leaves to the monument its harmonious proportions; while in the design of Ballu, the architectural mass a little injured the impression of the fine detail. We may remark also in that collection the design for the Église St. Bernard, a building of great excellence, and studied with great care.

This exhibition recalls us for a moment to Baudry, in honour of whom some great artistic

manifestations are talked of. Besides an exhibition of his works, both those belonging to the State and those in private hands, whose owners are all ready to lend them, there is talk of lighting the foyer of the Opera House by electric light and admitting the public generally.

When these lines appear the exhibition of water colours of the French School will have opened its doors in the Galerie Petit. We must, however, leave to our next letter our impression of this brilliant and popular exhibition, the opening soirée of which draws every year the elegant "all Paris" of "first representations." By the side of a collection in which are mingled the graceful "society pictures" of Heilbuth and Madeleine Lemaire and L'Amé, the sporting scenes of J. L. Brown (like the blare of hunting-horns), the poetic landscapes of Cazin, and the marvellous drawings of Detaille, the neighbouring exhibition of M. Berchère, 5, Rue de la Paix, may appear a little monotonous. One must pay tribute, however, to these conscientious studies of a painter who goes straight to nature, and whose talent is especially adapted to the rendering of that melancholy calm of Oriental landscape. There is in this little exhibition a charm and an impression of sincerity which is very attractive, and which proves that, in spite of his age, M. Berchère's talent has always remained poetic and youthful.

It is also in the Rue de la Paix that there is to be opened an exhibition of works offered to the committee formed to erect a monument at Nancy to the memory of Claude Lorraine. There are more than 200 works of art,—pictures, statues, drawings, engravings,—signed by the best names among certain contemporary artists, and which are to be sold by lottery for the profit of the undertaking. Among the finest contributions is a portrait of the landscape painter Français, by M. Bonnat.

The annual exhibition of the "Mirlitons," the artistic club of the Place Vendôme, is also open. It had, as always, a great social success. A great many portraits this year, among which are specially to be noted that of Cabanel, painted by himself, and that of M. de la Borde, the Academician, by M. Bonnat; a military scene, entitled "Sous Bois," by M. Protais; a "Revue," by M. Detaille; a curiously-realistic scene, by M. Gervex, "Le Bal d'Opéra à 5 h. du Matin"; a fine piece of still life, by M. Philippe Rousseau; two busts by M. Franceschi; two terra cottas, by M. de Saint-Marceaux, &c. These selections indicate, as will be seen, an exhibition of a high class, which fully merits its continually-increasing success.

There is talk of the candidature of M. Meissonnier for the Senate; but in the absence of any proof to the contrary, this may probably be regarded as a *force d'atelier*, and we shall not see the painter of the infinitely little enter on this new career of ambition. Unhappily we have still present in our minds the varnished boots and silk attire in which "Colonel" Meissonnier was tricked out during the siege of Paris. These recollections make us dread another relapse. There is also talk, and the matter is nearly decided, as to some statues commemorative of national glories; at Paris, statues are proposed of General Chevert; of the chemist, Nicolas Leblanc; of Denis Papin; and of Henri Martin. The execution of this last has been entrusted to M. Marquet de Vasselot. At Tours there are to be statues erected to three eminent medical men,—Trousseau, Bretonneau, and Velpeau. Times are so bad, and the situation of artists so lamentable at present, that in spite of our repugnance to this multiplication of posthumous heroes in statuary encumbering the public ways, one must applaud the Government for attempting to find work for all. The general stagnation which has affected art as well as industry has been the subject of an interesting lecture by M. Paul Haag, engineer-in-chief to the Department of Roads and Bridges, at the "Société Centrale des Architectes." M. Haag, who had taken for his text the metropolitan railway scheme and the re-opening of public works in Paris, wished to show that the two questions were intimately connected, and in constructing a metropolitan railway, not in tunnels as in London, but on iron viaducts over some of the streets, they would be giving a great impetus to the various branches of building industry. The arguments of M. Haag are plausible, but, as the Municipal Council and general public opinion have long ago pronounced against the creation of an open railway above the streets,



the conclusions of the lecturer may be classed among Utopians.

As to the re-opening of public work, nothing much can be done till Parliament has passed a decisive enactment in regard to the Exhibition of 1889. The actual pre-occupations of the Cabinet are, unfortunately, not of a nature to hasten the solution of that question. It is already late in the day, and what work there is to be gone through, and what transformations to be made in Paris, to prepare it for this approaching demonstration! The prolongation of the Boulevard Haussmann; the enlargement of the Carrefour Montmartre; the continuation of the Rue de Rennes to the Seine; the construction of a new bridge over the river between the Rue de Rennes and the Palais Royal; and all this without counting the Bourse de Commerce, the transformation of the Quartier des Halles, the metropolitan railway, and the immense works of the Exhibition itself. There will be no want of work, at any rate, and the "crisis" will be at an end,—if only the Chambers will consent to go to work in earnest.

In the meantime, we are restricted to consolidating the Pont Neuf, which has been reopened for traffic. Centerings are being constructed under the arches that have shown signs of failure, and when this is done, the second pier and the second and third arches from the left bank will be rebuilt piece by piece.

The new works for the Musée Guimet will probably be commenced in the spring. We believe we have already mentioned that the city was going to present a site to the State for it. With this object the Municipality have bought a piece of ground of about 4,000 mètres in extent near the Trocadéro, adjoining the Rue Boissière, at the price of a million francs. Here will be constructed the building to which will be transferred the curious Oriental collection which M. Guimet had got together at Lyons, and which he offered as a free gift to the Ministry of Public Instruction.

We have to record the death of M. Léon Gaucherel, an engraver of great merit and artistic director of the journal *L'Art*. Gaucherel was born in Paris in 1816, and had obtained successively a medal of the third class in 1853, one of the second class in 1855, medals at the *Salons* 1859, 1861, and 1863, and the Cross of the Legion of Honour in 1864. He was a conscientious artist, whose example and instruction have formed a large proportion of the modern engravers and etchers.

We have also lost recently a painter of merit who was known for his military scenes,—Eugène Louis Ginain. He was brother of the eminent architect of the Church of Notre Dame des Champs, and other buildings. The two brothers had lived long in close and affectionate union. The deceased artist received a decoration in 1878. Much sympathy has been expressed and shown towards the surviving brother by the many friends who deplore and share in the loss which he has sustained.

#### ROYAL INSTITUTE OF BRITISH ARCHITECTS.

The fifth ordinary meeting of this Institute for the present session was held on Monday evening. Mr. E. L'Anson (Vice-President) occupied the chair, in the absence of the President through indisposition.

##### The Proposed New Charter.

Professor Kerr asked when the members might expect the report upon the draft of the new Charter?

Mr. Macvicar Anderson (hon. secretary) thought it would be necessary to have another meeting of the Charter Committee to draft the report before it could be submitted to a general meeting, as it would scarcely be courteous to a general meeting to send out the draft Charter in a crude form without giving the reasons for the alterations.

Professor Kerr said he hoped there would be no further delay. The minority report was ready, and waiting for an opportunity to be delivered.

In reply to a further question by Professor Kerr, Mr. Macvicar Anderson said that the report of the Committee on Departmental Action had been received, and was to be printed in the next issue of the "Proceedings."

##### The Architectural Examination.

Professor Kerr, under by-law 69, gave notice of his intention "To direct attention at the next ordinary meeting to certain proposals published by Mr. Arthur Cates in the professional journals of 23rd January last, and addressed to candidates for the Associateship; and to ask by what authority from the Council, or from any general meeting or otherwise, such proposals were so published."

##### The Charterhouse.

Mr. Hebb inquired if the Council had taken any action in regard to the Bill introduced by the Governors of the Charterhouse for the purpose of building on their estate? He understood there was a reference to the Committee on the Conservation of Ancient Monuments, and the meeting might like to have some information as to whether any progress had been made.

The Chairman said the subject had received careful attention on the part of the Committee on the Conservation of Ancient Monuments. The matter had been reported to the Council, and steps would be taken in reference to the proposed works at the Charterhouse. It seemed to him, however, that, though not all, yet the greater part of what was interesting to the public would be preserved intact. He had, moreover, the authority of the Registrar of the Charterhouse for saying, as a sort of guarantee for the continuance of the group of buildings, which though not very ancient, was so picturesque and full of interest, that it was proposed to dedicate that portion as a residence for the Bishop of London.

Mr. E. C. Robins having referred to the desirability of continued efforts on the part of the Institute to secure the widening of St. Paul's Churchyard,

The Chairman said that the President was in correspondence with the civic authorities on the subject.

##### Studentships.

The Chairman said it was his pleasing duty to present to Mr. J. B. Gass, Associate, the holder of last year's Godwin Bursary, the medal which their excellent friend, Mr. George Godwin, had provided for each recipient of the Bursary. Mr. Gass, as they knew, had done very useful work in America, which, he hoped, would be as permanently useful to himself as it had been interesting to this Institute. The Chairman then presented the medal to Mr. Gass.

Mr. W. H. Bidlake, M.A. Cantab., who won the Pugin Travelling Studentship last year, next came forward to receive the Pugin Medal. In presenting it the Chairman said he had never seen a more beautiful set of drawings than those submitted by Mr. Bidlake.

The Chairman also announced the awards of the Travelling Studentships for the current year, viz., to Mr. Henry D. Walton, 6, Moore-street, Cadogan-square, the Pugin Travelling Studentship; and to Mr. G. J. Oakeshott, 44, Sloane-square, the Aldwinckle Travelling Studentship. This studentship had been very generously given by Mr. T. W. Aldwinckle, a well-known London architect, whose good example, he hoped, would be followed by other members of the profession. Mr. W. T. Oldrieve, of 1, Stanhope-place, Edinburgh, an Assistant-Surveyor in H.M. Office of Works for Scotland, had gained the Godwin Bursary, but there had been no competitors for the Owen Jones Travelling Studentship.

##### The Royal Gold Medal.

The Chairman.—The Council propose to submit to Her Majesty the Queen the name of M. Charles Garnier, Hon. and Corresponding Member, and a member of the Institute of France, architect of the New Opera House at Paris, as that of the recipient of the Royal Gold Medal for the year. To my mind the Paris Opera House is one of the noblest of modern works; its design is grand, its details are most carefully studied, and it is most gorgeous and magnificent.

Professor Kerr.—No body could for one moment hesitate to grant the Gold Medal to M. Garnier, but is it not the turn of an Englishman this year? Are we entirely exhausted?

The Chairman.—We are not exhausted, but last year it was not given to an architect, but to an archaeologist. The names of English architects also were under consideration, but seeing that we have not awarded the Medal of late to a

foreign architect, the Council fixed upon so distinguished a man as M. Garnier, who probably ought to have had the Medal before.

##### The late Professor Donaldson.

Mr. Wyatt Papworth then read a paper entitled "The late Professor Donaldson's Connection with the Institute." Mr. Papworth commenced by referring to his family's connexion with the Institute, and his own first recollections of it. In 1834, Mr. Donaldson and other architects attended a meeting to consider the expediency of forming an Architectural Society. The scheme seemed somewhat crude and ill-digested, and Mr. Donaldson suggested the propriety of forming a more extended association. After various meetings a well-digested scheme was drawn up and adopted, the Institute of British Architects being inaugurated on the 15th of June, 1835, with Lord De Grey as president, and Mr. Donaldson as one of the vice-presidents. Two of the earliest subjects of his active mind were the Institute motto, "Decorum urbanitas civium," and the design for the Institute medal. At that time it was essential to have a paper ready for any unexpected vacancy, and Mr. Donaldson was always prepared for an emergency. In 1835 the Institute published a pamphlet, entitled "Questions upon various Subjects connected with Architecture, for the Purpose of illustrating Uniformity of Observations, and Intelligence in their Communications to the Institute." No one who perused the paper could doubt who had compiled the manuscript, and the suspicion of its being by Mr. Donaldson was confirmed by the preface, signed by him. Also, to further the formation in the library of a series of the printed editions of the father of the profession, he compiled "Particulars relating to the Manuscripts of Vitruvius preserved in various European Libraries," a valuable contribution on the subject. In 1836 he contributed a considerable number of papers on Italian and other subjects. In 1838 his name appeared on the Committee appointed to consider the subject of public competitions for architectural designs, and in the same year he was one of a deputation appointed on behalf of the Institute to negotiate for the junction of the Architectural Society with the Institute, which was accomplished in 1842. In 1839 he resigned the post of honorary secretary, becoming Honorary Secretary for Foreign Correspondence. On his retirement the members presented him with a silver centrepiece of the value of 100 guineas, making him at the same time a life member. In 1842 he was appointed Professor of Architecture at University College, and in 1842-4 he was one of the vice-presidents and Honorary Secretary for Foreign Correspondence of the Institute, 1844 holding the latter post only. In 1846-7 while retaining this post, he had also a seat on the Council, and for 1849-50 was one of the honorary secretaries for some time. In 1850 the Royal Gold Medal was awarded to him. Later on he prepared a paper on the Royal Tombs in Westminster Abbey, insisting that the advisers of the Sovereign should see to the restoration of these ancient memorials. The result was an address to the Queen on the subject of the preservation of these tombs, and in 1855 a certain sum was voted for the purpose, though it would be difficult to say what was the amount, and what had been done with it. In 1859, Professor Donaldson retired from the post of Hon. Sec. for Foreign Correspondence. His relations with distinguished foreign architects enabled him to do a great deal for the students, and a letter from him was a passport to all the chief foreign architects of Europe. Most of the Honorary and Corresponding Members up to that period were introduced or nominated by him, and the correspondence was kept up by him. In the winter of 1860, the Professor went to Egypt, and on his return explained to the Institute the wonderful discoveries made by Mariette Bey. At the annual meeting in May 1863, Donaldson was elected President in succession to Sir Wm. Tite, and he also delivered his second opening address for the session of 1864-5. On January 15th, 1866, a testimonial gold medal, bearing his portrait, was presented to him by some of the members, on his retirement as Professor of Architecture, after filling the chair for twenty-three years. The residue of the fund founded the Donaldson Silver Medal. In 1868-9 he made a journey to Syria and Palestine, and read several papers before the Institute. In 1867 he had again accepted the post of Honorary Secretary for



Foreign Correspondence, and acted as one of the honorary secretaries for home duties, which lasted till 1871. His portrait was presented to the Institute by subscription, and placed over the chair as a lasting memorial, not only of Donaldson's presidency, but also of respect and esteem. Donaldson presented the Institute with the gold chain and badge, Mr. John Whichcord being the first President invested with it. He attended the annual meeting on May 23rd, 1881, at the contested election for President, on which occasion he refrained from voting. He also read a paper on the Mariette excavations, though then eighty-six years of age, and that was his last appearance at the Institute. In the course of the paper, Mr. Papworth enumerated Professor Donaldson's many contributions to the Transactions of the Institute, and referred to his liberal gifts of money. The paper concluded as follows:—"For the period I have gone through, or nearly forty years of it, Donaldson was the life and soul of our Institute. He had been the founder, for all others owned themselves his coadjutors. He continued to be its prime mover; for all accepted his leadership to the last. His opinions were not always our opinions, but his policy was our policy, because his heart was our heart. When he left us our blood ran slow. Throughout the civilised world his name is still our name, and his fame our fame. He made the influence of English art felt abroad. That influence, administered by his hand, was ever generous; expressed by his genial lips, luminous in his bright and earnest eyes. Well may we be proud of him; for all his pride was in us, and this his filial homage is conveyed by our Transactions, not only to every English-speaking community throughout the globe, but to the great cities and academies of the world, the universal brotherhood of our profession will rejoice in the remembrance and regret the loss of a colleague so worthy of its approbation and applause. In all Europe there is not a Society of Architects which has not in him lost a member. His activity as a correspondent was irrepresible, his enterprise omnipresent, his earnestness provoked earnestness everywhere, his unwearied industry compelled everywhere industrious response. But it was in our own hall that he was truly at home. Who can forget the irrepresible charm of his manner, lighting up the whole assembly with sympathetic lustre, the effervescence of his loquacity maintaining a continual flow of anticipation, the unaffected pleasantry of his wit and his humour never breaking bounds and inspiring all,—that guileless adoration of his art which regarded its great monuments like the great stars of heaven and the knowledge of their secrets as the one thing worth living for? If he announced a book it became a gift of price; if he exhibited a specimen or a relic it became a curiosity that everybody must inspect with interest; if he introduced a visitor it was to claim for him distinction and the welcome of a friend; if he administered a rebuke, or even represented an injury, it was done with a simple-minded dignity and an unoffending authority all his own. But what was the particular excellence of Donaldson's policy in this Institute and on its behalf? Its liberality, its essential reliance upon every one's good sense and good feeling; its trust, its frank acknowledgment and unreserved encouragement of individual opinion. Every architect of fair fame who came into this room was to him a man of intelligence and honour; his very feelings leaned to virtue's side, even his impulsiveness the *perfidium ingentium Scotorum*. Who does not remember the graciousness of it, its indignation without anger, its self-assertion without self-conceit, its frown passing in a moment into a smile? In a word, who that has taken Donaldson by the hand, can forget how kind and true and honest was the grasp? Fertile as nature is in producing men for the time, when such men pass away, the feeling may well be excused that we shall never look upon their like again."

Mr. Edward A. Gruning followed with "A Short Memoir of the Late Professor Donaldson." Mr. Gruning gave an interesting account of the birth and parentage of the Professor, and of his early days. His first building was a church at Brompton, which he obtained in competition. This could not be called a success as a specimen of Gothic, but the days of the Gothic revival were then young. Donaldson competed in 1840 for the rebuilding of the Royal Exchange, then recently burned down. [His drawings

were exhibited on the screen.] His design was selected as the best of the first class, and he always felt that he should have been entrusted with the work. Mr. Gruning then enumerated Professor Donaldson's works, which, for one so well known, were neither very extensive nor numerous. His last work was the re-building of the Scottish Corporation Hall, in Crane Court, Fleet-street, after its destruction by fire, and this was completed in 1880, when he was eighty-five years of age. The paper next referred to his many appointments, and stated that as Professor of Architecture he must be well remembered by many of the profession. Donaldson always paid great attention to the preparation of his lectures, and was most anxious to have them copiously illustrated, the illustrations being at the service of the students for the purpose of home study. Of his private pupils, only two were now alive, viz., Mr. J. P. Seddon and Mr. Gruning himself. Donaldson was always at the call of any member of his profession wanting advice or assistance, as many a now prosperous architect could well testify. He died on the 1st of August, 1885, being then only two months short of ninety years of age.

Mr. Hebb remarked that he had had the advantage of being a fellow-student with Mr. Gruning under Professor Donaldson, and could bear the most sympathetic testimony to the manner in which he managed to conciliate all his pupils, and to interest them in their work. Even as an old man he was always interested in the young, and ever endeavouring to further the interests of architecture in all its developments. He was a man who above all things worked probably more for others than for himself. Had he taken a more selfish view of life he would doubtless have had another career, but he chose to devote himself more particularly to the interests of architecture. Mr. Hebb concluded by proposing a vote of thanks to the readers of the papers.

Mr. C. Forster Hayward, F.S.A., seconded the vote of thanks. As a student he had always felt that nothing could have been more congenial to the feelings, and have given a young man a higher conception of the art he intended to practise, than the lectures and illustrations of Professor Donaldson. He was always interested in youthful effort, and assisted many in making a start in life.

Mr. James Brooks said that Professor Donaldson prepared his lectures and drawings with great care, and took the utmost interest in young men. A more genial, painstaking, and lovable disposition than his never existed.

The Chairman added that the first time he became more intimately acquainted with Prof. Donaldson was something like forty years ago, when he (the speaker) read a paper before the Institute on the restoration of one of the Athenian temples. He was also intimately associated with the Professor during a short visit to Brussels, and a more congenial companion it was impossible to conceive. At one time he was the life and soul of the Institute, and he managed to bring it prominently before the attention of foreign architects. On the whole he believed the concluding remark of Mr. Papworth's paper was justified, that it would be difficult, if not impossible, to look upon his like again.

The resolution was then carried by acclamation, and the meeting adjourned to the 15th inst, when Mr. Alexander Beazeley, M.Inst.C.E., will read a paper on "Swedish Building Law."

*The Report of the Special Committee on Departmental Action* is published in the number of the Institute's Journal of Proceedings for the 4th inst. The Committee have arrived at the following among other conclusions, viz.:—

1. That the principle of Departmental Action promises to serve various highly useful purposes, in providing a proper organisation for the action of the members at large, as a public body, in the interest of the Art, Science, Literature, and Practice of the profession.
2. That the Departments may, for the present, be four in number, taking the names of "Art," "Science," "Literature," and "Practice" respectively; it being probable that most of the work in question might be without difficulty divided between such four Departments, each being administered by a standing Committee acting under proper By-laws of the Institute.
3. That the Examination work of the Institute ought to be separate and distinct from such departmental organisation, and placed in the hands of a Special Examination Board as at present; but that the several Departmental Committees might probably be consulted with advantage respecting the nomination of the members of such Examination Board.

Each Departmental Committee is, it is proposed, to consist of twenty-one members, viz.,

ten Fellows and six Associates, and five members of the Council, to be elected annually. Each is to elect its own chairman, vice-chairman, and honorary secretaries. It is proposed that the work appropriated to the existing "ordinary committees" appointed by the Council may be divided amongst the four Departmental Committees, with the exception of finance and the adjudication of medals and prizes.

#### NEW BY-LAWS FOR CONCRETE-BUILDING IN THE METROPOLIS.

THE following is the draft of the new by-laws proposed to be adopted (under the provisions of the Metropolis Management and Building Acts Amendment Act, 1878) with regard to concrete-building, which were referred to in our last (p. 216, ante). The Board announces its intention of asking the Home Secretary to confirm them:—

#### METROPOLIS MANAGEMENT AND BUILDING ACTS AMENDMENT ACT, 1878, SEC. 16. ADDENDA TO BY-LAWS.

##### 2A. Description and Quality of the Substance of Walls.

Whenever concrete is used in the construction of walls, the concrete shall be composed of Portland cement, and of clean Thames or pit ballast, or gravel or broken brick or stone, or furnace clinkers, with clean sand, in the following proportions, viz.:—One part of Portland cement, two parts of clean sand, and three parts of the coarse material, which is to be broken up sufficiently small to pass through a 2-in. ring.

The proportions of the materials to be strictly observed, and to be ascertained by careful admeasurement; and the mixing, either by machine or hand, to be most carefully done with clean water, and, if mixed by hand, the material to be turned over dry before the water is added.

The walls to be carried up regularly and in parallel frames of equal height, and the surface of the concrete filled in; the frame to be left rough and uneven to form a key for the next frame of concrete.

The thicknesses of concrete walls to be equal at the least to the thicknesses for walls to be constructed of brick-work, prescribed by the 12th section in the first schedule of the Metropolitan Building Act, 1855.

Such portions of concrete party-walls and chimneys as are carried above the roofs of buildings to be rendered externally with Portland cement.

##### 3A.—Duties of District Surveyors.

It shall be the duty of each District Surveyor, on receiving notice of the commencement of any house, building, or other erection, or of any alteration or addition, or on his becoming aware that any house, building, or other erection, or any alteration or addition is being proceeded with, to see that the provisions of the foregoing By-laws are duly observed (except in cases where the Board may have dispensed with the observance thereof), and to see that the terms and conditions upon which any dispensation may have been granted, are complied with.

##### 4A.—Fees to be Paid to District Surveyors.

There shall be paid to the District Surveyor, in respect of his supervision of every building constructed wholly or in part with concrete walls, a fee one-half more in amount than the fee to which he would be entitled under the Building Act for new buildings or additions. No additional fee is, however, to be charged in respect of any alteration to a concrete building.

#### A MODERN IRONWORKER'S FORGE.

THE first Saturday afternoon visit of the current session of the Architectural Association was made on Saturday last, when, on the invitation of Mr. Alfred Newman, a large number of members visited his works at Archer-street, Haymarket, to see the various processes for working wrought iron. Mr. Newman had very kindly arranged to keep the men at work on Saturday afternoon, and had each forge labelled so as to illustrate the different kinds of forging that are employed to produce the work for which he is so well known. The forges were labelled "Leaves, Heads, and Masks," "Setting and Welding," "Flattening and Fullering," "Scrolling and Foliated," "Spirals and Pike heads." At the first forge Mr. Newman showed the difference between malleable iron and wrought iron by heating a piece of the former red-hot and striking it with a hammer. It flew to pieces at once. The wrought iron being heated in a similar way was only bent about, and, as was explained, became tougher the more it was worked. At the forge some masks were made while the members were present, similar to the very striking bull-dog gas-brackets de-



signed for the Duke of Hamilton, for Easton Hall, by Mr. Binyon, several examples of which were shown in the collection of finished work which had been laid out for the members to see. The second forge showed the processes of setting and welding, several large iron bars being joined together during the afternoon. The smiths at the third forge were engaged in widening out the ends of bars of iron and cutting notches in them for the purpose of making the small dowel used in connecting certain parts of the work together. The fourth forge was being used for making the scroll-work so largely used in wrought-iron designs: the iron, being heated to a dull red, was bent round a special model fixed in an iron case. The last forge was devoted to the manufacture of the wire spirals and leaves, which are so delicately worked, thus affording an example of the wide scope of design to which wrought iron adapts itself.

In addition to the work being executed, a very interesting series of finished work was exhibited; amongst others were two wrought-iron panels for the Marquis of Londonderry, designed by Mr. F. B. Wade. These were beautiful specimens of ironwork, both as regards the design and execution. A very quaint design, by Mr. Binyon, for a gas standard to a newel-post at Easton Hall, exhibiting the crest of the Hamilton family, the salamander being surrounded with gas jets on the cap of maintenance. A triangular wall lamp for a country fire-engine station, and several pendent lamps, were examined. Mr. Newman's large collection of old ironwork also afforded a very good opportunity for the study of this interesting form of art-work.

That the opportunity of seeing the actual execution of the various operations was considered a privilege to be eagerly sought after was shown by the large attendance of the members, and the interest they took in the work, and there is no doubt that an afternoon spent in this way is most valuable for showing the difficulties, as well as the possibilities, of working in iron and carrying out the designs of architects, and it is to be hoped that the example set by Mr. Newman may be followed by other art manufacturers, as familiarity with the process of manufacture cannot but improve the character of the designs prepared, for a knowledge of the difficulties to be met with in dealing with different materials would often prevent the production of designs which it is impossible to carry into execution as originally shown.

**Mr. Colvin and the Cambridge Slade Professorship.**—Mr. Colvin's resignation of his chair at Cambridge is matter of regret, but hardly of surprise. It became, in truth, inevitable when the Slade Professor accepted the custody of the Department of Prints and Drawings at the British Museum, and its occurrence from that moment was merely a question of time. The Keeper's duties are too engrossing, his responsibilities too heavy and too serious, to permit the existence of divided aims; and it says much for Mr. Colvin's energy, and much for his facility of hard work, that he should have carried on the labours of his double charge so long. He has held the Slade Professorship for thirteen years (since the January of 1873, in fact), and during his tenure of office he has impressed upon the work of the chair a very definite tendency and a very well-marked direction. The place, as he has conceived it, is a place apart. It is small wonder Mr. Colvin's classes were popular, not only among the undergraduates, but with the general Cambridge public. Of their efficiency there is an abundance of proof. One of Mr. Colvin's pupils, Mr. W. Martin Conway, whose study of Reynolds and Gainsborough we recently reviewed, has lately been appointed Professor of Fine Art at Liverpool; another is Miss Jane Harrison, an accomplished lecturer and teacher, and author of a work so sound and scholarly as "The Myths of the Odyssey," and the excellent "Introductory Studies in Greek Art"; a third and fourth, Mr. Ernest Radford and Miss Julia Cartwright, are known, the one as a lecturer in connexion with the University Extension movement, the other as a writer on the art and men of the Italian Renaissance; while a fifth and sixth, Miss E. A. Gardner and Mrs. A. H. Smith, are now in charge, for the Egyptian Exploration Committee, of the excavations and researches at Naukratis.—*Saturday Review*.

## Illustrations.

### LIVERPOOL CATHEDRAL DESIGNS.

WE give this week the majority of the fine series of drawings by Mr. Jas. Brooks which are hitherto unpublished. The large view from the north-east is taken from the platform street in front of the Free Public Library, and shows the portion of St. George's Hall immediately adjoining the cathedral, and its proportions and scale relatively to the new building. The view serves to bring out in an effective manner the simplicity and solidity of treatment adopted in the design. In the south-east view the interior of the cathedral precinct is shown, and the subsidiary buildings in connexion with it. We give also elevations of the east and west ends, the latter showing a portion of St. George's Hall in elevation in the rear; but it must be observed that in perspective St. George's Hall could not be seen from any accessible point of view over the residential buildings and cloisters to the extent to which it is shown in this elevation. The reproductions of the sections, though to a small scale, are sufficient to show the constructional balance of the building, and the ample solidity of the buttressing.

### ARCHITECTURAL SOCIETIES.

**Leicester Society of Architects.**—The annual general meeting of members of this society was held on the 29th of January, when the following officers were appointed for the year 1886:—President, Mr. J. B. Everard. Council, Mr. R. J. Goodacre, Mr. J. Goddard, Mr. J. Tait, Mr. J. Barradale, Hon. Sec., Mr. W. Jackson. **York Architectural Association.**—On the 28th ult. an interesting lecture was delivered in the saloon of the Victoria Hall, York, by the Rev. Newton Mant, vicar of Sledmere, on "Classic Architecture and Modern Church Building," in the course of which he dwelt on the importance of the work of Wren as evidenced in some of the City churches. At the close, on the motion of the President, Mr. A. Pollard, seconded by Mr. B. Priestley Shires, a hearty vote of thanks was accorded to the lecturer.

### SOCIETY OF ENGINEERS.

THE first ordinary meeting for the present year of the members of the Society of Engineers was held on Monday evening, February 1, at the Town Hall, Westminster. The chair was first occupied by the retiring President, Mr. Charles Gandon, who presented the premiums of books awarded for papers read during the past year. These were to Mr. W. Newby Colam for his paper on "Cable Tramways," and to Mr. J. B. Redman, M. Inst. C.E., for his paper on "Tidal Approaches and Deep Water Entrances."

The retiring President then introduced the President for 1886, Mr. Perry Fairfax Nursey, who proceeded to deliver his inaugural address. After thanking the members for having elected him to the chair, the President referred to the satisfactory position of the Society, and reviewed its work during the past year, summarising each paper read, and supplementing some by subsequent information upon the same subject. In like manner he reviewed the visits made to engineering works during the vacation. After noticing the leading scientific events of the year, he directed attention to the comparatively insignificant effects produced by the engineer in works done by blasting operations as compared with the gigantic dislodgments effected by nature in the development of analogous forces. He gave particulars of several extensive blasting operations, including the two heaviest on record at Hell Gate, New York, in 1876 and 1885 respectively. He also gave by way of comparison, statistics concerning many earthquakes and volcanic upheavals, some 7,000 of which it was computed had taken place within historic times, and from the effects of which many millions of human beings had perished, the physical character of vast tracts of land having been transformed. Passing on to consider the present advanced state of engineering science and practice, the President observed that we were rather prone in the present day to exalt ourselves at the expense of the ancients, whom we were wont to consider as possessing no science whatever according to the modern acceptance of the term. But he pointed out

that, although text-books of the ancients and other similar evidence had not been handed down to us, yet in many instances which named a large amount of scientific skill and knowledge had been manifested, although of different character from that of the present day. The works of the ancients, he said, were distinguished for their massive grandeur, and were typical of brute force; those of the moderns for elegant lightness and delicacy of detail, indicating a higher and more refined culture, which aimed at economising material and power. The President then proceeded to point out that many modern engineering inventions and scientific discoveries had been foreboded in the past, and some even definitely described. From the long interval between the prediction and the fulfilment he drew a lesson of patience and unresting, but not restless, perseverance in our work, finally pointing out that the progress of science was very far from being measured by its material achievements. It had given standards of truth at once absolute and accessible, and great as had been its material rewards, its moral rewards would be greater still.

At the conclusion of the address, Mr. John Church, Past-President, proposed a vote of thanks to the President, which was seconded by Professor Henry Robinson, Vice-President, and cordially passed.

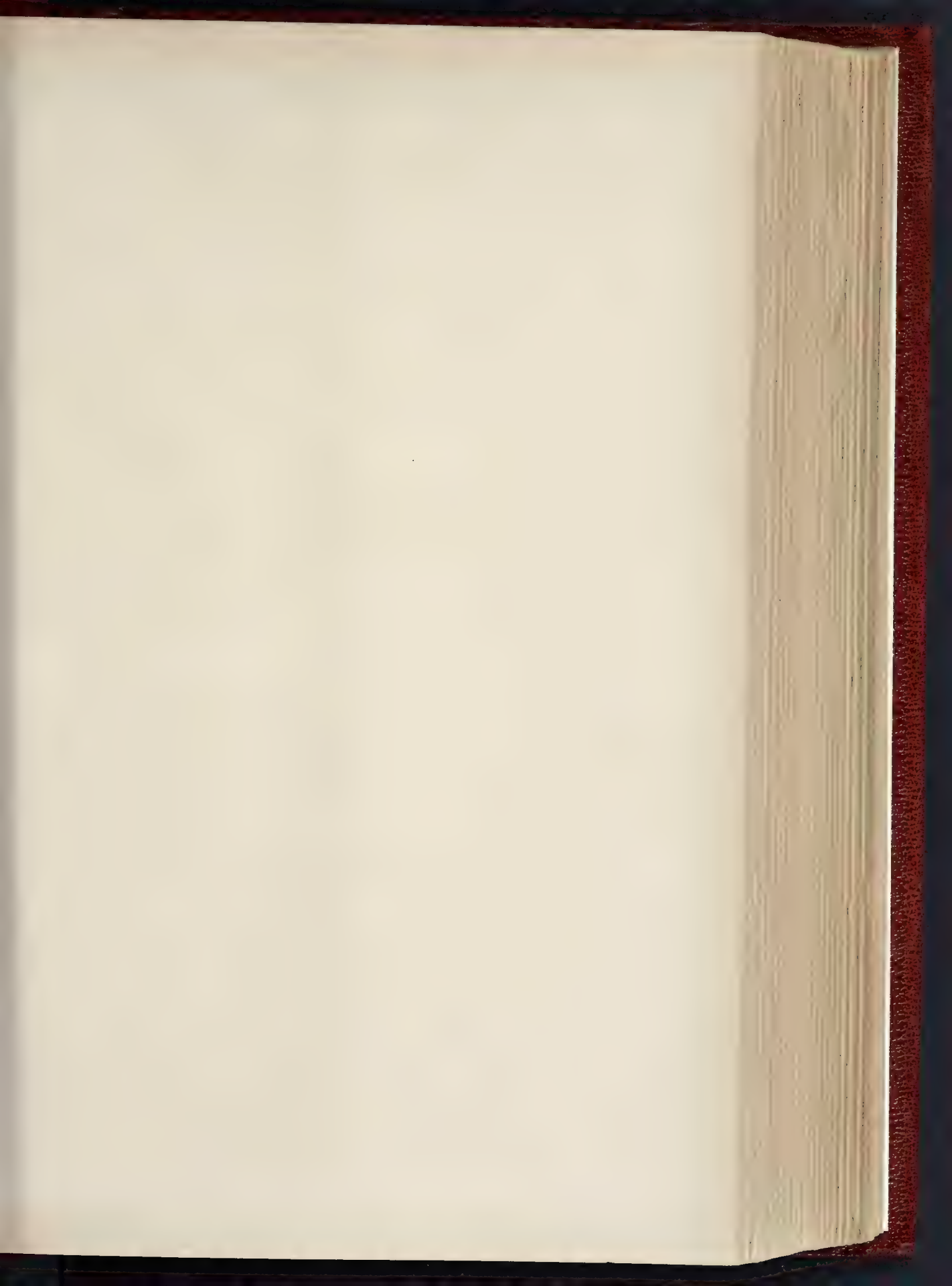
Having acknowledged the same, the President announced that the Council, upon his proposition, had nominated Professor Francis Elgar, LL.D., F.R.S., of the Glasgow University, an honorary member of the Society. He also stated that the Council had, upon his motion, instituted "President's Premium" of Books, which would be awarded annually, in addition to the other premiums awarded by the Society for papers read during the year. He then made a gratifying announcement that, at his request, Sir Henry Bessemer (honorary member) had kindly undertaken to present to the Society an annual premium of books, to be designated "The Bessemer Premium." He then proposed that the best thanks of the Society be given Sir Henry Bessemer. The proposition was seconded by Mr. W. Barnes Kinsey (member of Council), and carried with acclamation.

### OBITUARY.

**Mr. John Goad**, the sole partner of the firm of Messrs. J. & E. Goad, marble quarrymen and statuary, of Stonehouse, Devon, was found dead in bed on the morning of the 28th ult. He was sixty years of age, and died of heart disease. Mr. Goad was a native of Plymouth, and served an apprenticeship as a granite mason at the Laira Granite Works, outside Plymouth. He worked on the Plymouth and Harwich Breakwaters and at Dover Pier. Subsequently he became foreman of the Alderney Docks, and then, after a time, returning to his native town, started business as quarryman and statuary in partnership with his brother, who died suddenly in June, 1877. Mr. Goad carried on probably one of the largest marble businesses in the kingdom, and it was from his quarries that the Devonshire marbles so largely used in the new Oratory at Brompton were taken. Mr. Goad leaves four sons and two daughters to mourn his loss. The interment took place at the Plymouth Cemetery on the 28th ult.

**Mr. Robert Warren Best**, architect, Exeter, died on Monday night, after a short illness, in his fifty-seventh year. Mr. Best was formerly in partnership with his brother, but for some years the firm has been known as Messrs. B&W & Co. He had long enjoyed an extensive practice, and held several public appointments.

**Liverpool Cathedral Illustrations.**—We have been surprised by the appearance in the pages of a contemporary of two of the illustrations of the Liverpool Cathedral designs, viz. the interior view of Messrs. Bodley & Garner, and the interior (looking west) of Mr. Brooks, which are evidently reproduced from the plates appearing in our issues of 9th and 16th ult. respectively. For some reason, best known to themselves, our enterprising contemporary thought fit to adopt this course without acknowledgment. This method of obtaining illustrations is highly flattering, no doubt, to ourselves, but as to its propriety we will leave our readers to judge.







LIVERPOOL CATHEDRAL COM

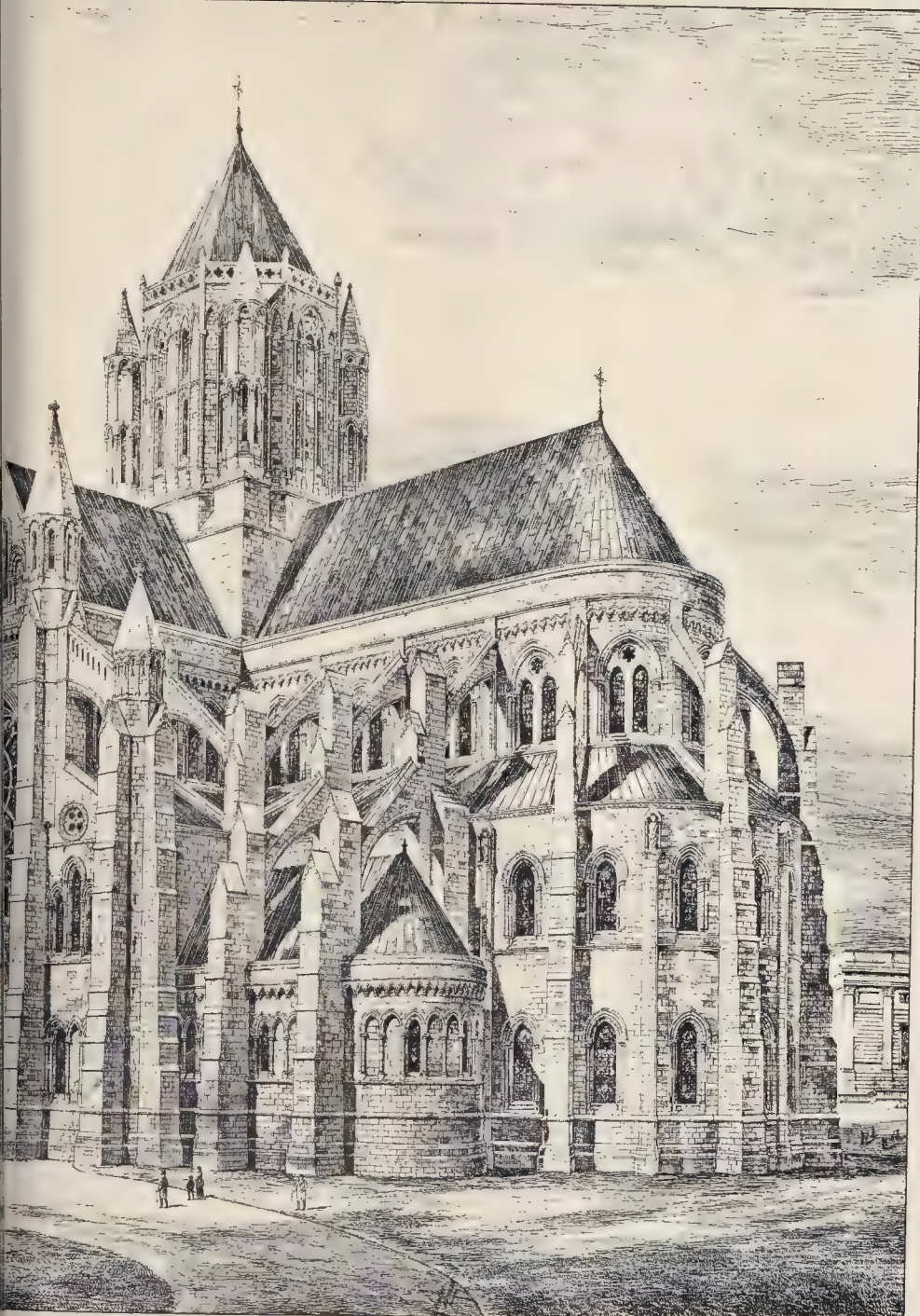
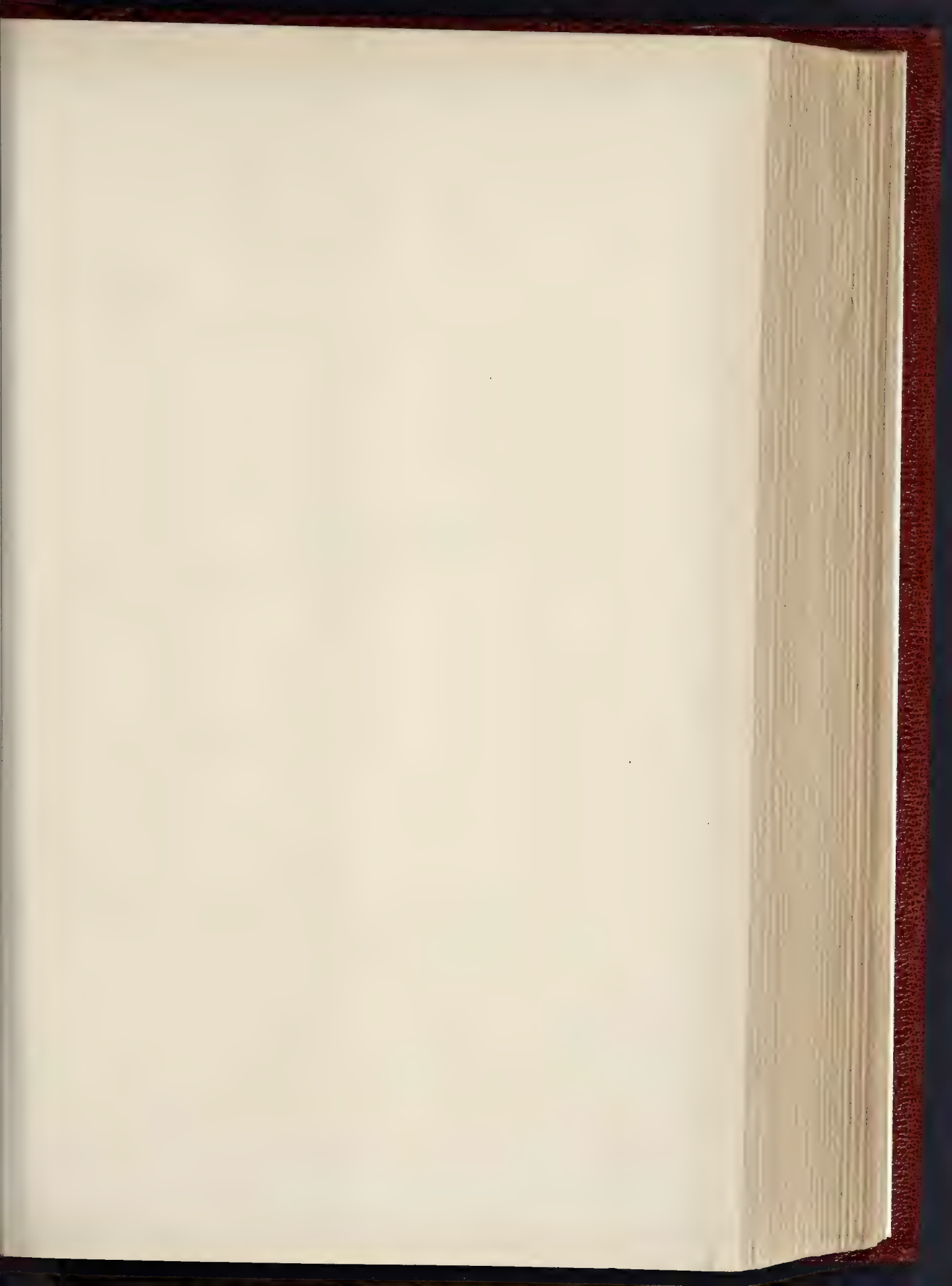


PHOTO - THO SPRAGUE & CO. LONDON

DESIGNED BY MR JAS BLOOM F.R.I.B.A



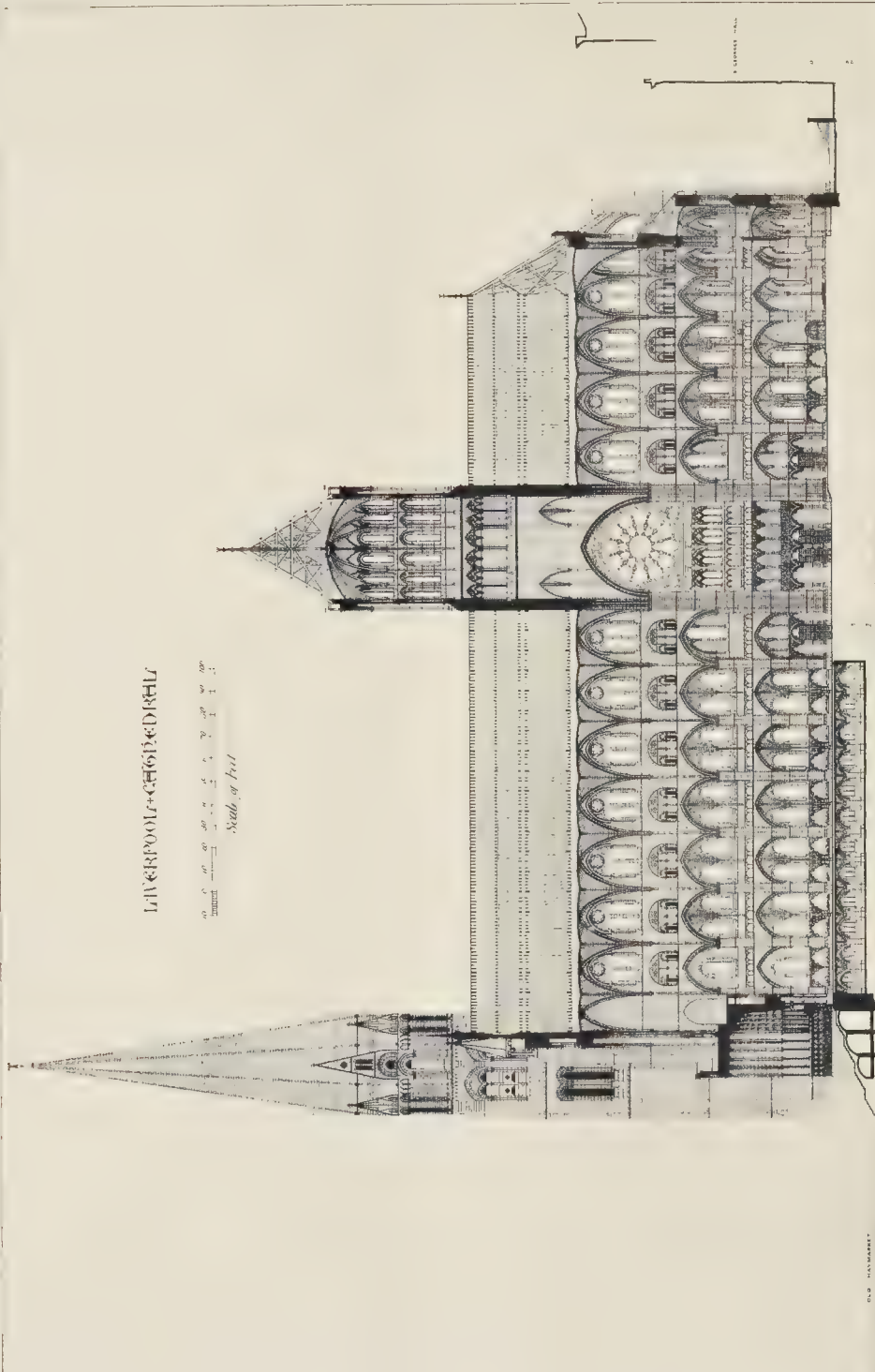






LIVERPOOL-CATHEDRAL

Scale of Feet  
0 10 20 30 40 50 60 70 80 90 100



# LIVERPOOL CATHEDRAL

10 5 0 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100  
*Scale of Feet*



EAST ELEVATION



LONG SECTION THROUGH CHAPEL AND SOUTH TRANSEPT

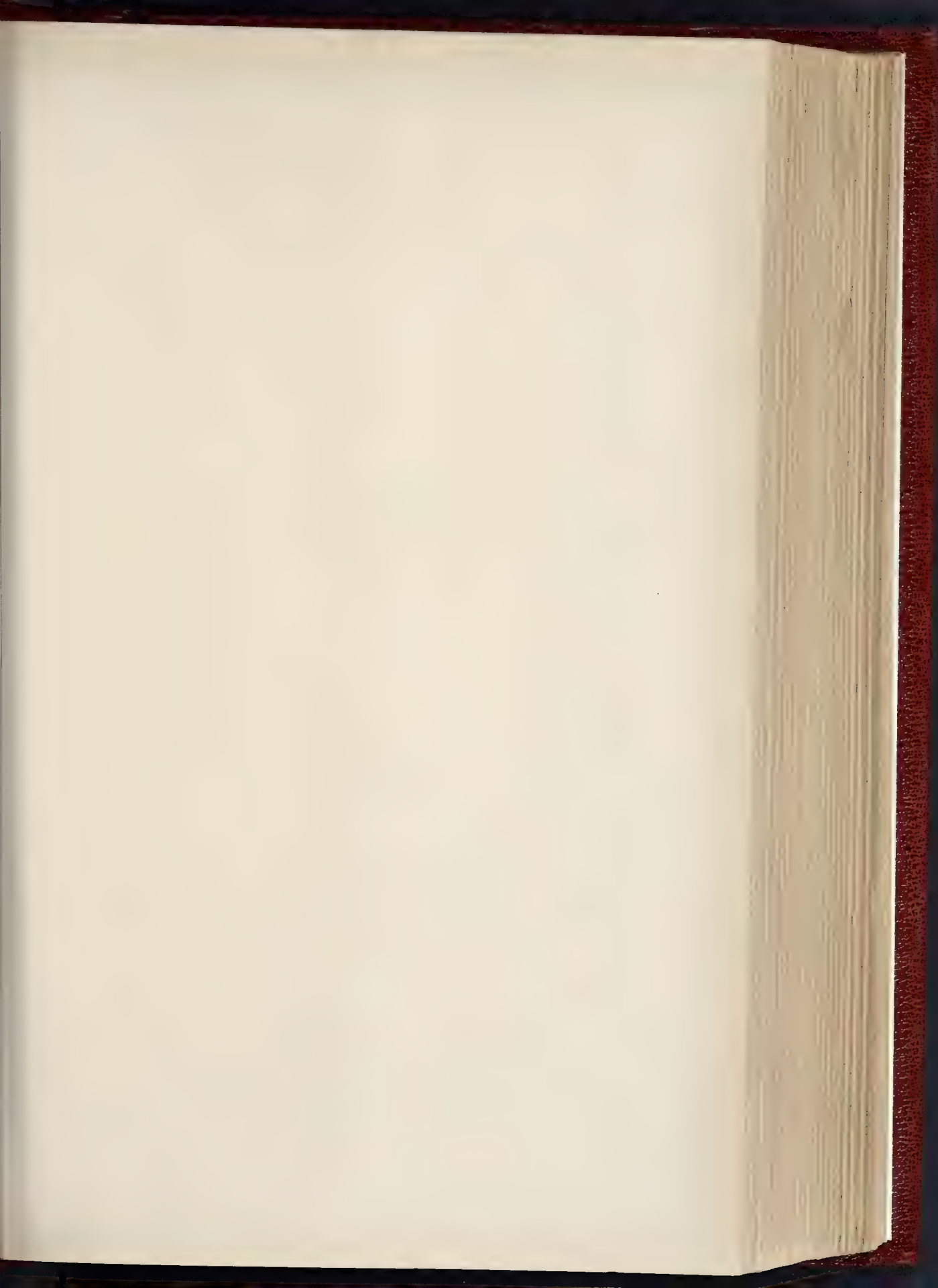
ROSS SECTION THROUGH CHOIR AND CHAPEL LOOKING EAST

W. & A. SPRAGUE & CO. LONDON

LIVERPOOL CATHEDRAL COMPETITION.—DESIGN BY MR. JAS. BROOKS, F.R.I.B.A.



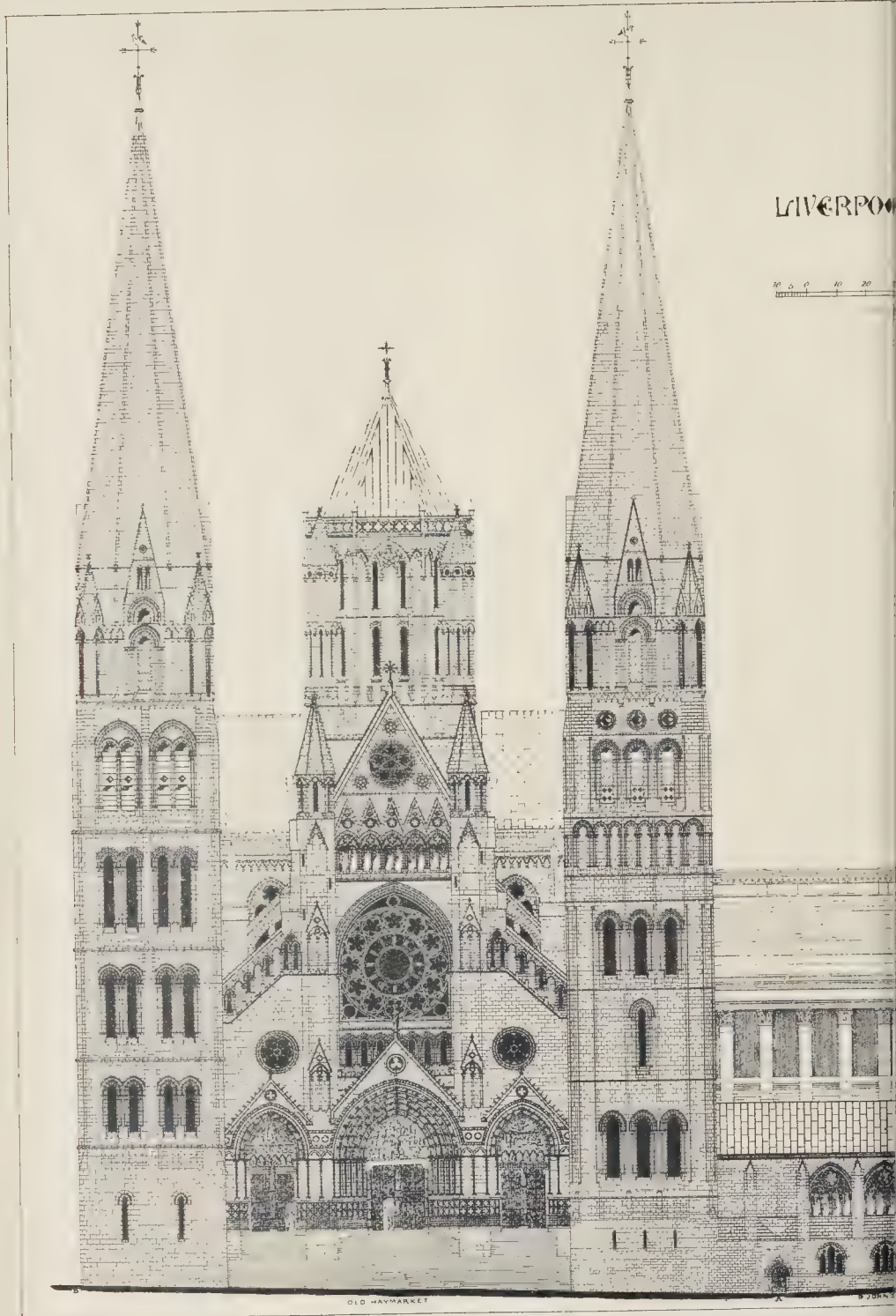






LIVERPOOL

10 0 0 10 20

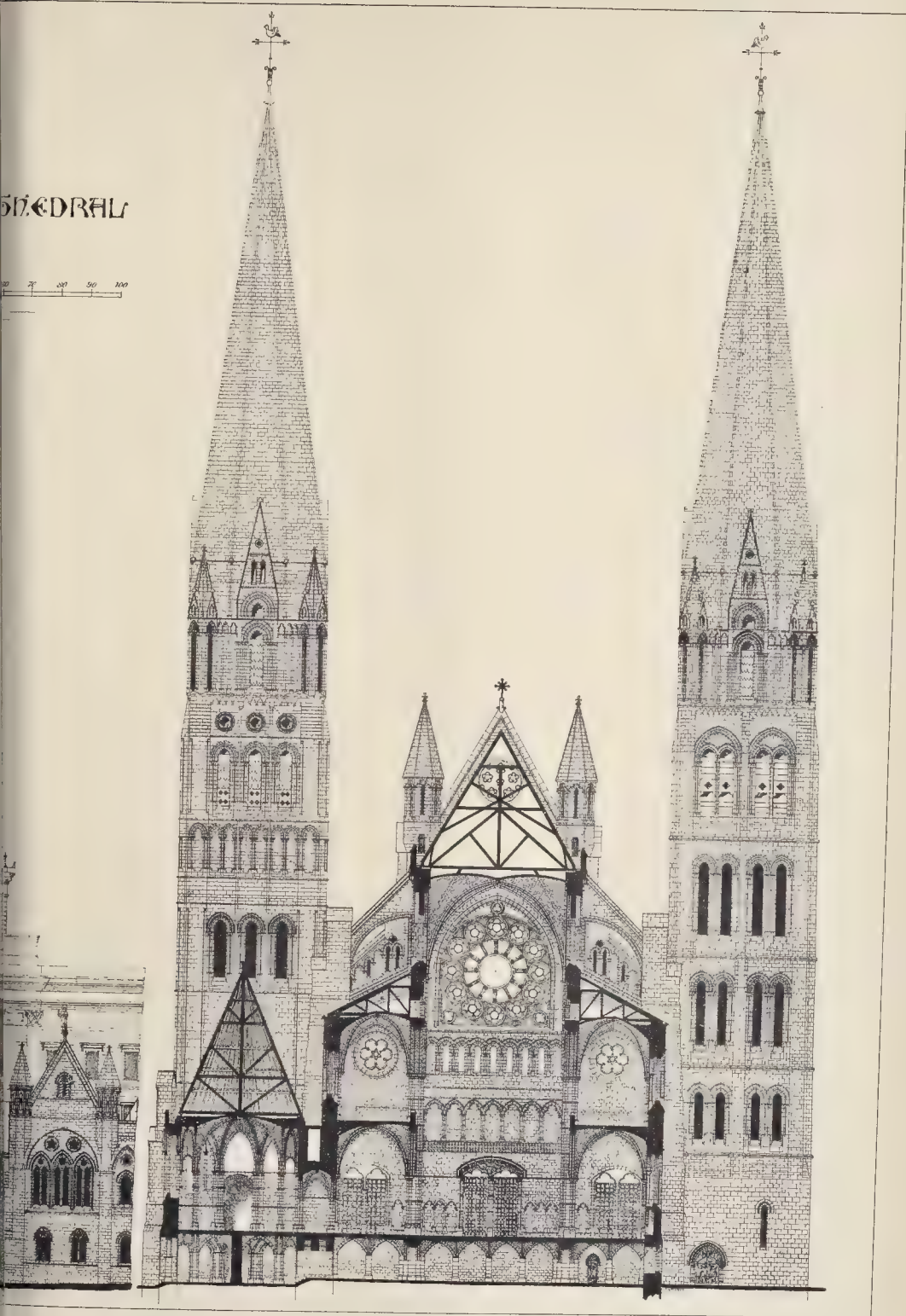


ELEVATION OF WEST FRONT, SHOWING CLOISIER, AND ST GEORGE'S HALL IN THE REAR

LIVERPOOL CATHEDRAL COV

CATHEDRAL

0 25 50 75 100



TRANSVERSE SECTION LOOKING WEST

PHOTO LITHO SPRAGUE & CO

DESIGNED BY MR JAS BROOKS, F.R.I.B.A





## CATHEDRAL FAÇADES.\*

CATHEDRAL design to-day is a matter which is exercising to a great degree the critical faculties of every architect, and all our minds are falling back upon recollections and studies of the great churches of bygone times for standards of judgment and comparison; as well as to obtain darts and stones wherewith to assail the declared enemies of our long-cherished and precious ideals. But our subject was chosen and the occasion of its discussion determined in peaceful times; no special interest attached to it then, no war-hatchets were being flourished to stimulate public excitement, and nothing much had been said or written to arouse that flame of enthusiasm which now is so keenly burning within us for the victory of one or another of the competing masters. Our simple purpose is to study some ancient cathedral façades for the encouragement of our imaginative qualities, that we may derive lessons from them which may be useful in our ordinary work of design, and that they may teach us how, readily to see, and boldly to take advantage of, the opportunities which may be offered us of doing great and good architectural work in whatever buildings or designs we may be occupied with.

We are accustomed to regard cathedrals as buildings that do not in the ordinary sense of the terms possess a front, sides, and a back. In this country they are, as a rule, planted in ample precincts round which the spectator roams, enjoying the variety of grouping and picturesque and effective massing of towers and transepts, flying buttresses and pinnacles, gables and roofs, obtained by the use of that most artistic arrangement of plan, the cruciform placing of nave, transepts, and choir. The crossing lantern tower thus really becomes not only the central object of interest, but is depended upon to give the cathedral idea of majesty and beauty to the church; in fact, the lantern tower makes the cathedral; and its importance is so well understood in England that the cathedral tower has become to us the idea of the city that surrounds it, and which owes her place among the cities of the realm to its presence in her midst. Turner the painter's remark that the dome of St. Paul's made London, is simply the expression of a sentiment that each one is conscious of, and though London of Ven's time would not know London of to-day, we feel brothers of the men who built, gazed upon, and loved the St. Paul's Cathedral that we know, while their immediate forefathers, who knew it not, but revolved around another exquisite cathedral lantern as their sun, seem almost mythical, indistinct and distant from us the inhabitants of Pompeii or Herculaneum.

The great skill and judgment with which the cathedrals were chosen has a great deal to do with the way in which they dominate the surrounding country. The cities were built in their shadow, and came to them not only for their benefits the church was able to bestow, but so on account of the advantages of the awkwardly-chosen spot in the centre of the fertile plain, or upon the commanding cliff. Remove St. Paul's from Ludgate-hill to the Surrey side of the Thames, and it would become most as unimportant in the London landscape as its neighbour Bedlam. Salisbury or Canterbury Cathedrals, removed from the hearts of their well-watered plains to the crown of one of those hills which surround their basins, would lose immensely, not only in charm and beauty, but also in dignity and power. Take Lincoln or Durham from their proud cliffs to the more gentle and accessible eminences, and the whole counties will seem to lose crowns. From many and various points of view the cathedral group has its influence and duty. It has no need of a front, in the carnal sense of the term, for that involves sides and back. Its position and site demand that eminently the building must be the centre and which the circumference of the city life flows, and from which radiate the roads of the county; though differing in almost every architectural particular, our English cathedrals seem in the closest relationship to the dome of St. Paul's in possessing their front, sides, or back.

A foreign cathedrals we find (where lanterns are exceptional) that the chevet, with unapproachable picturesqueness and grace, by its own force, the chief object of interest.

A paper by Mr. A. Beresford Pitts, read at the meeting of the Architectural Association on the 29th ult.

The radiations of the flying buttresses practically defy the competition of other parts of the building, and the western is but the end of the cathedral; the point where interest concentrates, where the greatest skill has been expended, and where every part is made to share the beauty of the whole is behind at the back. Surely, then, it seems anomalous to talk about the front. At every angle of vision we have beautiful grouping and perspective. If the front is the face of the building, the countenance which gives it character and beauty, at home we have it in the majestic brow of the lantern tower, and abroad in the vivacious beauty of the chevet. But neither the central lantern towers, with their groupings, nor the chevets, can be described as façades.

Cathedral façades in England, from the circumstances with which we have been dealing, are exceptions to the prevailing principles of cathedral design. In each case that we shall consider the building shares with its fellows throughout the country national peculiarities of site, the same cruciform plan, central tower, and the full interest of every portion. The great difference that distinguishes them from other cathedrals is the treatment of the west front.

The orthodox west front of an English cathedral consists of the end of the nave with its gable, a great window and porches, the side aisles being generally masked by towers, which group effectively with the central lantern. To such west fronts the term façade cannot be applied to distinguish them from the transept and eastern fronts, as they are designed on the same principles, and composed of similar gables, windows, porches, and occasionally flanking towers. Thus these fronts group together, each obtaining and using features from its neighbour, and the towers bear as important relations to the north and south elevations as to the west front. In all these respects the west fronts of Lincoln, Peterborough, and to a certain degree, Salisbury cathedrals differ from all others, as they bear no direct relation to their groups of buildings, to which they are merely attached, and are practically of no service. These are exceptions not of eccentricity, but of intellectual power; they are constructed ornamental façades, to be seen from a fixed point of view. Distinct architectural compositions, as complete in themselves as framed pictures, which they further resemble in possessing fronts and backs but without sides. Freed from contributing to the work of the edifice; to a great extent without constructional restraints; having no internal thrusts to resist by external appliances; they stand uniquely interesting as monuments of architectural idealism. No underlying rule of ritual confines their scheme; no mystic symbolism inspires the imagination of the beholder; without history to relate of chapter or canon, or ceremony to emphasise and shroud in dim religious life; they stand before us purely as the embodiments of their designers' dreams of beauty, grandeur, and mystery; and as exponents of their belief in the manifold powers of their art to impress and delight the beholder of the House of God.

Two of these three façades, those of Peterborough and Salisbury Cathedrals, are wholly the work of their individual architects, while at Lincoln an Early Norman front was expanded into the façade by an architect of the same thirteenth century which witnessed the erection of all three. These façades, unlike lantern towers, octagons, or chevets, were not produced by series of logical architectural developments and evolutions, but solely are the achievements of the determined originality and genius of their designers, who, let us remember, by the way, were probably unable to draw elevations to a small scale of any use or comprehensiveness.

Though these three erections are embraced within the narrow limits of that century when Gothic architecture has reached its purest and most Classic development, they widely differ in conception and treatment, while possessing very interesting links with each other. In each, ornamental sculpture and decorative architectural forms are used as materials; light and shade is sparingly introduced, and perspective and grouping are avoided; there is an absence of any false representations of the building behind, a fault not uncommon in Italian cathedral façades; breadth and dignity are sought by the use of severely simple lines of great magnitude; rhythm is obtained by judicious repetitions, the horizontal tendency is preferred

to the vertical; and withal there is adjustment to the concealed masses of the buildings beyond. These three cathedrals only in England can be said to be illustrations of the principles of pure façade design, the great majority of fronts that remain being simply elevations of the ends of their cathedrals; but among them there are notable variations from the rule, of which Wells is a deeply interesting instance that we cannot include in our present consideration. Ely stands by itself in composing the flanks of the western transepts, with the great tower and fine angle turrets, into a great façade of striking dignity and beauty; but it has little in common with the underlying principles of the group of three façades we have taken, as all its effects are produced by a masterly treatment of essential parts of the cathedral. The western towers of Lichfield and Durham enter into the composition of their respective buildings in a way which precludes their consideration as distinct fronts. York, Canterbury, and Westminster all exemplify what we can describe as the accustomed principles of cathedral design.

Abroad, however, the western front is constantly made the subject of special design. The façades of Continental cathedrals form too great a subject to be fully taken into consideration in a paper without extended and comprehensive study, but we will refer among them to three great French west fronts which contain rich food for reflection and digestion. In earlier times to the great cathedral era the architects of the Romanesque period were most assiduous and fertile in their imaginative compositions for western façades, of which St. Pierre, Angoulême, furnishes a most piquant example. In the cathedral of Notre Dame, Paris, we have a very beautiful instance of the value of a wise use of liberty in design. The west front expresses the end of the church in a simple manner with great simplicity and breadth; an open arcade, however, is carried across the nave wall to connect the towers for the purpose of masking the gable of the roof behind, and thus procures that due relation of horizontal to vertical lines which is the peculiar charm of this front, bestowing that exact balance and just proportion which make it uniquely perfect among Gothic cathedrals. The means used are so simple that we wonder why the idea has not been followed again and again. How many fronts and designs for fronts are broken up and spoiled by unseemly gaps between the nave gable and flanking towers? Height and breadth are both secured for the whole façade by this open arcade, which lightly and gracefully lifts the nave wall above the gable, and with its strongly-accentuated cornice links the twin towers together. I know of no façade (for this courageous treatment places the front among examples of façade design) that can compare with Notre Dame of Paris for exquisite simplicity of line and majestic elegance of proportion. We should also notice how well the height of the towers is adjusted to the side views of the cathedral in which they play an important part. It is instructive to compare this façade with that of Amiens, where the nave gable is masked with a similar arcade, which, however, stops between the towers, and in spite of the great height of the front, all its superb magnificence of detail, and the unusual grandeur of all its parts, we fail to be impressed with the same lofty sense of grace and beauty as at Notre Dame. Of these towers the late Mr. Street, in remarking upon the comparative effects of height in English and French cathedrals, says: "The towers of the west front of Amiens only look like towers when seen from the west front. When seen from the side in connexion with the church, they shrink into mere turrets." A somewhat similar design to these two instances has been adopted by the architect of Rheims Cathedral; a much larger arcade than either those at Paris or Amiens crowns the west front and stretches across the towers, like Notre Dame, just below the light and graceful belfries, the arcade rises from a strongly-accentuated stringcourse, but instead of being finished under a pronounced cornice above, is crowned by an array of pinnacles and gablets, among which appears the nave gable properly decorated for the occasion. The upper portion of this façade is more successful than the lower stories, which are too much broken up; the unequalled wealth of sculpture that has been lavished upon it scarcely tells as it might, for lack of broad enclosing lines and surfaces. We must not pass away from Rheims without observing the transept gables and towers, which form separate



fronts of great beauty and simplicity of design, as the ornament here is very successfully restrained and richly massed, the effect of the caryatide arcade beneath the gable being superb. One cannot but reflect how much more majestic and satisfactory these fronts are than the western façade, with all its gorgeousness and scale.

We have taken these three French cathedrals into consideration because in each of their fronts ornamental arcades were added to obtain lines for the purpose of gaining the special effects of designed façades, and in so doing the customary limits of cathedral design were passed, and those of more imaginative composition entered upon.\*

#### FATAL FALL OF WALLS IN HOLLOWAY-ROAD.

Last Saturday afternoon the front walls of several houses in the Holloway-road, which were in course of demolition, were blown down, killing five persons. At the inquest held on Wednesday.

George Nutt, a carpenter, said he was employed by Mr. Heath, builder, of Liverpool-road, and had charge of the work of pulling down the old houses in question. He was assisting in this work on Saturday. The houses were two stories high and had shop-fronts, and some of them had iron girders. By Saturday last the roofs had been removed, as well as the back walls and most of the upper story. He left shortly after noon. Mr. Heath had not then visited the place since the preceding Tuesday. The witness added that he had erected hoardings round other similar works, and he did not know why a hoarding was not put up in the present instance. Replying to the foreman, the witness said he did not think it was necessary to fix more shores. By the Coroner.—He was sure the party-walls were bonded into the front, but whether the front wall was bonded into the first adjacent old house which remained, he could not say. Usually when old buildings were pulled down the practice was to clear away floor after floor in regular order; but in the present case his orders were to leave the front wall intact.

John Heath, builder, Liverpool-road, said he arranged with the surveyor to the Tynell Estate to pull down the old premises in question and take the materials. He began the work just after Christmas. He had not visited the place since last Tuesday week. He was not aware that it was incumbent upon him to inform the District Surveyor or the Local Vestry's Surveyor of Highways of his intention to demolish the houses. A licence was required for the erection of a hoarding. It was his intention to leave the front wall standing as a barrier until the site was utilised for the erection of new buildings, when a hoarding would have to be provided. He did not keep the wall standing in order to profit by its being utilised as an advertising station.

Mr. George McDowell, the District Surveyor, said that if the wall in question had been reported to him as dangerous, it would then have been his duty to see to the safety of the public. Personally he should have shored the wall up, but it might reasonably have been deemed to be safe as it was.

Mr. Charles Higgins, Surveyor to the Islington Vestry, deposed that in the case of buildings about to be erected, the builder must give notice to the District Surveyor as well as the local Surveyor of Highways; but there was nothing in the Metropolitan Local Management Act requiring notice to be given of any intention to pull down an old edifice.

Mr. H. H. Collins, District Surveyor for the Eastern Division of the City of London, said that the remains of the party-walls of the houses in question showed that the walls were not properly tied together.

The jury returned a verdict of Accidental Death, adding, however, the following rider to the verdict—

"The jurors are of opinion that the work of the demolition of these houses should not have been left in the hands of two men,—a carpenter and a labourer,—without the close superintendence of the builder, who, the jury consider, should have visited the place more frequently. They further believe that had he properly inspected the premises, and seen the condition in which the wall was left, this would have led to the proper shoring of the wall in front, in which case probably the present catastrophe would have been averted. Further, they recommend the Metropolitan Board of Works to procure powers so that the District Surveyors shall have control over the pulling down of old houses as well as the erection of new ones."

**The Aylesbury Dairy Company, of St. Petersburg-place, Baywater, and elsewhere,** has succeeded in acquiring a reputation for good milk and dairy produce, which it supplies under what we believe to be unexceptionable sanitary conditions. Mr. W. Eassie, C.E., being the Company's inspector of farms and dairies. As will be seen by an advertisement in our present number, the Company is about to issue shares and to take up a portion of its unissued capital.

\* To be continued.

#### PAYMENT FOR QUANTITIES.

M'LACHLAN AND ANOTHER v. GRANT.

This action, which has been tried before Mr. Baron Huddleston, in the Queen's Bench Division this week, was brought by the plaintiffs to recover a sum of 120*l.*, which they alleged was due to them from the defendant upon a bill of quantities and other preliminary expenses connected with a proposed building which the defendant contemplated erecting under the direction of the plaintiffs as architect and surveyor respectively. The defence was ultimately reduced to a question of amount. The following particulars of the case are taken from the *Times* report:—

The plaintiff M'Lachlan is an architect, and Jackson, the other plaintiff, was the surveyor employed to assist the former in taking out the quantities. The defendant conducts a large school for ladies in South Kensington. It appeared that in 1884 she was desirous of building a large college for ladies, to accommodate 600 pupils, at Kensington. The plaintiffs' case was shortly as follows:—Miss Grant had consulted him upon the subject of the building, and engaged him, after some negotiation, to prepare the preliminary plans, &c., for the proposed building. He had told her that her suggestion that the cost would be about 2,000*l.* was too little, and had all along insisted that 5,000*l.* would be nearer the cost. The plans were prepared, submitted to, and approved by Miss Grant, and the question of quantities discussed. The plaintiffs' case was that she knew that these were to be taken out by him in order to obtain the builders' tenders which she desired. No special bargain, it was alleged, had been made as to what those should cost, and the plaintiffs' case was that, therefore, they were entitled to be paid a fair price for the work, and also the cost of lithographing them, viz., 20*l.* This price of quantities, it was submitted, was 2 per cent. upon the lowest *bona fide* tender. Tenders had been advertised for, and seventeen were sent in by different builders, ranging from 5,787*l.* to 4,332*l.* for the first sixteen, while the seventeenth was 3,268*l.* But it was submitted that this latter tender was a bogus one, and that this being so, the sixteenth tender, viz., 4,531*l.*,—was practically the lowest tender, and the one upon which the plaintiffs were entitled to claim 2 per cent. commission. Mr. M'Lachlan altogether denied Miss Grant's contention, viz., that he had given her to understand when she had consented to the quantities being taken out that their cost would be a mere trifle,—about 4 per cent. He stated that she must have been mistaken, for he never mentioned, nor could he have ever mentioned, so small a percentage; it was unheard of in the profession, where the percentage varied from 1½ to 2½ per cent., according to the class of work. It was further urged that it was Miss Grant's own fault that the work had not gone on to completion, as she refused all the tenders as too high, and had made out an estimate for herself, which came to 2,500*l.*, but which, as the learned judge pointed out, did not estimate for stairs or drains,—two very essential adjuncts to a house. Miss Grant's case was that she was only bound to pay the plaintiffs 1 per cent. on the lowest of the seventeen tenders. The lowest of these, Williamsons', viz., 3,268*l.*,—which the plaintiffs alleged was not a *bona fide* tender, she submitted was *bona fide*, and called Mr. Williamsons to prove it, and he stated that he could have done the work at a profit for that figure. At the conclusion of the case,

Mr. Baron Huddleston proceeded to sum up, and in the course of his remarks he said that eleven of the builders considered the manner in which architects were paid was most unsatisfactory, for their being paid 5 per cent. upon the total cost made it to their interest to run the builder's expenses up as high as possible. His Lordship thought it would be a very great advantage if the society which governed that profession would make some alteration in such an invidious system of remuneration.

The jury, without retiring, found for the plaintiffs for 120*l.*, the full amount claimed.

#### GOVERNMENT TENDERS.

Sir,—Having written last year on the subject of Government tenders, and the desirability of the various departments being asked to communicate to persons tendering a list of the tenders received, it may be well that your readers should be informed that the Metropolitan Board of Works and the Receiver of the Police have kindly agreed to and commenced this practice. The former have also arranged that such tenders shall be opened in the presence of the parties tendering, and this was first done in the case of the fire-engine station at Stoke Newington in November last.

Her Majesty's Office of Works has not yet consented to do so, but it is to be hoped that they will soon be induced to follow the above examples and conform to the almost universal practice of architects. The change of Government gives an opportunity for the Central Association of Master Builders to lay the matter before the new First Commissioner, and urgently request a favourable decision.

H. S.

#### THE EXAMINATION IN ARCHITECTURE.

Sir,—It is interesting to find that the hope entertained by such a representative of the Institute as Mr. Cates should tally with those that I ventured to indulge in when serving of the Institute "long" Committee, under the chairmanship of the late Mr. T. H. Wyatt, namely, that there should be a closer connexion between the Institute and the Association. It was then considered unneeded by both bodies, but the next Institute Committee, under the auspices of Mr. Charles Barry, took,—perhaps unconsciously,—the first step towards it by abolishing the Institute "Student class," thus throwing the entire educational work upon the Association.

This work has been taken up with the characteristic energy of the younger body, while the Institute has given great facilities for the prosecution of the work by throwing open its fine (but draughty) library to the members of the Association, and by giving its President a seat on the Council.

And now Mr. Cates advocates student classes connected with the Institute and under the guidance of the Association. Should the closer bond be drawn, it need not imply any loss of the glorious liberty of the junior members who could continue to hold their ordinary meetings unawed by the seniors.

As a matter of fact, however, the Association has, perhaps for administrative reasons, diluted the fine old system of mutual help and criticism which made the Class of Design of twenty years ago the most enjoyable thing in the profession. Now, Visitors are appointed to criticise the works submitted at all the numerous classes, and are not paid for their responsible services, which seems hardly fair to them, while the system of mutual instruction as well, and it always appeared to me that the comprehensive body might gain some advantage from every rung of the ladder when each becomes the step to the one above it.

A very simple examination,—for which a principal could prepare his pupil at the cost of a few minutes a day,—might well limit membership to those who could show some capacity for becoming architects, such as by setting up simple elevation and section of a given object by pointing out the palpable distinctions between any two styles of architecture, or by any other simple evidence of an appreciation of form.

A PAST-PRESIDENT OF THE ASSOCIATION.

#### THE REGISTRATION OF PLUMBERS.

Sir,—I have read with much interest the account of the meeting convened by the Plumbers' Company [p. 196, ante]. I cordially sympathise with the Master in his laudable endeavour to increase the efficiency of the plumbers, and I have no doubt that, if carried out with a due regard to the existing interests, it may be productive of good. I have no wish to discourage their efforts, but I cannot help thinking that the Company do not go far enough. It is very well to register the existing plumbers, but not one word is said in the report about educating the future race. Surely, sir, this is quite as important, if not more so, than registration; in fact, so much so that it ought to be overlooked, and I would submit that the question of educating or apprenticing young plumbers is worthy of the consideration of the Worshipful Company. My views on this matter are pretty well known in the trade, for I have written and spoken much on the appropriate question. The Tynders and Bricklayers some years ago determined to "increase the efficiency of the bricklayers, and to that end offered premiums to working masters to take boys and to thoroughly instruct them in the mystic of the trade, and, on the whole, the scheme met with fair success. I should like to see Plumbers' and other companies follow in the wake, for I am convinced that the old system is the proper one. You cannot have good workmen unless they have been properly taught. The National Association of Master Builders, four years ago, keenly alive to the growing and pressing necessity for improvement in the workmen, issued a circular to the whole of the trade throughout the United Kingdom calling on them to take steps to revert to the old system.



of apprenticeship. This applied to plumbers as well. They also issued a memorandum of suggestions as to premiums, &c., with a form of indenture. This is now being very generally acted upon in the provinces. I cannot but regret that Mr. Shaw has not asked builders to assist in his conferences, as suggested by Mr. Henshaw, as I see that two of your correspondents state that the builders employ by far the largest number of plumbers. Therefore the thought occurs,—What is to be the sad fate of the master builders and those men who cannot register? For, to judge by a remark made by the chairman, there is a sort of doubt as to their admittance. He thought there could be no objection to admit builders on certain conditions. It is almost certain from this remark that the Plumbers' Company are not very eager to hold out the hand to builders, although Mr. Shaw says in his letter that they are. Plumbers must remember that they have been having "a rare good time of it" of late, but this sanitary craze will not always be as fashionable as at present. By and bye perhaps the public may employ builders again, although they may not be registered, and notwithstanding their being only "messers" and "tinkers."

STANLEY G. BIRD.

28A, Upper George-street, Feb. 3.

### "PLUMBERS AND PARLIAMENT."

SIR,—I am glad to learn from the President, who from holding that position for several years must be an authority upon the subject [see p. 218, ante], that the Central Association of Master Builders still continues to take an interest in the affairs of the building trade. No one, I am sure, would think of accusing the Association of "dabbling in a noisy and ostentatious manner in matters which are being dealt with by others." May I ask what the "matters" may be, and who the "others" are? Surely the President is not alluding to the Plumbers' Company, who are clearly satisfied to go their own way, and evidently do not require the assistance of the Association.

No, sir; it is the apathy and inactivity of the Central Association of Master Builders that I take exception to. There are many important questions at the present time affecting the building trade which should be taken up and discussed, and, if considered expedient, dealt with by such an Association. One, and not the least, is the question of plumbers working different hours in the winter months from all other trades.

The fact is, that, although we possess a so-called Central Association, the members of the building trade do not stand by each other, and his is one of the main difficulties to any reform being carried out.

F. M.

### THE NEW STREET FROM PICCADILLY TO NEW OXFORD-STREET.

SIR,—Your "note" of last week [p. 192] encourages us to believe that the Metropolitan Board of Works will not adopt for their approach from St. James's to St. George's, Bloomsbury, any designation like to Criterion-avenue, "Rocadero-drive, or Pavilion-walk,—indicative in each of these may be to the Local Board and Vestry orders of mind.

Here is opportunity of commemorating—as, indeed, in such a thoroughfare should be commemorated—the topographical associations of a course. The new street traverses the ancient manors of Bloomsbury and St. Giles, component parts of the more ancient and yet prebendal manor of Ruggemere. If this last be deemed to be too archaic, St. Giles too "low," and Bloomsbury too "Bury" or Bloomsbury too commonplace, an equally applicable alternative remains. Give the good old local name of Soho to a street that passes along and in portions crosses over the actual site of Soho-fields, which were known under that style long before the Duke of Monmouth yielded the day at Sedgemoor.

W. E. MILLIKEN.

SIR,—I see that the new street now being made connect Holborn and Piccadilly is in search of a name. I beg to suggest, through your valued paper, that it be called "Giles-way" or "St. Giles-way." This would be distinctive and short,—both great

recommendations,—indicative of the locality through which it passes, and altogether appropriate.

I enter into no argument to enforce my proposal, the grounds for it being so self-evident.

February 2nd, 1886.

E. O. W.

### SEWAGE PURIFICATION AT GUILDFORD.

SIR,—I do not complain that the patentees and advocates of any of the existing methods of producing sewage sludge should do their best to prevent investigation of a process which is shown by competent chemical analysis to "produce marvellous effects upon sewage"; to such an extent, indeed, as to raise the fear that "all those who are now labouring in this field of research may cease to work." But the public, to say nothing of myself, have a right to expect that these gentlemen should adhere to truth in their criticisms.

Mr. Arthur Angell, in the *Builder* of this day's date, makes a mis-statement when he says that "Dr. Thresh has taken upon himself to publish the particulars of the trials made." I am not aware how Dr. Thresh, who was not present at any one of them, could have done so; and a reference to his paper in your columns discloses no undertaking or attempt of the kind.

With regard to the other statement made by Mr. Angell, in assumedly an official capacity, I have to request you to publish the two following letters to and from the proper representative of the Urban Sanitary Authority of Guildford.

FRANCIS R. CONDER, M. Inst. C.E.  
Guildford, January 30, 1886.

[COPY.]

To Henry Peak, Esq., Borough Surveyor,  
Guildford, 30th Jan., 1886.

SIR,—Allow me to call your attention to a statement signed "Arthur Angell," without date, printed in the *Builder* of to-day, to the effect that "no real and serious idea of adopting Mr. Conder's process was ever entertained by the authorities" of Guildford.

In face of the courteous attention which I have received from the Mayor and other authorities of Guildford, yourself included; of your report of 8th December last; and of the operations now in progress; I have to ask on what authority the above statement has been made, in the name of "the Public Analyst for the Borough of Guildford."—I have the honour to be, Sir, your obedient servant.

FRANCIS R. CONDER, M. Inst. C.E.

[COPY.]

Dear Sir,—Replying to your note calling my attention to a statement in to-day's *Builder*, by Mr. Arthur Angell, to the effect that "no real and serious idea of adopting your process of sewage purification" was ever entertained by the authorities of this town, I will only remark that that gentleman can have no *pro-ride* for his assertion; as instructions were given by the Mayor and Committee to afford you a full opportunity to experiment at the town's expense.

The adoption or otherwise of your system will, I presume, depend on the final results which you are able to show; but I should be sorry to feel, with Mr. Angell, that the authorities are simply trifling with you in the matter, and intentionally wasting the ratepayers' money in paying for the said experiments.—I am, dear sir, yours faithfully,

HENRY PEAK,  
Surveyor to the Guildford Urban  
Sanitary Authority,  
3, Market-street, Guildford, Jan. 30, 1886

To F. R. Conder, Esq., M. Inst. C.E.

### CHELTEMHAM GRAMMAR SCHOOL COMPETITION.

SIR,—Complaints have, I hear, been published that some competitors have, on the return of their address-envelopes, found that they have been opened and resealed. I have also myself received several such complaints, some of them worded with so little courtesy or reasonableness that I have no wish to be brought into direct communication with the writers. Will you therefore kindly allow me to explain what happened with respect to these envelopes?

The several van-loads of packing-cases, as they arrived last summer, were placed in a separate room at the school, and given into the charge of one of the first firms in Cheltenham to unpack and hang, in such a way, that when desired, each set of plans might be restored to its own case. As the process of selection proceeded, the same firm unhooking and repacked the discarded plans. Last of all, the plans selected for the assessor were packed and sent to him. On the return of these the award was made, and the envelopes belonging to the premiated designs were opened by the Chairman before the Board. All the other envelopes were, at that time, unopened, but attached to the respective packing-cases ready to guide their return. The Governors were, of course, at perfect liberty to open them after the award, but it occurred to me that competitors might prefer to send address-cards, not necessarily disclosing their names, and to have their address-envelopes returned unopened, and I advertised accordingly.

I waited a few days until a good batch of address cards had come in, and then sent them to the packers with orders to send off the packages to which they related. I intended these as a first instalment, but the packers thought these were all the address-cards, and that where there were no such cards, the address was to be obtained in the usual way by opening the envelopes. Directly I found this had been done, I ascertained that no one but the packer employed had seen the envelopes opened, and then ordered them at once to be resealed; and the process of return has since been carried out in batches as the address-cards have come in. Many competitors have not written yet.

That is the whole mystery of the case. I am very sorry for the mistake (which, however, is of little practical consequence, as scarcely one competitor has, in fact, been desirous not to reveal his name), but I can assure all competitors that it occurred at least a fortnight after the making of the award, previous to which every envelope was intact.

Should any of the more irritable and suspicious of the persons who have written so rudely to me require anything beyond this statement, it might, I think, occur to them that if there had been any tampering with the envelopes which it was desired to conceal, a voluntary proposal to return them unopened would never have been made.

Would you further permit me to say how much I regret the impossibility of reporting to, or discussing with, so large a number of professional gentlemen the opinions formed on the relative merits of their varied and skilful designs, and to ask competitors (with whom I have the greatest sympathy) kindly to have a little consideration in their turn for the endless worry and thankless trouble which an open competition entails upon

THE HON. SEC.

Cranley Lodge, Cheltenham,  
January 30, 1886.

### SWINDLING BUILDERS.

SIR,—The superscription to this letter may sound at first severe and uncalled for, but the sequel will, I think, justify the epithet.

As a warning to business firms who put reliance in references before opening accounts with strangers, I beg you will allow me to relate how I have unwittingly become the victim of a speculating builder.

One of this genus, hailing from a southern suburb, called on me to purchase constructional ironwork for some buildings he was about to erect on land he had taken direct from the freeholder, who was to advance money in the usual way, under the direction of a reputable firm of surveyors.

Not knowing the builder, I asked him for cash or satisfactory references, and he, preferring the latter course, gave me the freeholder's surveyors' and another apparently respectable name. My inquiries of the surveyors led me to consider that I was not incurring any unusual risk, and the builder solemnly engaged to pay cash on the usual 10th of the month.

The ironwork was delivered to the buildings, and signed for by the builder himself, but when the pay-day arrived he made all sorts of plausible excuses, which culminated in rounds of abuse upon being pressed for payment, and on making inquiries in the neighbourhood I found that the ironwork was never used in the buildings at all, but was soon after delivery reloaded and carted away, no one seems to know where, and timber beams used instead. I should say that timber was specified, but the builder said he would use iron as likely to make a better job, and assist the letting or selling of the buildings at a better price.

I at once issued a summons from the Lord Mayor's Court, returnable in eight days. The builder took no notice; judgment was signed, with no result; and on an execution being put in his house, it was found that he owed more rent than it was likely his goods would realise under the hammer, and consequently the sheriff withdrew.

I cannot attach any moneys payable to the builder, because the surveyors say that, although he may draw money on account by permission, no money is yet legally due, as the buildings are not up to the requisite height, and, besides, there are a number of "stop orders" to be satisfied.

I must now either give up the chase, or "prove means" to the Court's satisfaction before a judgment summons can issue, but which I despair of doing under the circumstances.

I have since found out that the second reference, whom I unfortunately did not see, for the reasons above stated, is actually the man who is acting as the builder's manager!

Surely, sir, this is a distinct fraud, although my lawyer says it is not. Anyhow, if not a legal fraud, it is certainly a moral,—or, rather, an immoral one, of the worst type.

Lawyers are now so indifferent about pursuing matters of this kind, as under the "new rules" they cannot make good costs, that they advise clients to put up with the first loss as the least, rather than fight out a really good case. I have experienced this many times of late.

Possibly the builder I refer to may read this; if so, I trust he will feel a little remorse, and, at least, abstain from making fresh victims.

AN IRONMAN.



## The Student's Column.

FOUNDATIONS.—VI.  
UNDERPINNING.

**T**HE operation of underpinning, in which concrete is almost invariably employed, generally consists in putting a new foundation under a wall or pier which has shown signs of failure through insufficient foundation. It is also carried out in the cases,—very frequently happening,—where an additional story has to be put under the building on one side, or each side, of a wall, without rebuilding the wall. The kinds of soil that have been mentioned in reference to ordinary foundations are equally likely to be found when it is a question of underpinning. If the ground is quite satisfactory, the new foundations may be simply such as would be put if the wall were being newly built. If it is not perfectly reliable the concrete must be made wider in the trench so as to secure greater spread of footings, and, if by going deeper a better foundation can be obtained, the cost of doing this in a case of underpinning should be incurred, although it might not be necessary if the wall were then to be built; for the damage that may result from even a small settlement is a sufficient reason for increased expenditure. If the foundation is very bad, it may be a question whether the idea of underpinning should not be abandoned and the wall rebuilt on an artificial foundation that can be more easily put in as a whole than in parts.

Underpinning is, however, not only a very frequent operation, but one that is almost invariably carried out without gross failure, to say the least, and its success is due to the care usually taken in employing the best workmanship and materials.

The general principle on which walls are underpinned, is to arrange the work in sections of 3 ft. to 4 ft. in length, to select, as far as possible, those parts that are the weakest, as shown by their signs of failure, and to deal with them in the first instance. It may generally be assumed that those parts of a wall that are sound will carry the superstructure during the short time required for re-building a piece that is only just long enough to give room for a man to work. The places to be first dealt with are selected so that, by putting in alternate lengths, or by leaving two or three lengths between those which are first underpinned, there is enough of the old foundation left to carry the wall above, and when the new pieces of foundation have had time to become firmly set, the intermediate pieces may be dealt with in the same way. When the wall is in a tolerably good condition, the operation is simple and safe. Portland cement concrete is used, and hard bricks of good shape laid in Portland cement made up with clean sand in the proportion of two parts to one of cement. Great care must be taken to pin up the new work tightly under the old wall using tiles or slates if necessary, and the work must be carried on with sufficient deliberation to allow the concrete and brickwork to set.

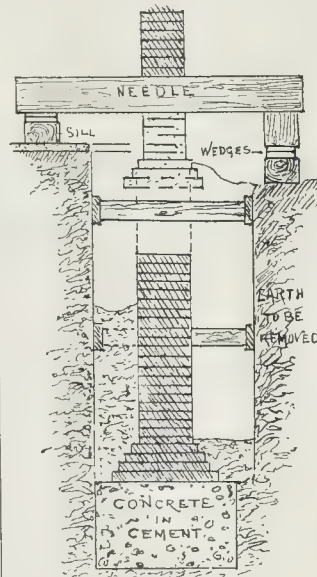
But questions of underpinning are generally complicated by considerations of support for the dead weight of the wall or of the resistance to the outward thrust of a building that, for the time, is standing without the support from the adjoining structure which it has hitherto had. Thus, shoring and underpinning go together, and it is necessary to consider here so much of the larger question of shoring as has special application to this subject.

It is of the first importance that a wall which is being underpinned should not sink at all during the operation, or at least not in an appreciable degree. If that should happen to it, the result will be seen in fractures at the junction with adjoining walls, in distinct cracks along the cornices or junctions of ceiling and wall in each room in the building, and derangements in the level of floors, perhaps even in the slope of roof gutters. In order to support any heavy load the best mode (that is the mode which will be least liable to accident and most economical of material) is to put a strut or prop directly under it. If this cannot be done the best thing is to get a sufficient beam under it, which beam is supported by struts or props. The work may be done in a third way, by putting the prop obliquely as in a raking shore. But unless there is something solid within the building, at the point where the head of the raking shore comes against it, any settlement in the wall which throws weight on the shore may

cause serious damage owing to the thrust which will be brought to bear against the wall by the head of the shore. Such shores are not, therefore, suitable means of support for heavy weights unless they are placed at a cross wall or they meet the resistance of a cross wall or a strong floor. When a raking shore is expected to carry any serious weight it should be made out of "half timber," or at least of "die square" stuff,—that 12 in. by 6 in. or 7 in. by 7 in. or stronger, as deals or planks are useless for such a purpose.

It is also specially important that a building should not bulge outwards while its wall is being underpinned. This may be prevented by the use of a raking shore, which is often the only possible expedient, but is subject to the objection just named. The best thing to use is a flying shore,—that is, one which is placed horizontally from the building requiring support to some building opposite to it, thus "flying" across vacant ground or a public way. If the span is not very great a few scaffold-poles judiciously placed and made tight will give all the resistance to outward thrust that is required.

The shoring being fixed, a shaft is sunk down on one or both sides of the wall at the spot where the underpinning is to be begun. It will be of the full length of the piece of new foundation that is to be put in and of a



UNDERPINNING FOR NEW BASEMENT.

width that will give room for the workmen. If the wall above is so bad that the short length that is dealt with will not do without support, a strong "needle" must be put through it at a convenient height above the base of the wall, taking care that the brickwork close above the needle is sufficiently sound. If there is no brickwork sound enough for this purpose the wall should not be underpinned, but rebuilt. Usually a piece of "whole timber," 12 in. or 14 in. square, is put through the wall, each end being wedged tight up from a sill lying parallel with the wall on each side of it, or the ends of the needle may be propped up with short stout pieces of timber from such sills. But it is better to use as needles short lengths of rolled iron joists, for one such joist, 12 in. by 4 in. or 12 in. by 6 in., will require a hole not more than a third (or at most half) of the width of a timber needle.

The execution of the work in several sections as above described presents no difficulty. When a new basement story has to be formed by means of excavating and underpinning (or a sub-basement, as is not unfrequently done), the matter requires greater care, particularly as all the walls round the site have to be dealt with. There is a strong disposition in such a case to dig out the soil from the new story in

the first instance, leaving, perhaps, just so much as is thought to be necessary to carry the feet of a few shores. By this plan the excavation is got out of hand, and more ready access is obtained to the base of the wall than by the slower process of sinking shafts. This should never be permitted, as the earth so removed provides the best means of obtaining support for shores while new foundations are being built. The work should be done wholly by sinking shafts against the surrounding walls until the whole is finished, and an isolated mass of earth remains in the middle of the site. This is called the "dumpling," and it can be removed when the underpinning has been done. One instance of mismanagement will illustrate these observations, and teach. In a case where a sub-basement had to be formed, the work was begun by putting up raking shores made of 9-in. deals, resting upon the bottom of the original basement. As much of the earth as could be removed without digging very close to the feet of the shores was then excavated down to nearly the bottom of the sub-basement. The shores soon showed by bending that great weight was being brought upon them, the lumps of earth began to yield, the partitions in the adjoining house became broken from the party-wall, and the doors in them became tightly fixed. More shores were then put together with flying shores, as it was by this time obvious that an accident was imminent. The wall sank bodily some few inches, causing large expense to the builder, which fortunately was the extent of the mischief.

It has been shown by some experiments that concrete swells in setting, and this has been thought to be an advantage in underpinning. But any perceptible expansion would be injurious as a settlement. If concrete is made of good stones in close contact, and the cementing material is well slacked, there will be no expansion,—which is the best thing that can happen.

## RECENT PATENTS.

## ABSTRACTS OF SPECIFICATIONS.

4,063, Gully Trap. J. Phillips.

The gully tank is provided with a cast-iron top having a hinged grate, and at one end a rectangular bent overflow pipe, dipping into the tank to form a trap. The overflow pipe discharges into the head of a drain connected directly with the sewer. On the top of the bent pipe is an inspecting box, having a hinged lid, and the pipe itself is provided with removable air-tight cover. The cast-iron top is bedded on thick tarred felt, or in cement.

9,207, Mats, Staircase Treads, &amp;c.

Into the perforations of a metal grating are fixed india-rubber blocks, which may be formed of warps, scraps, &c. Or india-rubber strips are bound screwed together with wood or other strips.

11,533, Window-sash Fastener. J. Parker.

A catch is pivoted on a plate, which is fixed to the window-frame in such a manner that it fits forward when the lower sash is closed, and presses on a plate on the meeting-rail which secures the sash. A screw fixed on a swinging plate at the side of the sash-frame prevents rattling.

15,032, Fireplaces. J. Wostenholme.

The side and back of the solid fire-clay fire-basket of open slow combustion stoves are provided with a number of holes leading from an air-chamber made either in the back of the stove-basket, or between the side and back plate. Air supplied to the chamber through the under part of the stove is heated, passing through holes made in the side of the stove, mingles with and assists the combustion of the gases arising from the fuel.

16,979, Copying Drawings. J. Schenker.

A slate colour is produced on paper by a solution of iodine and potassic oxide. The drawing is then copied on the coloured paper with a bleaching liquid, consisting of a solution of hyposulphate of soda. The drawing thus produced is used as a negative to print from on sensitive paper.

17,003, Enamelled Metal Work. W. F.

The design, when of large size, instead of being produced in rectangular sections, as is usual, is divided into pieces of a convenient size along lines corresponding to the principal outlines in the figure. The shading is emphasised by the free use of repoussé work, which is hammered up before enamel is applied. In cases where the metal is thin and the relief high, it may be backed with cement.

17,043, Water Crane. Ransome &amp; Rapier.

The jib of the crane is bolted on to a basin casting, with trunnions on each side working in bearings in an outer basin, which terminates at the bottom of a hollow pivot. This pivot allows for a



zonal motion of the jib and the removal of the residual water when the jib is tipped up. The jib is counterbalanced by a weight hanging inside.

Calcareous Portland Cement. W. Smith.

Calcareous sands are mixed with clay or shale or other combination of silica, alumina, and iron oxides in suitable proportions. The mixture is powdered, made into any suitable shape if desired, or dried, calcined, and finely ground.

10,394, Ventilating Greenhouses. C. Lawrence.

Chambers for the inlet, or inlet and outlet of air, are formed of wire-gauze along the sides or ends of the greenhouse. Openings to these chambers occur at equal intervals along the outside, provided with shutters by which the inflow or outflow air may be in some degree regulated. The top, bottom, and ends of the chambers are inclined to each other for directing the air. Any form of ventilator may be used which allows air to pass out, but prevents its return. In addition to the ventilator a valve shutter, controlled by a hanging chain, may be applied to an opening in the roof communicating with a similar chamber.

16,409, Kitchen Ranges. J. McJ. Shaw.

A flange projecting downwards is cast or fixed to the hot-plate of kitchen-ranges on one or both sides of the fireplace, so that when an open fire is being used, some of the gases may be directed round the oven instead of passing directly to the chimney. Other plates are fixed to this flange parallel to the front of the range to prevent cold air entering the flues surrounding the oven.

16,902, Hoists. J. W. Styles.

The chain or rope is attached to the largest of two buckets on the same shaft. An independent rope is connected to the small barrel, and carries a counterweight. On the rims of the large barrel a brake-strap is arranged, and a coiled spring may be enclosed beneath them to assist or supersede the counterweight.

#### NEW APPLICATIONS FOR PATENTS.

Jan. 15.—657, W. Wade, Preventing Down Drafts and Smoky Chimneys.

Jan. 17.—728, P. Le Duc, Thumb Latch.

Jan. 18.—746, J. Warburton and W. Carter, Preventing Drafts.—755, P. Claudel, Calculating Instrument.

Jan. 19.—794, A. Thomas, Automatically Flushing Drains, &c.—802, R. and J. Dempster, Fireproof Construction.—804, J. Scott, Rough Plate Glass.—805, W. Jukes and W. Kershaw, Ornamentation of Sheet or Plate Glass.—820, C. Jensen, Deco-rating Plaster of Paris, Wood, &c.—829, J. Stidder, Flushing Water-closet Fans.—830, R. Boyle, Ventilators.—838, B. Raxworthy, Latches.—842, W. Wardle and M. Shillito, Ventilating Fans.

Jan. 20.—868, W. Towler, Cisterns.—883, S. Phillips and S. Wise, Indicator Lock.—891, C. Hodges, Joint for Pipes.—905, T. Young, Door Lock Spindle.

Jan. 21.—923, H. Buchan, Water-closets.—930, W. Bartholomew, Water Waste Preventing Cistern.—967, W. Vane, Ventilating.

Jan. 22.—974, A. Alimack, Bell Battery.—977, J. Nicholls, Neils.—979, W. Leggett, Regulating Fanlights, Ventilators, &c.—990, J. Green and Others, Kitchen Ranges.—1,007, J. Spong, Automatic Fire Alarm.

Jan. 23.—1,036, E. Hawkes, Screws, &c.—1,039, C. Veit, Door Locks.

Jan. 25.—1,075, A. Deas, Service Cisterns and Valve Apparatus for Water-closets.—1,086, F. Wendling, Paint.—1,088, H. Hunting and A. Tolfer, Machines for Mortising and Dovetailing.—1,091, J. Peckover, Stone Saws.

Jan. 26.—1,126, C. Alison, Cements and Plasters.—1,138, A. Bergmann, Locks.—1,139, T. Walton, Lever Locks and Latches.—1,149, H. Hartung, Door Checks.—1,163, D. H. Vaughan, Plant for Drying Bricks.—1,168, D. Winter, Automatic Door-closer and Checks.—1,171, F. Balbi, Composition or Sharpening Edged Tools.

Jan. 27.—1,206, G. Whitehead, Ventilator or Chimney Cowl.—1,216, T. Caussett and R. Leadley, Upboard Turns or Fastenings.—1,230, J. Radford, Securing Door Knobs to Spindles.—1,233, W. Bartholomew and E. Reynolds, Flushing Syphons.

Jan. 28.—1,282, J. O'Callaghan, Securing Door handles or Knobs to Spindles.

#### PROVISIONAL SPECIFICATIONS ACCEPTED.

4,519, J. Davison, Soil and Waste Pipe Ventilator.—13,352, E. Aldous, Chimney Top.—14,352, J. Winn, Syphonic Apparatus.—14,381, A. Carey and A. Jack, Portland Cement.—15,038, W. Collins, Ventilating Vertical Sanitary and other Pipes.—15,180, H. Rotten, Coupling the Ends of Pipes.—15,518, W. Robertson, Ornamental Woodwork.—15,577, R. Brown, Batten Nail.—15,608, D. Laister and Others, Movable Partitions, &c.—15,684, G. Sowerby, Lead Glazing.—15,847, D. Howell, Casement Window Sash.—30, E. Jones, Combination Shovel, Riddle, and Sieve.—146, J. Ferriero, Fireproofing Buildings.—6,849, J. Dewny, Hooks.—14,363, E. Clarke, Apparatus for Opening and Closing Ventilators, &c.—14,921, J. Sephton and J. Evans, Chimney Pots.—15,003, E. Benn, chimney Pots.—15,827, A. Rickaby, Slotting and

Planing Machines.—15,553, W. Atkins, Door Bolt.—15,609, D. and E. Glister, Apparatus for Securing and Automatically Raising Doors.—15,753, C. Wells, Ventilating Tunnels.—76, C. Wells, Decorative Material for Walls.

12,222, S. Smith, Working Window-sashes.—14,100, E. D'Eve, Cowl.—14,815, L. White, Portland Cement.—15,001, J. Carr, Ventilation.—15,255, J. Csanaka, Water-closets.—15,272, J. Davies, Opening, Closing, and Fastening Doors, &c.—15,487, J. Chew, Lever Window-sashes.—15,513, W. McGowan, Screw-drivers, Gimlets, &c.—15,689, H. Stockman, Concrete Mixing Machines.—15,870, W. Lea, Hot-air Heating and Ventilating Stove.—13,775, J. Cookrane, jun., Cowl.—14,981, W. Reid, Pneumatic Chimney-cowl.—15,554, A. Harris, Ventilation of Sowers.—15,752, P. Lawson, Enamelled Paint.—15,789, J. Longden, Cement.—15,860, H. Doulton, Joints of Stoneware Pipes.—15,850, E. Palmer, Open Trough Water-closets.—15,015, W. Poultis, Apparatus for Heating Buildings, &c.—16,096, H. Hadden, Terraces and Flat Roofs.—190, D. Wilson, Slotting Machines.

#### COMPLETE SPECIFICATIONS ACCEPTED.

Open to opposition for two months.

1,476, W. Walton, Ascending Tall Chimneys, &c.—2,934, A. Ransome and T. Wilkie, Wood Planing and Moulding Machines.—3,435, J. Brown and T. Porter, Climbing Chimneys, Steeples, &c.—3,754, D. Faulds, Joint for Pipes.—3,836, W. Brown and H. Clayton, Sinks and Traps.—5,980, W. and B. Jones, Looks and Keys.—10,864, T. Milo, Door-Knockers.—1,102, R. Warwick, Colouring and Decorating Plastering Work.—2,817, E. Aldous, Ventilating Apparatus.—3,477, T. Wilson and H. Johnson, Chimney Cows.—4,209, F. Henderson, Flushing Apparatus.—4,239, J. Miller and C. Cameron, Wash Pipes and Flushing Drains.—8,443, J. Lowe, Planes.—3,607, G. Sowerby Ventilators.—3,660, J. Lewis & C. Rawlings, Firegrates and Stoves.—8,839, E. Gardner, White Lead.—6,077, G. Thynne, Sanitary and other Pipe Joints.—9,154, W. Joy, Cement.—9,469, W. Macfarlane, Closets and Urinals.—13,346, W. Lake, Door Locks.—3,012, R. Hale, Joint Connections of Sanitary Drain and other Pipes.—4,018, E. E. H. Ludlow, Attaching Door-knobs to Spindles.—4,205, F. Vargara, Stoves and Firegrates.—4,231, W. Thompson, Painters' Platforms, &c.—5,189, A. Lake, Concrete Lights for Roofs, &c.—15,406, J. Laybott, Saw-sets.

#### RECENT SALES OF PROPERTY.

##### ESTATE EXCHANGE REPORT.

JAN. 25.

By THOMAS, PEYER, & MILES.  
Ashford, Kent—The Royal Oak Hotel, partly freehold and partly copyhold ..... 21,000  
The Market Hotel, 71 years, ground-rent 12. 10s. 3,000  
The Freehold Brewery, including Plant, &c. .... 1,150  
The Marlborough Hotel, and Maltheuse, partly freehold and partly copyhold ..... 2,650  
22, High-street, and Maltheuse, freehold ..... 1,300

JAN. 26.

By BROAD, PRICHARD, & WILKINSON.  
Fulham—38, Lillie-road, 68 years, ground-rent 51. 6s. .... 420  
By TOWERS, WILLIAMSON, & ELLIS.  
Bayswater—38, Westbourne Park, 63 years, ground-rent 10l. .... 1,150

By WALKER & RUMTS.

City, Skinner-street—Ground-rent of 87. a year, reversion in 73 years ..... 1,410  
Whitechapel—Wentworth-street—Freehold Plot of Land, area 432 ft. .... 200

By H. RUTLEY.

Kilburn—117, Penton-road, 78 years, ground-rent 81. 10s. .... 186  
By D. J. CHATTELL.  
West Chislehurst—2 Plot of Freehold Land, ca. 2r. 3ap. .... 630

JAN. 28.

By MESSRS. CHADWICK.  
Lambeth—29 to 38, Princes-street, 23 years, ground-rent 95s. .... 3,850

By HERRING, SON, & DAW.

Highgate Hill—The Residence, "Grove Cottage," 73 years, ground-rent 37l. .... 1,900  
By DEAN, BURNETT, & ELDRIDGE.  
City—52, Gresham-street, freehold, area 940 ft. .... 10,320  
Croydon—1 and 2, Elm Cottages, freehold ..... 350

By G. ROBINS.

Chelsea—183 and 190, King's-road; 2, Walpole-street; and 7, 25, 27, and 29, Ovington-street, including mortgagor's house ..... 3,160  
By FAREBROTHER, ELLIS, CLARK, & CO.  
City—77, Louthbury, freehold, area 2,130 ft. .... 43,000  
Kentish Town—172, Camden-street, 24 years, ground-rent 84. 8s. .... 35

By NEWBORN & HARDING.

Islington—3, William-street, 69 years, ground-rent 41. .... 380  
27 and 29, Brookly-street, 23 years, ground-rent 10l. .... 430  
Clerkenwell—14, Rydon-crescent, 43 years, ground-rent 51. 8s. .... 550  
Holloway—58, Andover-road, freehold ..... 465  
Hoxton—8, 9, and 10, Napier-street, 19 years, ground-rent 9l. .... 650  
Stoke Newington—41, Alken-road, 76 years, ground-rent 91. .... 265  
53 and 55, Allen-road, freehold ..... 900

By E. STIMSON.

Clapham—The Prince of Wales Public-house, 25 years, no ground-rent ..... 360  
Wandsworth-road—No. 415, 83 years, ground-rent 16l. .... 750  
North Kensington—24, Appleford-road, 79 years, ground-rent 7l. .... 220

Camberwell—17, Albert terrace, freehold ..... £335  
Southwark—114, St. George's-road, 43 years, ground-rent 71. 1s. .... 616  
City-road—69 and 61, Prevost-street, 19 years, ground-rent 41. .... 205  
By WORSFOLD & HAYWARD.  
Dover—40, Trevinon-street, freehold ..... 235  
1 and 2, Clyde Cottages, freehold ..... 615  
Buckland, near Dover—Five Freehold Cottages ..... 225  
Dover—3, Charlton-place, freehold ..... 655  
The Three Compasses Public-house, freehold ..... 665  
19, Finsis Hill, freehold ..... 175

JAN. 29.

By NORTON, TRIST, WATNEY, & CO.  
Kingston—Three Plots of Freehold Land ..... 1,500  
Norbiton—A Plot of Freehold Land, 3a. 1r. 12p. .... 1,520  
New Malden—Freehold Meadow Land, 5a. 1r. 26p. .... 600

JAN. 29.

By HARDS & JENKINSON.  
Oxford-street—No. 164, term 45 years, ground-rent 15. 1l. .... 5,310  
Croydon—10, Morland-road, freehold ..... 1,410  
Lewisham—35, Elmira-street, freehold ..... 135  
1, 2, and 3, Pettett's Buildings, freehold ..... 225  
Haggerston—71 and 73, Whiston-street, freehold ..... 840

By FURBER, PATCH, & FURBER.

King's-cross—23, Manchester-street, 59 years, ground-rent 61. .... 730  
Edgware-road—No. 5/2, and Stabling, 36 years, ground-rent 18s. .... 840  
By BAKER & SONS.  
Hoxton—36a, Grange-street, 51 years, ground-rent 51. 10s. .... 350  
Transvaal, South Africa—Seven Farms, containing 30,163 acres ..... 490

#### MEETINGS.

SATURDAY, FEBRUARY 6.

Association of Public Sanitary Inspectors.—Mr. T. Buckworth on "The Sale of Foods and Drugs Act." 6 p.m.

MONDAY, FEBRUARY 8.

Royal Academy of Arts.—Lectures on Sculpture: Mr. A. S. Murray on "Bas-Relief in Rome." 8 p.m.  
Society of Engineers.—Mr. H. B. Hans Hamilton on "Rights of Foreshore." 8 p.m.  
Society of Arts (Cantor Lectures).—Professor H. S. Hele Shaw on "The Methods of Reducing Friction." 8 p.m.  
Society and Yorkshire Architectural Society.—Mr. A. W. Blomfield on "Church Architecture, Past and Present." Inventors' Institute.—8 p.m.

TUESDAY, FEBRUARY 9.

Royal Institution.—Mr. R. S. Poole on "Naukratis." 11. 3 p.m.  
Institution of Civil Engineers.—(1) Discussion on Mr. Stromeier's paper on "The Injurious effect of a Blue Heat on Steel and Iron"; (2, time permitting), Mr. L. F. Vernon-Harcourt on "The River Seine." 8 p.m.  
Royal Victoria Hall (Penny Science Lectures).—Mr. J. M. Thomson, F.R.S.E., on "Dirty Water, and How to Cleanse it." 8.30 p.m.

WEDNESDAY, FEBRUARY 10.

Civil and Mechanical Engineers' Society.—Mr. Cole A. Adams on "Railway Stations." 7 p.m.  
Society of Arts.—Mr. Bennett H. Brough on "Mining Industry at the Buda-Pest Exhibition." 8 p.m.  
Liverpool Engineering Society.—The Chevalier Charles de W. Steers on "The Panama Canal." 8 p.m.

THURSDAY, FEBRUARY 11.

Royal Academy of Arts.—Lectures on Sculpture: Mr. A. S. Murray on "The School of Paisteles in Rome." 8 p.m.  
Society of Telegraph-Engineers and Electricians.—Prof. D. R. Hughes, F.R.S., on "The Self-induction of an Electric Current in Relation to the Nature and Form of its Conductor." 8 p.m.  
Society of Antiquaries.—8.30 p.m.  
St. Paul's Ecological Society.—7 p.m.

FRIDAY, FEBRUARY 12.

Architectural Association.—Mr. H. D. Appleton on "The Practical Survey of Works in Progress." 7.30 p.m.  
Institution of Civil Engineers (Students' Meeting).—Mr. A. S. B. Oakley on "Gold-mining in the Wynad, Southern India." 7.30 p.m.

SATURDAY, FEBRUARY 13.

Architectural Association.—Visit to houses being erected in Collingham-road, South Kensington, from the designs of Messrs. George & Peto.

#### Miscellaneous.

**Board Schools, Wednesbury.**—In response to an invitation, a number of architects have submitted designs in competition and under motto for New Schools at King's Hill, for the Wednesbury School Board. From amongst the designs sent in, the Board, after careful consideration of the whole, made a selection of three, and subsequently decided to adopt the design bearing the motto "Experience." This design was found to be by Mr. E. Pincher, architect, West Bromwich. The other two selected designs were respectively by Mr. Cossins, of Birmingham, and Mr. Brevitt, of Darlington. The buildings are to accommodate 600 children, and will be proceeded with at once.

**The New Bridge at Battersea.**—At the meeting of the Metropolitan Board of Works on the 29th ult., a report was presented from the Bridges Committee, submitting contract drawings for the construction of the new bridge over the Thames at Battersea, and recommending that the same be approved and lithographed, and that copies and prints thereof, and of the specification, be prepared, for the purpose of obtaining tenders for the execution of the works. The report was agreed to.



**The Surveyors' and Auctioneers' Clerks' Provident Association.**—The annual report of this Association for the year ending 31st December last has reached us. The figures in the balance-sheet show that the Association is in a sound financial condition, but the committee regret that there is only a nominal increase in the membership. Six members have joined during the year, but, as five have become disqualified or left, the net increase is one. The distribution of the members is as follows:—sick fund, 28; life assurance fund, 22 (including one member's wife); superannuation fund, 9; benevolent fund, 6. In order to remove some difficulties which the past two years' experience has shown to exist, the committee propose, at the forthcoming annual meeting, to submit for approval alterations in the rules having for their object:—(1) The transfer of surpluses from any of the five existing funds to any others which may be insufficient, and (2) Permitting the relief to any assistants not being members of the Association, or to their widows and orphans, subject to well-defined regulations. The President of the Association is Mr. Daniel Watney, and the Secretary is Mr. L. Edmondson (Messrs. D. Smith, Son, & Oakley), 10, Waterloo-place, S.W., who will be pleased to give further information as to the objects of the Association.

**The Belgian Competition in Rolled Girders.**—The Belgian and German ironmasters continue to compete severely with English makers for the trade in rolled iron girders. Finding that Middlesbrough makers are getting their products more and more into the market, the foreigners are accepting lower prices than before, and for the large sizes their quotations, delivered to engineers' works in Mid-England, are sensibly under those of native manufacturers. The heavy rates charged by the railway companies for conveyance between the North of England and Staffordshire—30s. for lots under two tons—mitigate considerably against the native girders when needed by Staffordshire engineers. The Belgian iron is conveyed from the Thames to Birmingham for much less money. Messrs. Dorman, Long, & Co.'s quotations for lots of five tons and upwards, f.o.b. Middlesbrough works, are:—Plain rolled joists, 18 in. deep by 7 in. by 7 in., 7l.; 16 in. by 6 in. by 6 in., 4l. 15s.; 14 in. by 6 in. by 6 in., and 12 in., 10 in., 8 in., by 3 in. sizes, all 4l. 10s. Rolled joists with flanges are 6l. to 6l. 5s.—*Mining Journal.*

**Raffety, Thornton, & Co. (Limited).**—This company has been formed for the purpose of acquiring the well-known business of timber merchants carried on for many years successfully by Messrs. Raffety, Thornton, & Co. The prospectus (which is printed in full in our advertisement columns) says that Mr. W. J. Raffety, the senior partner, is retiring from the concern, and in order to replace his capital and further develop the business, the two remaining partners, Mr. C. I. Thornton and Mr. A. V. Raffety, have decided to invite public subscriptions to a Limited Joint Stock Company. Mr. C. I. Thornton and Mr. A. V. Raffety, who have had the sole management of the business for the last three years, have agreed to continue their services as heretofore as joint managers. The business will be taken over by the company as a going concern, free from all liability, as from January 1st, 1886, so that no interruption shall occur. The vendors will receive no cash payment whatever for the goodwill, &c., the consideration for the same being solely the allotment and issue to them of 16,500 fully-paid shares.

**Chubb's Locks.**—In the Chancery Division of the High Court of Justice, before Mr. Justice Chitty, this week, a motion was made by Messrs. Chubb & Sons, the well-known firm of locksmiths, to commit to prison one W. H. Chubb, an ironmonger at West Bromwich, for breach of an undertaking given by him in 1881, in an action brought against him by the plaintiffs to restrain him from selling or advertising for sale goods marked as "Chubb's patent." It appeared that plaintiffs, in 1882, having removed their principal lock manufactory from Wolverhampton to the neighbourhood of London, the defendant had recently issued circulars, advertising for sale "Chubb & Co.'s patent locks, Wolverhampton," where, however, he had no place of business. Mr. Justice Chitty said he had no alternative but to send the defendant to prison. His lordship added that in a week's time the defendant might move for his release, and the plaintiffs intimated that they would not oppose it. Costs were given to the plaintiffs.

**Building in Brooklyn in 1885.**—The report of the Brooklyn Commissioner of Buildings for the year ending December 1st, 1885, shows that the building activity during that period was very great, the total number of buildings for which "permits" were granted being 3,902, the estimated cost of constructing them being 19,000,000 dol. (3,900,000L.). Building proceeded most actively along the line of the elevated railway, but there was also a large increase in the residential district bordering upon Prospect Park. Nearly one half of the buildings erected were private dwelling-houses, 677 of them being designed to hold two or more families, and 465 being tenement-houses. The number of buildings actually erected in 1885 (January 1st to December 1st) was 3,665, at a cost of 18,187,587 dol.; in 1884, 3,050, at a cost of 14,370,714 dol.; in 1883, 2,683, 12,096,681 dol.; 1882, 2,375, 10,386,769 dol. It is expected that the current year will witness a very large increase in the erection of new buildings, and that the population of Brooklyn may soon reach a million. It is further anticipated that one or more new bridges will have to be built shortly to supply increased facilities for reaching Brooklyn from New York.

**The Turner Monument.**—Fresh from adoration of the Turner drawings at Burlington House, we turned into St. Paul's Cathedral, to worship at the tomb of the great water-colourist. We were wonderstruck to find that our former recollections of the statue erected to his memory had vanished. Here was no ideal representation, as we imagined, of the man, but a feeble figure stretching out his arms in a most inanimate manner. A closer inspection revealed the reason. From the effigy's right hand had been broken off both ends of the pencil or brush which it once held, from the left the palette or note-book which it once grasped. From the height of the statue above the ground it was evident that this injury could not have been caused by the wantonness of an outsider; it could only have arisen from the carelessness of the cathedral authorities, upon the removal of the organ which, some years ago, was reared hard by. This disfigurement must have long ago come to their knowledge, and should have been long ago made good by them.—*Art Journal.*

**Snow Ploughs and Scavenging Machines.**—Why, asks *Invention*, is so little attention paid to snow-ploughs and scavenging-machines by our makers of machinery? A Berlin firm, it is stated, is doing a large trade in machines of this kind, and has received orders from many Continental cities. Even if our own municipal authorities disdain the employment of machinery in street scavenging, our manufacturers might do a good export trade with more enlightened foreign cities.

**Proposed Ship Canal from Cleveland to the Ohio River.**—American architects and engineers are at the present time discussing the question of building a ship canal from Cleveland to the Ohio River, by way of the Muskingum River. Several of these professional gentlemen made a series of explorations recently, and they state, as the result of their examination of the ground, that such a project is feasible, but its execution will, at all events, be a somewhat difficult task. The estimated cost of the construction of the canal is 10,000,000 dollars, or about 2,000,000L. sterling.

**A Non-Registered Plumber debarred from Collecting Money for Work done in New York.**—A decision was rendered on the 9th of the present month by Judge Kelly, of the Sixth District Court of this city, in the case of William C. Poole against William H. Hyde, junior. The suit was brought to recover under a contract for plumbing and other repairs to the dwelling-house, No. 54, East Eleventh street. The main defence was the non-registration of the plaintiff as a master or journeyman plumber, in accordance with the provisions of Section 1 of Chapter 450 of the Laws of 1881. The fact of non-registration was admitted on the trial. The attorney for the plaintiff contended that as the Act prescribed its own penalty for violation in Section 6, the plaintiff should not be debarred of his recovery, because it would inflict a different penalty from that prescribed in the statute. The defendant's attorney represented that the defence offered was not in the nature of a penalty, and that a plaintiff cannot recover for work prohibited by statute. Judge Kelly sustained the defence.—*New York Sanitary Engineer.*

**A Large Gas-holder.**—The largest gas-holder on the Continent has just been completed for the Imperial Continental Gas Association at their gasworks at Erdberg, near Vienna. It is exceeded in size by but few English and American gas-holders, its cubic contents being 2,825,000 ft. (80,000 cubic metres). It consists of two parts, the water-tight pit sunk into the ground, and the bell, covered by an iron Schwedler cupola roof. Its total height is 202 ft., its diameter 209 ft. The roof, consisting of forty trusses and weighing 100 tons, was constructed on the ground and lifted to its ultimate position by forty screws. The iron work was supplied by the Witkowitz Company (Bohemia). The total cost of the gas-holder is 75,000L.

**Diminished Death-rates.**—The marked improvement in the health of the country generally, and especially of the urban population, which has taken place since the beginning of the present decade, was fully maintained during last year. In the ten years 1871-80 the death-rate in the large towns dealt with by the Registrar-General in his weekly returns averaged 24.0 per 1,000. During the past five years of the current decade, 1881-85, the rate of mortality in these towns has not exceeded 21.5 per 1,000, which implies that upwards of 110,000 persons have survived, during the last five years, in these towns, who would have died had the death-rate of 1871-80 since prevailed. It may be stated that in England and Wales during the same period of five years the saving of life, as the result of the reduction of the general death-rate of the country, is estimated at about 388,000. The rate of mortality in London during 1885 did not exceed 19.7 per 1,000, and was the lowest on record.—*Sanitary Record.*

**Sir Stamford Raffles' Statue at Singapore.**—At Singapore, the model of the recently completed statue of Sir Stamford Raffles is shortly to be erected at a prominent spot on the Esplanade. The work has been executed by Mr. Woolner, and is stated to be a very successful likeness. Sir Frederick Weld, the Governor of the Straits Settlements, has promised to inaugurate the statue as soon as the pedestal is completed. This portion of the work which is also designed by Mr. Woolner, it is proposed to make of granite.

**Rolled Iron Stanchions of Cruciform Sections.**—It will be remembered that some months ago the use of cast-iron columns or stanchions was interdicted, in Berlin, in consequence of several accidents having occurred through their failure to carry the loads which were put upon them. Hitherto, it has only been possible to supply their place by built-up structures of angle, channel, and joint irons, in combination with plates. Now, however, according to *Engineering*, Mr. Hugo Sack, of Duisburg, has designed and patented a rolling-mill for rolling cruciform sections of large dimensions, and of any desired distribution of material.

**London and County Banking Company.**—The Directors, in their report for the half-year ending 31st of December last (submitted at the annual meeting held on the 4th inst.), state that the net profits amount to 167,713L. 11s. 6d. This sum, added to 52,400L. 17s. 7d., the balance brought forward from last account, produces a total of 220,123L. 9s. 1d. Out of this the Directors recommended the payment of a dividend of ten per cent. for the half-year. The report and balance-sheet will be found in our advertising columns.

**The Certificate of Award, Invention Exhibition.**—Published as a supplement to the *Journal of the Society of Arts* of last week is a plate giving a facsimile of the certificate of award of a gold medal for articles exhibited at the recent Inventions Exhibition. About 80 per cent. of the whole of the design represents Music and Art—Mechanics and Engineering, which comprised about 80 per cent. of the Exhibition, being represented by a man with sledge-hammer about to begin work, with naked foot on an anvil which is about one-third the proper height.—*Engineer.*

**Grimsby to London by Raft.**—The Grimsby correspondent of *Timber* writes:—"As a novelty in the shape of timber-carrying, I notice Messrs. Bennetts & Co. have despatched a large raft of pitch-pine logs under tow of a powerful steam-tug, the destination being London. Grimsby to London by raft is quite new departure."







**HARROW GREEN.**—For the erection of a Wesleyan Mission-room. Mr. E. J. Sherwood, architect and surveyor, Queen Victoria street, London:—  
 W. Gillingham, Leytonstone ..... £260 0 0  
 E. Norwood, Leytonstone ..... 456 10 0  
 A. Reed, Stratford ..... 450 0 0  
 W. T. Searle, Leytonstone ..... 430 0 0  
 W. Greer, Stratford ..... 394 0 0  
 R. Lister & Co., Leytonstone ..... 382 0 0  
 J. Oliver, New Southgate ..... 370 0 0  
 North Bros, Stratford ..... 368 0 0  
 F. J. Corhead, Leytonstone ..... 340 0 0

**LEYTONSTONE.**—For the erection of "Salvation Army Barracks," Leyton-road, for General Booth. Mr. E. J. Sherwood, architect. Quantities by the architect:—  
 R. Lister & Co., Leytonstone ..... £1,017 0 0  
 W. T. Searle, Leytonstone ..... 1,004 0 0  
 A. Reed, Stratford ..... 998 0 0  
 W. Greer, Stratford ..... 907 0 0  
 North Bros ..... 890 0 0  
 Lobb & Oliver, New Southgate ..... 875 19 2  
 F. J. Corhead, Leytonstone ..... 864 11 0

**LONDON.**—For alterations to No. 16, Finsbury-circus, and pulling down and rebuilding 7 and 7a, Eldon-street. Messrs. Davis & Emanuel, architects, Finsbury-circus. Quantities by Mr. Fredk. Downing, Whitehall-yard:—  
 G. S. & Williams & Son ..... £3,467 0 0  
 John Mowlem & Co. .... 3,457 0 0  
 Colls & Sons ..... 3,430 0 0  
 E. Lawrence & Sons ..... 3,198 0 0  
 J. & J. Greenwood ..... 3,140 0 0  
 John Grover & Son, Wilton Works, Islington (accepted) ..... 2,983 0 0

**LONDON.**—For fittings, &c., to warehouses in St. Mary-axe, for the Egyptian Cigarette Co. Mr. H. J. Newton, architect, Queen Anne's-gate, Westminster:—  
 Godden ..... £387 0 0  
 Burman & Son ..... 387 0 0  
 Cook ..... 339 0 0

**LONDON.**—For sundry fittings at Nos. 465 and 467, Oxford-street. Messrs. T. Chaffield Clarke & Son, architects:—  
 F. Sage & Co. .... £550 0 0  
 Hall, Bedford, & Co. .... 525 0 0  
 Drew & Cadman (accepted) ..... 519 0 0

**LONDON.**—For sundry drainage works to No. 9, Chatterfield-gardens, Mayfair. Messrs. T. Chaffield Clarke & Son, architects:—  
 A. Bush (accepted) ..... £1,465 0 0

**MILLWALL.**—For rebuilding workshops and stores, for Messrs. Stephens, Smith, & Co., Millwall. Messrs. J. & B. P. Clarkson, Great Ormond-street, architects:—  
 Macey & Son ..... £2,195 0 0  
 J. H. Johnson ..... 2,123 0 0  
 W. J. Eack ..... 1,997 0 0  
 Riddall ..... 1,797 0 0  
 Salt ..... 1,649 0 0  
 Linn, Millwall (accepted) ..... 1,560 0 0

**TOTTENHAM.**—For the erection of St. Mary's Church, Tottenham. Mr. J. E. K. Cutts, architect:—  
 Dove Bros. .... £7,283 0 0  
 Morter ..... 7,254 0 0  
 Nightingale ..... 7,180 0 0  
 Brass & Son ..... 6,983 0 0  
 Tyerman ..... 6,925 0 0  
 Stephens & Bedford ..... 6,895 0 0  
 Lathey Bros. .... 6,870 0 0  
 L. H. & R. Roberts ..... 6,796 0 0  
 Dobson ..... 6,430 0 0  
 J. Holloway ..... 6,350 0 0

**WHITECHAPEL.**—For erecting a block of dwellings in Wentworth-street, Whitechapel. Mr. E. Hooley, architect:—  
 John Mowlem & Co. .... £9,999 0 0  
 Patman & Fotheringham ..... 8,455 0 0  
 Lathey Bros. .... 7,932 0 0  
 Williams & Son ..... 7,869 0 0

**WHITECHAPEL.**—For alterations and repairs at 81, Leman-street, Whitechapel, for the Ford Jew's Shelter. Mr. Lewis Solomon, architect, New Broad-street:—  
 Roberts ..... £313 0 0  
 Buxton ..... 302 1 0  
 Triggs (accepted) ..... 278 15 0

**WILLESDEN.**—For completion of St. Andrew's Church, Willesden. Mr. James Brooks, architect:—  
 Morter ..... £3,900 0 0  
 Jerrard ..... 3,843 0 0  
 Turtle & Appleton ..... 3,776 0 0  
 Biggs & Hill ..... 3,690 0 0  
 Lathey Bros. .... 3,690 0 0  
 Dobson ..... 3,425 0 0  
 Kilby & Gayford ..... 3,009 0 0

**WOLVERHAMPTON.**—For the erection of three houses, Cranmore-road, for Mr. T. R. Adams. Mr. Joseph Lavender, architect, Darlington-street, Wolverhampton. Quantities by the architect:—  
 C. Ford & Sons ..... £235 0 0  
 Bradney & Co. .... 9 8 0  
 H. Gough (accepted) ..... 784 7 4  
 J. Jones ..... 781 0 0

**Schools, Northfleet.**—Messrs. Balsam Bros., of Shenton-street, Old Kent-road, write to say that their tender for this job should have been 3,500*l.*, but that there was an error in cast of summary.

**SPECIAL NOTICE.**—Lists of Tenders frequently reach us too late for insertion. They should be delivered at our office, 46, Catherine-street, W.C., not later than *Four p.m.* on **THURSDAYS**.

#### TO CORRESPONDENTS.

Registered Telegraphic Address, "THE BUILDER, LONDON."

N. H. G. R. — "Goshaling." — W. G. B. J. J. F. S. H. J. — J. H. H. W. B. T. N. G. R. D. J. E. — G. C. B. & O. (should send amounts).

All statements of facts, lists of tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

**NOTE.**—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications beyond mere news-items which have been duplicated for other journals, are NOT DESIRED.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; all communications relating to advertisements and other matters which should be addressed to THE PUBLISHER, and not to the Editor.

#### PUBLISHER'S NOTICES.

Registered Telegraphic Address, "THE BUILDER, LONDON."

THE INDEX and TITLE-PAGE for Volume XLIX. (July to December, 1885) was given as a Supplement with our issue of January 9th.

A COLOURED TITLE-PAGE may be had, gratis, on personal application at the Office.

CLOTH CASES for Binding the Numbers are now ready, price 1*s.* 6*d.* each, also.

READING CASES (Cloth), with Strips, to hold a Month's Numbers, price 2*s.* each; also.

THE FORTY-NINTH VOLUME of "The Builder" (bound), price Twelve Shillings and Sixpence.

SUBSCRIBERS' VOLUMES, on being sent to the office, will be bound at a cost of 1*s.* 6*d.* each.

#### CHARGES FOR ADVERTISEMENTS.

SITUATIONS VACANT, PARTNERSHIPS, APPRENTICESHIPS, TRADE, AND GENERAL ADVERTISEMENTS.

Six lines (about 110 words) or under ..... 4*s.* 6*d.*

Each additional line (about ten words) ..... 6*d.* 6*d.*

Terms for rates of Trade Advertisements, also for special advertisements on front page, Competitions, Contracts, sales by Auction, &c. may be obtained on application to the Publisher.

**SITUATIONS WANTED.**

Four lines (about thirty words) or under ..... 2*s.* 6*d.*

Each additional line (about ten words) ..... 6*d.* 6*d.*

PREPAYMENT IS ABSOLUTELY NECESSARY.

\* \* \* Sample matter not to be sent, but all small sums should be remitted by Cash to Registered Letter or by Money Order, payable at the Post-office, Covent Garden, W.C. to

DOUGLAS FOURDRINER, Publisher.

Addressed to No. 46, Catherine-street, W.C.

Advertisements for the current week's issue must reach the office before THREE o'clock p.m. on THURSDAY.

The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c. left at the Office in reply to advertisements, and strongly recommends that of the latter copies ONLY should be sent.

#### SPECIAL.—ALTERATIONS IN STANDING ADVERTISEMENTS.

NOTICES OR ORDERS TO DISCONTINUE same must reach the Office before TEN o'clock on WEDNESDAY in writing.

PERSONS Advertising in "The Builder," may have Replies addressed to the office, 46, Catherine-street Covent Garden, W.C. free of charge. Letters will be forwarded if addressed envelopes are sent, together with sufficient stamp to cover the postage.

#### TERMS OF SUBSCRIPTION.

"THE BUILDER" is supplied gratis from the Office to residents in any part of the United Kingdom at the rate of 1*s.* per ann. PREPAID. To all parts of Europe, America, Australia, and New Zealand, 5*s.* per annum. To India, China, Ceylon, &c. 5*s.* per annum. Remittances payable to DOUGLAS FOURDRINER, Publisher, No. 46, Catherine-street, W.C.

#### Best Bath Stone, for Winter use.

WESTWOOD GROUND,  
 Box Ground,  
 Combe Down,  
 Corsham Down, and { Summer  
 Farleigh Down. { Dried.  
**RANDELL, SAUNDERS, & CO., Limited,**  
 Corsham, Wilts. [ADV.]

#### Box Ground Stone

is the best for use in all exposed positions: being a well-known and tried Weather Stone 50,000 ft. cube in stock.  
**PICTOR & SONS,**  
 BOX, S.O., WILTS. [ADV.]

**Doubling Freestone and Ham Hill Stone** of best quality, in blocks, or prepared ready for firing. An inspection of the Doubling Quarries is respectfully solicited; and Architects and others are CAUTIONED against inferior stones. Prices, delivered to any part of the United Kingdom, given on application to **CHARLES TRASK & SONS**, Norton-sub-Hamdon, Ilminster, Somerset.—Agent, Mr. E. WILLIAMSON, No. 16, Craven-street, Strand, W.C. [ADV.]

**Doubling Free Stone** For prices, &c., see Dress S. & J. STAPLEHAM HILL STONE, Quarry Owners, Stone and Lime Merchants, Stoke-under-Ham (Ground or Lump), Ilminster. [ADV.]

**Asphalte.**—The Szeysel and Metallio LA. Asphalte Company (Mr. H. Glenn), Office, Poultry, E.C.—The best and cheapest material for damp courses, railway arches, warehouse floors, flat roofs, stables, cow-sheds, and mill rooms, granaries, tann-rooms, and terraces. [ADV.]

**Asphalte.**  
 Szeysel, Patent Metallic Lava, and White Asphalte.  
**M. STODART & CO.**  
 Office:  
 No. 90, Cannon-street, E.C. [ADV.]

EVERY DESCRIPTION OF SEASONED WOODS AND VENEERS EXTENSIVE QUANTITIES.

**B. J. HUDSON & SONS,**  
 Millbank Sawmills, Grosvenor-road, S.W. 1, Whitfield-street, W. 1.  
 And Store-street, London, W.C.  
 Telephone No. 3,152, and Private Wire connecting Business Premises.

**MICHELMORE & REA**  
 Manufacturers of

CHARLES COLLINGS'S PATENT—  
**COLLINGS'S PATENT HINGE**  
 LEVER, SCREW, & BARREL BOILER  
 Self-Acting "FALL DOWN" GATE STOPS, and IMPROVED GATE FITTINGS of every Description.  
 36A, BOROUGH ROAD, LONDON, S.E.

DISCOUNT TO BUILDERS.

**BRABY'S PATENT GLAZING.**  
 GLASS SET FREE,  
 ALLOWING EXPANSION AND CONTRACTION, AND PRECLUDING BREAKAGE.  
 ABSOLUTELY WATERTIGHT. PAINTING AND PUTTY SUPERSEDED  
**OVER THREE MILLION FEET FIXED.**  
 DRAWINGS AND PRICES ON APPLICATION.

— MODELS AND SECTIONS ON VIEW. —  
**LONDON: LIVERPOOL: GLASGOW:**  
 356 to 362, EUSTON ROAD. 6 and 8, HATTON GARDEN. 335, ARGYLE STREET

# The Builder.

Vol. L. No. 2117

SATURDAY, FEBRUARY 12, 1889

## ILLUSTRATIONS.

Liverpool Cathedral Competition: View in Choir.—Design by Messrs. G. F. Bodley & T. Garner, Architects .....	270
Liverpool Cathedral Competition: Centre West Portal.—Design by Messrs. G. F. Bodley & T. Garner, Architects .....	271
Section through Nave looking East, of Messrs. G. F. Bodley & T. Garner's Design for Liverpool Cathedral .....	274-275
Longitudinal Section, looking North, of Messrs. G. F. Bodley & T. Garner's Design for Liverpool Cathedral .....	276-279
The New Exchange Buildings, Cardiff.—Messrs. Seward & Thomas, Architects .....	282-283

## CONTENTS.

Discovered at Winchester Cathedral .....	229	British Architectural Association .....	237	New City of London: Bathing in the Metropolis .....	247
Report on Sewer Ventilators .....	230	Royal School of Mines .....	247	The Student's Column: Foundations.—VII. ....	248
Notes .....	231	Liverpool Cathedral Design .....	247	Church-Building News .....	248
Cathedral Facades .....	232	The New Exchange Buildings .....	248	Recent Patents .....	249
Edinburgh: By the Lord Provost .....	233	St. Paul's Cathedral Approaches (with Plans) .....	249	Recent Sales of Property .....	249
The Latest Education for Artisans in London .....	234	The Parishes of Diocese of Liverpool .....	249	Meetings .....	249
The Proposed Cathedral at Liverpool .....	235	Builder's Measurement .....	249	Miscellaneous .....	249
Out College Buildings, Glasgow (Illustrated) .....	236	"Founders and Parliament" .....	249	Prices Current of Building Materials .....	249

### Discoveries at Winchester Cathedral.



FOR some time to come the attention of architectural students and antiquaries may be with advantage devoted to certain works of some magnitude which are now being carried out at Winchester Cathedral by the Dean, aided by his colleagues, and supported by local subscriptions.

It will be remembered by many of our readers to whom this famous cathedral is known, that it occupies the southern side, so to speak, of a large open area, planted more or less with trees, the most conspicuous of which form the fine shaded avenue which leads almost direct from the high street of the city to the main western door of the sacred pile. This open area has a perceptible slope citywards down to the north side of the cathedral, and a cursory inspection only a short time since would have convinced an ordinary spectator even that a great amount of earth had been allowed to accumulate along nearly the whole length of the building. At the west front, too, the ground is more or less uneven, giving the appearance to the path as if it had been cut through the soil to receive its recent level, while some curious remains of walling opposite the west front had a buried look plainly telling of the rising of the ground. This aspect is no creation of recent years, for it was noted at the beginning of the last century by Dr. Milner, who spoke of the ruins referred to, to refute the then asserted belief that they were the remains of a portion of the church said by tradition to have been built by the ubiquitous King Lucius in Roman times!

Old views of the cathedral also show the extent to which the ground had risen, for the singular Norman doorway which opened externally on the west front of the north transept is shown as being covered well up to the springing of its semicircular arch.

The Dean's work is altering all this buried appearance. A body of excavators have been at work for many weeks removing the earth from the cathedral walls down to the original level, and also making many improvements in the somewhat dreary expanse of open ground already referred to, many judicious works of planting and re-arrangement being carried out at the same time. The benefits are threefold: not only is the building kept free from the damp rising from the accumulated earth, but its appearance is greatly enhanced. Fully 1 ft. of earth have been already removed from

a great portion of the walls, the effect of which is to materially increase their apparent height, of essential benefit since the design of the cathedral is so long for its height.

In addition, the kindly feeling which has prompted the carrying out of these works at the present time of distress and scarceness of work, is beyond all praise.

This open ground on the north side has always been spoken of by old writers as the ancient cemetery of the cathedral, remarkable for the erection in it, in Saxon times, of another large monastic church side by side with the cathedral, and called, in contradistinction, the New Minster. The existence of two churches close together is a matter of much curiosity, since it is so different to that of a parish church adjacent to a monastic minster, or to the grouping of several small detached chapels around it; both of which arrangements are common enough, and readily explainable from the usage of the times. To have in a city two large monastic establishments at some little distance from each other is not infrequent, particularly on the Continent, but an instance of it may be cited at Canterbury, where St. Augustine's Abbey was at no great distance from the cathedral.

Here, however, a few feet only divided two large churches parallel to each other. The appearance must have been not unlike that which exists in our own day at Erfurth, where two fine churches are placed so close together as to present an architectural group of great interest, although the benefit of the position may be open to question.

The old records are precise enough as to the state of things which existed here at Winchester, as well as the earlier events attendant upon the foundation of the monastery. Thus we are told by Ingulph, Leland, and others, that the intention of founding was King Alfred the Great's, although it appears by earlier chroniclers that the completion of the work was effected by his son King Edward the Elder, the year 903 being named in the Saxon Chronicle as the date of the consecration.

King Edward translated the remains of Alfred and his Mother, Queen Alswitha, into the church immediately after its completion, and it appears to have been his intention to place St. Grimbald, the Frankish mass priest, over the establishment of secular canons attached to the church, but his death took place in the year of consecration. The dedication was to the Holy Trinity, St. Mary, and St. Peter. We learn from William of Malmesbury that the site was so valuable that a mark of gold was paid for every foot of ground upon which the building was erected, while Radbourne states that the site extended to

1,884 ft.,—whether in length or in area is not very clear, but the former may be supposed, particularly if the return boundaries be included. King Edward's charter tells us that the area consisted of three acres and three virgates, and we learn from this document what is mentioned by the writers already quoted, that King Alfred planned the foundation of the church and partly executed it, the completion and endowments being Edward's.

Evil days were in store for the monastery. Its occupants took the side of King Harold. Twelve of the monks and twenty soldiers followed their Abbot Elwy, who was a brother of Earl Godwin's, to the field of Hastings whence they never returned. The displeasure of William the Conqueror against the abbey was felt for many following years, and the more so since the king was close at hand. He appears to have erected a palace at the north-west of the cathedral, probably on the site of that of the early Saxon kings, this being, perhaps, included in the vacant ground remaining to be excavated. The further history of New Minster closes, so far as its original position is concerned, by a record of its being taken down and removed to the Hyde meadows in 1110, or 1111, as the date is given by various chroniclers. At this time the relics of King Alfred and his queen were removed to the new church, where they remained until they were scattered by spoilers apparently in recent years, long after the dissolution. The cause of the removal is tersely stated. It was the discord between the occupants of the two Minsters. The bells of one were rung while service was going on in the other; the choral services themselves interfered with those in the adjacent church; and we are constrained to believe that the occupants did not possess any of the blessedness promised to those brethren who dwell together in unity.

The knowledge that the site of King Alfred's foundation was covered by the accumulated earth close to the cathedral naturally prompted the Dean to have some tentative excavations made, with the view of testing the accuracy of the old records. Accordingly the ground was trenched northwards from the cathedral. At a distance of 26 ft. 5 in. from the north transept the workmen came upon a massive wall, about 4 ft. in thickness, and 3 ft. below the ground. This was soon found to be of considerable extent, running parallel with the north wall of the cathedral, and justifying the belief that it was actually the southern wall of King Alfred's church. This belief is most probably correct. The wall has been traced eastward, and uncovered for about 70 ft. or 80 ft. in length, and it is found to continue for the whole of its extent of the same uniform appearance and thickness. Following its course



westward, it is found to return at right angles, as if for the west front of the building; but here only the rough concrete of the foundations, about 10 ft. below the present level of the ground, are to be met with. This has been followed for about 25 ft., but the termination has not yet been reached. The wall is solidly, but roughly, built of local rubble, put together with fairly good mortar. There are numerous fragments of Roman brick built up in the wall, and the excavators have found a great quantity of Roman pottery and brass coins, mostly of the later emperors. The workmen are still at work on this most interesting site, the intention being to follow the indications of the walls from end to end, with the view of recovering the entire ground-plan. This work is likely to prove of considerable value; for, apart from the interest derived from opening up to view the outline, so to speak, of King Alfred's foundation, the importance of having revealed to us the actual design of a Saxon minster of large size cannot be over-estimated in relation to the history of art.

The results of the excavations along the north wall of the cathedral are of considerable interest. The ancient plinth of the building has been exposed to view entirely around the north transept. As is well known, this transept is the work of Bishop Wakelyn, the first of the Norman bishops, who rebuilt the cathedral entirely. The exact date is well recorded, for we hear of the beginning of the work in 1079, and its completion in 1093, in which year the monks removed from their old monastery to the new one thus prepared for them, the shrine of St. Swithin being brought into the new church. On the following day the demolition of the old one began and was completed within the year, except one porch and the great altar which were left standing. The work is, therefore, amongst the earliest which the Normans erected, and it is a valuable study. Its roughness and entire absence of ornament give no little reason to the belief for so long a time held by the antiquaries of the beginning of this century that this portion of the cathedral was of Saxon and not Norman date. Increased knowledge of Early Norman work enables us now to recognise in it all the characteristics of this date, while we may in this same building trace in the works which brought it to completion the modification of the Norman style by the introduction both of ornament and moulding. Interesting as the study of the work has always been, it is now greatly enhanced, for the walls are now seen standing on their original base, which is as perfect as when laid by the old masons 800 years ago. The base consists of a boldly-chamfered plinth, which extends from point to point of the principal projections and does not break around the smaller pilaster buttresses. The old masonry is in perfect condition, having the diagonal tool-marks which are so sure a sign of Early Norman work. The joints are wide and the stones are of the moderate size so usually found at this period.

The work is very similar to Lanfranc's work at Canterbury, so far as it remains at the latter cathedral; the original plan of these two Norman buildings, which were in progress at the same time, having many points in common. One illustrates the other, and with the advantage that what is lost by removal at Canterbury exists at Winchester.

On removing the earth accumulated around the door in the west wall of the north transept, it was found to be of good proportions, and to go down to the plinth level. It has now been entirely cleared. The position of this door is remarkable. A doorway of Norman date exists on the west side of the south transept of the little cruciform church of Old Shoreham; but it is to be doubted if one in this position exists in any other cathedral. Much speculation has been occasioned as to its use; but may it not have been to give a direct entrance to the Norman king and his court? If the old tradition is correct, that the palace was to the north-west of the cathedral, its position would be one of necessity. The excavators were rewarded in an unexpected way during the progress of their work at this point. On removing

the rough filling-in of the doorway, two or three charming pieces of sculpture more or less broken were found. Attention being called to these discoveries, more of the walling was taken down, and fragment after fragment came to light. These consist of heads and portions of the figures of saints, carved with remarkable delicacy and skill. There is one figure with a hand upon a book; another with the name Dorothy, in old English spelling, and many others. Several fragments of architectural panelling have been met with, and a singular portion of a Purbeck marble column worked in the form of a twisted knot. These fragments show clearly enough the fate of the numerous shrines which once adorned the cathedral, while the remains of the figures account for the many vacant niches, which are apparent in the chantry chapels, which have been preserved to our time almost uninjured.

The excavations in the crypt will, it is hoped, be the most interesting portion of the work, the intention being to remove the whole of the accumulated earth. This crypt, apparently entirely of Wakyln's work, is one of the most interesting of our early crypts remaining. At present it is encumbered with about 3 ft. or 4 ft. of earth, either placed there to prevent the rising of water or for purposes of convenience. A trial hole was made some time ago, and the base of one of the massive circular columns was found at the depth named. This was watched for some months, and no water having been found to percolate into it, it is considered that the excavations can be continued with safety, the main drainage of the city, recently accomplished, having, it is hoped, brought about this happy result. The increased appearance and effect to be given to this fine crypt, by nearly 4 ft. being added to its height, is expected to be very great; while the bringing open to view the whole height of the columns, and their curious early bases, will render the work of additional importance as an example of the earliest Norman work extant.

The progress of the excavations, too, may be expected to reveal some ancient features at present buried. The grave of Prior Silkestead has already been brought to light.

#### REPORT ON SEWER VENTILATION.

**T**HE Report of the Special Purposes and Sanitary Committee to the Metropolitan Board of Works, on sewer ventilation, reminds one that there is no finality in sanitary matters more than in other branches of science. It is only a very few years since charcoal disinfectors or filters were to do everything for us in the way of disinfecting and purifying the air escaping from sewers and drains, and now the charcoal system is reported on all hands as practically a failure, not because charcoal will not in the first instance perform what was promised for it, but because it soon becomes saturated with the moisture in suspension in the sewers, and loses its deodorising power, and the constant changing and reburning of it would be too troublesome and costly in a large system of sewerage. The Report charges against charcoal also, on the ground that the placing of a charcoal tray in a ventilator amounts to closing that ventilator. This can hardly be said to apply to the arrangement which has been tried at Croydon, and, we believe, elsewhere, of a spiral series of trays, between which the air was passed, so as to afford contact with the least amount of mechanical obstruction. This system is reported as having been tried at Croydon for ten years (the charcoal being replaced every three weeks), and finally disused on account of the difficulty of keeping the charcoal dry, and therefore efficient, and also "because it obstructed the ventilation of the sewers"; but we cannot think there can be much in this latter objection in the case of the spiral trays arrangement. The charcoal tray, with only a passage for the air by percolation between the particles, is, of course, another matter, and is, undoubtedly, a serious obstruction to ventilation.

The Report is a rather rambling and un-

practical document. It assumes the possibility, for instance, of the majority of householders in a district entering into a covenant to flush the drains simultaneously, at stated intervals, so as to do it with more effect,—an idea which suggests a very imperfect acquaintance with human nature from the householder point of view. The principle is also suggested that a householder is morally bound to be a kind of sewer ventilation agent, even to the extent that if he puts in an intercepting trap, he ought to be bound to supply a ventilator to the sewer to compensate for the loss of the former ventilation into his own premises. There is a touch of unintentional satire, what may be called sanitary satire, in this, which is rather amusing. On the other hand, the householder who was formerly content to draw the sewer air directly into his house, as a part of the order of nature, has now, under the influence of the preachers of the gospel of sanitation, become so wary that he kicks obstinately against the proposals of the Board to carry up ventilating pipes from the sewers against the walls of his house to a point above the roofs. The caution of the householder, under his present sanitary education, is not to be wondered at; that it may be carried too far, however, is shown by the answers to questions scheduled in the Appendix, where, in reply to the question "Have vertical shafts or pipes been used in your district for ventilating the local sewers?" the Vestry of St. George's Hanover-square reply that the prejudice against them is so great that it could only be done in isolated cases, and that in one case, where such a pipe was put up, the occupier of a house in another street, who could see this pipe from his windows, complained in the strongest manner of the nuisance occasioned by it, and the danger to his family, and threatened legal proceedings, long after the pipe, though still visible, had been disconnected from the sewer!

The Report groups the possible methods of ventilating sewers under three heads:—(a) Surface ventilation by shafts leading from the crown of the sewer to the surface of the road; (b) by large separate shafts, factory chimney shafts, and smaller shafts, in all of which fire or other heat is the motive power; (c) by pipes or shafts without heat. In regard to system b it is perfectly effective, but, unfortunately, the great cost it would entail in the erection of chimney-shafts and in fuel would place its general adoption in a large sewerage system out of the question, and the utilisation of the heated current of factory shafts, besides that such shafts are not numerous enough and are not always where they are wanted, is met with the same difficulty as that just touched on in regard to the shafts up the sides of buildings,—the great objection of most owners of factories to allow their shafts to be utilised in this way. The conclusion of the committee is that this system can only be usefully applied, with proper regard to economy of cost, at a few points in a system where there are special difficulties of ventilation or special cause for desiring very efficient ventilation; and this is the only reasonable conclusion that can be come to on the evidence.

In regard to ordinary pipe ventilation, there has been tried to a greater extent than many persons are aware of, generally to mitigate the nuisance arising from ventilating openings to the roadway. It is stated by the Commissioners of Sewers that 137 pipe ventilators have been constructed in the City, but that these "have not helped materially in reducing the nuisance from surface ventilators. In twenty-two of thirty-seven other districts in the metropolis, pipe ventilators have been to some extent used, and the total number of such ventilators provided by the local authorities in London appears to be 582, of which Lewisham has 149, the City 137, and Wandsworth 100. In twelve districts the pipe ventilators are reported as having abated nuisance, especially when used in connexion with surface ventilators. In five districts the pipe ventilators, it is stated, have not abated nuisance. Fulham states that the pipes have not materially abated nuisance, as in certain atmospheric states they are ineoperative. St. Saviour's



Southwark, states that the ventilating pipes had to be abolished, as they were a nuisance to the inhabitants."

In Bethnal-green and in the Strand district it was impossible to obtain the consent of the owners of property to the erection of pipe ventilators, and Hampstead and St. James's state that they can give no decided opinion whether such ventilators have abated nuisance. Lewisham has the largest number of pipe ventilators of any district, but the report from that district gives no certain opinion, only observing that "where the surface ventilators have been removed the complaints have of course ceased."

In regard to surface-ventilation the efficacy depends upon the number, size, and construction of the ventilating-shafts, and the general evidence taken on this head points to the conclusion that in many cases these are too few and far apart, and that nuisance would be diminished by increasing their number, and thus dividing the up-draught and rendering it less concentrated. The distance from each other at which the ventilating-shafts are placed varies in different parts of the metropolis from 17 yards to 600 yards. Twenty-nine districts report that it would be advantageous to increase the number of surface-ventilators, reporting variously in favour of distances of 20 to 50 yards apart, 60 to 80 yards, 80 to 100 yards, 100 to 150 yards; and one district says "not less than 200 yards apart." It may be taken as the result of present evidence that it is better to have a considerable number of ventilators in a given length than to have them at long distances apart; the possible nuisance in the latter case occurs at fewer points, but it is considerably intensified at those points.

Now it must be observed that the Report fully recognises the indubitable fact that one of the principal causes of nuisance arising from sewers lies in want of sufficient water-carriage and consequent stagnation. Having admitted this, and having stated that "the Committee are of opinion that the first and most important matter in connexion with sewers is the provision of water for flushing the sewers in dry seasons," it is somewhat surprising to find that in another part of the Report it is seriously proposed that the Board should apply for Parliamentary powers for the compulsory erection of pipe-ventilators in connexion with houses and other buildings. This is one of the examples of the illogical character of the Report. It is admitted that the only advantage of pipe-ventilators is to remove the effluvia further out of reach; that such ventilators, unaided by heat, act no better for their main purpose than surface ventilators (the evidence seems to show, as might be expected, that in some states of the weather they may be even less efficient); that pipe ventilators would be a real source of danger or annoyance to the occupants of houses unless they can be kept at a considerable distance from windows and other openings; and that the main cause of there being any nuisance at all is insufficient flow; and yet with all these admissions the Committee propose to apply for powers to compel the erection of pipe-ventilators. We venture to think that, on the evidence of their own Report, they have no chance of obtaining such powers, and that they are unnecessary and might be very liable to abuse.

A confusion of ideas seems to have dictated the paragraph in regard to the conditions of temperature in sewers and its effect on the ventilation. "When the temperature of the air of the sewer is lower than that of the external atmosphere, and no other influence is at work, the colder atmosphere of the sewer, being heavier than the external air, remains in the sewer; but when the outer air becomes colder and consequently heavier than the air in the sewer, it presses down through some of the openings to the sewer, and drives out the warmer and lighter air through other openings." This is noticeably the case on cool evenings in hot, dry seasons, at which time the nuisance from sewer ventilators is probably at the worst. It is, therefore, necessary to provide in sewers as, in all other ventilation, inlets or the cold air as well as outlets for

the warmer air." Considering that in this case the flow is assumed to be sometimes one way, sometimes the other, it is probable that the air will make its own inlets and outlets; but perhaps for the greater convenience of the air, the committee would have the ventilators labelled, like the approaches to a railway booking-window, "In" and "Out."

Again, after having distinctly stated that the real desideratum for preventing nuisance is sufficient and rapid water-carriage, the Committee, nevertheless, proceed to enlarge in their report on the value of permanganic acid for deodorising the contents of the sewers in hot weather; whereas what is really needed, according to their own showing, is an extra supply of water. In fact the report gives the idea of having been compiled by several persons, each with his own idea of the best treatment, which he takes opportunity to enforce in his own special paragraphs.

As to the question of the provision of ample water-carriage, the Report alludes to one method of using water in dry weather, so as to make it do double duty, for cleansing above and flushing below. "In the summer months the paved surfaces of the whole of the courts and alleys in the Holborn district are periodically washed with water taken from the company's mains. In this way not only are the surfaces of the courts and alleys kept clean, but the sewers below are well flushed out also." The Committee think that, if a similar course were taken in other districts, a large part of the nuisance from sewer-gas would be removed, in addition to the sanitary benefit in other respects. This is one of the most practical suggestions in the Report. In general, the difficulty of adequate and frequent flushing, or of keeping up a full and rapid flow in the sewers in dry weather, is in the cost of the water. Special means for the storage of rain water, to be used for adding to the volume of water in the sewers when requisite, seems the most practicable alternative. The initial cost would be considerable, but it might prove economic in the long run. In violent storms the sewers are nearly choked with water, and get well flushed at the time; but if the water thus tributary to run away could be stored and distributed for more frequent use, it would be turned to much fuller advantage.

Generally, the conclusions to be gathered from the facts stated in the Report are that a more rapid flow and a greater number of surface ventilators would almost entirely remove the sewer-ventilator nuisance, and that the rest of the recommendations in the Report are not much to the purpose, and in some cases almost cancel each other.

#### NOTES.

**T**HE recent case of *McLachlan and Cuckson v. Grant*, in which an architect and a surveyor sued a lady for a sum due to them for taking out quantities, would not have been noticeable except for the judge's observations in regard to the payment of architects. For as to the merits of the case it was simply a dispute as to the amount due. But Baron Huddleston expressed, as has often been done before, his opinion that the way in which architects are remunerated by the payment of five per cent. on the total cost of the work is very unsatisfactory. He also expressed a wish that the Royal Institute of Architects would take the matter into their consideration. Of course there are low-class practitioners among architects as among lawyers, and in each profession these members of it will run up bills unnecessarily against their clients. But it is as unreasonable to suppose that the bulk of the profession overcharge their clients as it would be to say that the bulk of solicitors make up improper bills. On the other hand, there is no doubt that the existing method of remuneration prejudices the architectural profession in the eyes of the public, and inclines them to dispense as much as they can do with the services of architects. In principle the system is not a good one, for the plans of a

house which costs 2,000*l.* may be as troublesome as those of one which costs 4,000*l.* It may be observed, however, that the Institute of Architects has really no more power than the Incorporated Law Society has on its part to fix the amount of remuneration due to its members. Any architect may charge by a fee, instead of by 5 per cent., if he pleases.

**I**N the same case referred to above, Baron Huddleston also went out of his way to remark that he should hold, until he was overruled, that an architect has no right to employ a surveyor to take out quantities without the consent of his client. This was a purely gratuitous piece of information, inasmuch as the question of the employment of a surveyor did not arise in the case, the only point being the amount of commission to be charged for the quantities. It may be as well for the learned Baron to inform himself as to former decisions on the subject; and if he will turn to Scott's Reports, vol. vi., p. 1, he will find that his opinion is opposed to that of four judges, namely, Chief Justice Tyndall, Justice Parke, Justice Collier, and Justice Bosanquet, who held that an architect has the right and power, without notice to his clients, to pledge his employers' credit to a surveyor for the quantities, and that in so doing he is acting as their agent (*Moon v. The Guardians of Witney Union*). There was another case (*Wright v. Attenborough*), in the Court of Exchequer, before Mr. Baron Martin, of a similar character, in which the plaintiff recovered (*Builder*, vol. xiii., p. 489).

**I**N reference to the construction of the dome in Mr. Emerson's design for the Liverpool Cathedral, which is, we believe, admittedly adopted from that of the tomb of Mahmoud at Bejapoor, and the Jumna Masjid at the same place, a correspondent writes:—"Careful measured drawings of the tomb of Mahmoud and other buildings in Bejapoor have been made by Mr. Cumming, C.E., under the superintendence of Capt. Hart. They are published in a folio volume, entitled 'Architecture at Bejapoor' (John Murray, London, 1866), and are well worthy of careful examination. The book is in the library of the Royal Institute of British Architects. Whilst writing the above, may I venture to ask what the plan is of the intersecting arches in Mr. Emerson's design? They surely must be in a vertical plane as in the two Indian examples, and cannot follow the curve of the dome. The interior perspective published in your journal seems to show the latter; for the wall immediately over the great arches is circular. This would be an impossibility, for the intersection of the eight great arches must form an octagon in plan. A triangular soffit is thus left between the octagon and the circle, which is covered in the Mahmoud tomb by placing brackets of varying projection underneath (see plan). If Mr. Emerson's dome were carried out, surely the walls and balustrade immediately over the pendentives would have to be octagonal, with the circular dome springing from behind, unless the same expedient of placing corbels under the soffit were adopted. In either case the internal effect would be materially altered."

**A** POINT of some interest has been decided in the recent patent case of *Otto v. Steel*, in which the question of the novelty of the invention of the well-known gas motor engines was raised. One of the objections to the novelty was that Otto's invention had been anticipated in a treatise by a Frenchman named Beau de Rochas. The only publication of the work, using the word publication in the legal sense, was that in 1863 a copy of the book was placed in the library of the British Museum. But Mr. Justice Pearson held that there was not a sufficient publication to invalidate a patent. It was not published (again using the word technically) in such a way that there was a reasonable probability that any person who wished might get knowledge from it. It had not, in the opinion of the judge, become



"part of the public stock of common knowledge." Of course, in each separate case it must be a question whether a book has become part of the public stock; but English inventors will, at any rate, derive comfort from the knowledge that their inventions are safe, although some foreign work which contains the same idea is reposing on the shelves of the British Museum.

AN international competition is advertised in the Italian papers for a design for a new west front to the cathedral at Milan. No fewer than fifteen premiums are offered, of a total value of 3,000*l*. The designs will be adjudicated upon by a jury of architects of different nationalities.

MR. HICKMAN, M.P., speaking at a meeting of the Wolverhampton Chamber of Commerce, on Friday last, gave his opinion as to the causes of the successful German competition in the iron and steel industries. He considers that one reason for the low prices of German manufactures is the low rate of wages and the longer hours made by the operatives of that country. They have another great advantage in the railway rates, which the speaker declared to be even lower than stated in the report to which we alluded in our article on this subject last week. He strongly favoured the proposal to construct a canal from Birmingham to London, for steamers of 120 tons burden, expressing his opinion that the cost of conveyance would thus be reduced 50 per cent. Several other canal schemes are being promoted, and the competition between land and water conveyance is likely to be carried on more vigorously than ever in both directions. Mr. Hickman brought a strong charge against the railway companies for excessive charges, and the preferential rates in favour of foreign produce in October, 1884, and a writer in the *Railway Official Gazette* of that month, commenting upon his paper, made the following remarks:—"Obviously the rates need revision, as the heavy traffic from the hardware districts is being carried in a much greater degree than heretofore by means of the canals; and, without taking a gloomy view, it is far from unlikely that on many such waterways steam haulage will set up a real and fresh competition with our railways, which it will be difficult to again completely overcome." Another thing which cannot be without significance to the companies is the removal of works to the ports, with the avowed purpose of avoiding the heavy railway charges. Messrs. Nettlefold, for instance, have now officially confirmed the report that they are about to remove their extensive steel and wire works to Newport, Monmouthshire, on this account.

WITH regard to the recent lamentable accident at Holloway (see p. 252, *ant.*), we are glad to see that the recommendation of the coroner's jury, to the effect that the Metropolitan Board of Works should endeavour to obtain powers enabling the District Surveyors to supervise the demolition of old buildings as well as the erection of new ones, was brought before the Board at its last meeting, and referred to the Building Act Committee for consideration and report. Attentive observers must often have felt the necessity for more adequate precautions in the conduct of demolitions, and this not only in the interests of the public at large, but for the safety of the men engaged in this often dangerous work.

THE celebrated arcade, called the Galleria Vittorio Emanuele, at Milan, designed by the late Professor Mengoni, and opened in 1867, has (according to *Il Politecnico*) fallen into a lamentable state of dirt and disrepair, and it is in consequence proposed to restore it. A discussion has arisen as to whether the original elevation of the interior shall be retained, substituting stone or some similar material for the plaster and cement in which the original design was executed, or whether a new and more simple design should be adopted for the interior, in order to avoid future deterioration of the surface from dust and damp. The

Milanese Society of Engineers and Architects recently passed a resolution to the effect that the Society was persuaded of the urgent necessity of a permanent and complete restoration of the arcade, and expressed the hope that such restoration should be carried out on the principle that the present architectural and decorative features should be respected as far as possible, introducing only such changes in the materials and workmanship as will, without altering the character of the building, render the interior facade absolutely durable and secure, and facilitate its being maintained in a simple and economical manner.\*

AN ingenious means of making good damage done by water getting under a lock-floor, without using coffer-dams and laying dry the dock, has been successfully tried on the Zuid-Beveland Canal, and is quoted in the "Foreign Transactions" published by the Institution of Civil Engineers. The lock in question rests on a pile foundation, supporting a timber floor on which the brickwork walls are built. The natural soil consists of fine running sand. For some time the earthen backing to the lock walls was found to be giving way, and considerable silting up had taken place in the canal bed, just outside the lock chamber. A hole was found in the apron of the lock floor, and there was a hollow underneath the floor itself. This was at first filled with puddled clay, but it had all been washed out again shortly after, and the sinking of the ground continued. Coal tar was then pumped down through a tube near the apron, at the upper side of the lock-chamber. This passed under the floor to the lower side, showing that continuous hollows existed under the lock-floor. An unsuccessful attempt was made to fill these by forcing down water and sand. It was then discovered that the timber piling was attacked by teredo worm, and that even the floor was not free from it. In 1882 it was determined to fill the hollows with concrete, of one part Portland cement to five parts sand. Eight holes were bored through the lock-floor, and the concrete was forced down through a tube so as to completely fill the space between the original soil and the underside of the floor. Thirty-seven metres cube of concrete was the quantity used, and this formed a hard mass underneath the floor. The traffic was only closed about seven weeks, and the cost of the work amounted in all to 177*l*.

THERE were 786 kilometres of new railway opened for passenger traffic in Germany in 1885 against 875.5 kilometres in 1884 and 916 in 1883. Of these, 580 kilometres were State railways and 206 kilometres were in private hands. The increase for the year is about 2½ per cent. on the length of lines previously open. The net return on the German railways averages 4.3 per cent. per annum, the co-efficient of working cost being 57 per cent. It will thus be seen that the main aim and outcome of the German lines is the facilitation of transport. The average cost of a mile of German railway is about 21,234*l*, against 42,017*l*. for a mile of railway in the United Kingdom. The gross receipts of the German lines amount to 10 per cent. on capital against 9.15 per cent. in the United Kingdom. But the Saxon railways, constructed at about the same average cost per mile, earn 11.9 per cent. gross revenue, and net 5.1 per cent. on capital.

ACCORDING to the official Year-Book of the Church of England, the funds raised by the voluntary contributions of societies and institutions organised and administered by the Church of England alone, during the last twenty-five years, amount to the large sum of 81,570,000*l*. This does not include bequests and voluntary offerings of which the Church of England is only a partial recipient, in conjunction with other religious bodies. And there is a large contribution from private sources which it has been impossible to bring

into account. Out of the sum above stated, no less than 35,175,000*l*., or upwards of 42 per cent., has been devoted to church building and restoration, building of parsonage-houses, enlargement of burial-grounds, and endowments of benefices. From this sum all grants from church societies and corporations are excluded. The published return does not divide the total under the heads above given. But however large be the allowance due to the last two heads, the allocation of a sum probably considerably in excess of a million sterling per annum to the purpose of building and restoration is certainly a matter of interest to both the architect and the builder.

THE accounts of the London and North-Western Railway Company, of which the published receipts for the half-year showed a decrease of revenue to the amount of 110,000*l*., on a total of 5,000,000*l*., show a balance sufficient to admit of a dividend at the rate of 7 per cent. per annum, against 7½ per cent. for the corresponding part of 1885, and 8 per cent. for that of 1884. The Great Northern Railway, with an increase of 26,000*l*. on a revenue of a little under 2,000,000*l*., maintains its dividend, at the rate of 6 per cent. per annum, declared for the corresponding half of the previous year. The Great Western Railway Company, with a decrease of 105,000*l*. on a revenue of 3,600,000*l*., divide at the rate of 6½ per cent. per annum, against 7 per cent. at the corresponding period of 1885; carrying forward a balance of 40,000*l*. instead of one of 35,400*l*. The accounts of the North London Railway Company show a balance sufficient to admit of a dividend at the rate of 7½ per cent. per annum. With these railway dividends should be compared the generally prosperous accounts of the tramway companies, and the 10 per cent. per annum dividend, with 1½ per cent. bonus, free of income tax, of the London General Omnibus Company.

EXTENSIVE changes are taking place in Rome. The embankment of the Tiber is being continued; the extension of the Via Nazionale to the river is being carried out, as well as the new street uniting the Via Angelo Custode with the Corso. This latter street, when finished, will make a continuous and nearly straight line of communication between the Corso near the Piazza Colonna and the new Spichover quarter and the new buildings at the Ludovisi and the Porta Pia. A new workmen's quarter is in progress at Mont Testaccio, a locality which will be remembered by students in connexion with the German artists' festival. Extensive building operations are also going on outside the Porta Pia, on the Prati di Castello and on the waste ground between the Lateran and the Church of Santa Maria Maggiore, which are rapidly changing the aspect of these parts of the city.

IN the last number of the *Revue Critique* M. Homolle gives an account of the results of the new explorations carried on at Delphi. We are glad that the glory of completing what years ago they began is to belong to the French Government. The remains of a Medisevian city have been laid bare, and the discovery in the field of classical archaeology, though not so sensational as those of the previous enterprise, are still full of interest for the history of the "island schools." Fifty fragments of marble sculpture have been found, besides terra-cotta and small bronzes. To these have to be added 224 fragments of inscription some dating as early as the fifth century B.C. none later than the first century B.C. They contain funeral inscriptions, dedication decrees, and choragic lists. One of them, six hundred lines long, and the whole, when edited, are sure to throw much light on the politics and commerce of the Cyclades. On individual monument we must note, a sculptured vase, signed by the maker Iphikides of Naxos.

THE excavations carried on in the Roman arena at Paris have just been rewarded with very interesting results. An artificial watercourse in excellent preservation has

\* Interior views of the building were published in the *Builder* for April 24, 1883, and February 4, 1882, and a plan of the entrance was published in our pages on July 1, 1883.



been laid bare, which evidently served the purpose of filling the circus with water on the occasion of mimic sea-fights. Enough of the structure of the door-posts remained to show that the entrance was closed by a door of extraordinary strength, which would indeed be needed to stem the force of the water. The hole which held the door-hinge is clearly made out. The excavators have further come upon a number of the seats for the spectators, and also on some fragments of a slab on which were inscribed the names of the dignitaries,—inhabitants of the ancient town of Lutetia, who had a right to seats of honour.

THE *Kölnische Volkszeitung* reports also an important Roman discovery. Within the precincts of the Roman castrum at Bonn a bronze statue of a "Victory," standing on a globe, has been found. The type is already familiar, the style of the workmanship is reported as belonging to the best Roman period. With the statue was found a splendid gold medalion set with rubies. Both of the discoveries are now in the private collection of Professor Weerth at Bonn.

THE collection of drawings by Mr. Herbert Marshall at the Gallery of the Fine Art Society, illustrating "the Scenery of London," is one of the most admirable and interesting of the smaller exhibitions now open. Mr. Marshall's fine and pure style in water-colour is known to all who are interested in contemporary art, and the subject of the picturesque of London architecture he has almost made his own, combining a fine sense of effect with a knowledge of architectural forms such as is not often found among painters who deal with architectural subjects. It is true that here and there we find drawings in which the attempt at special effect has rather obscured the truthfulness of the view. For instance, we should not at a glance have recognised the view entitled "South Kensington" (67) as a representation of the precise point selected; it does not convey the impression of the place at once; and the same may be said of a few (but only a few) others. Among those which are particularly good as combining effect with local truth are "Emmanuel Hospital" (18), "Lambeth, Early Morning" (19), "Whitehall" (21), "The Approach to Westminster" (24), "St. Giles, Cripplegate" (28), and "Sunrise in Broad Sanctuary" (34). A very effective drawing is that of "The Tower and River from Wrightson's Warehouse" (64), giving a point of view not, of course, familiar; looking over the tower and the river from a height. "St. Bartholomew the Great" (85) is a view specially interesting at the present moment. The collection shows how much of picturesque grouping exists in London, and on every ground it is an exhibition which none who are interested in London architecture, and in good and sound water-colour art, should miss seeing.

SIG. GIACOMO BONI, a young Venetian architect, whose researches with regard to the foundations of the campanile of St. Mark at Venice were recently noticed in these pages, has been recently elected a Corresponding Member of the New York Academy of Science.

SIR JOHN SAVILE LUMLEY, the British Ambassador at Rome, delivered a lecture on the 26th ult. before the British and American Archaeological Society at Rome, on the Galley of Tiberius on Lake Nemi, the

"Nemi navel'd in the wooded hills"

Byron, and the scene of Ernest Renan's romance "The Priest of Nemi." Frequent attempts have been made to discover the remains of the galley or ship or floating island, which is traditionally reported to have been sunk in a storm, but the only result has been pieces of timber, tiles, enamelled plates, andails, which have been brought up from time to time by the divers employed. The lecture was well attended, and was received with equent applause.

AT Messrs. Dowdeswell's Gallery in Bond-street is a collection of water-colour drawings by Mr. James Orrock, illustrating "the country of Scott," on the English and Scottish Border. Mr. Orrock's style is rather limited in its range of effects, but he possesses, as we have remarked before, a special gift in the representation of atmospheric effect under certain conditions: his rainy skies are full of rain and wind, his sea-coast scenes smell of the sea. A great deal of his characteristic power is illustrated in this collection of drawings.

WE have received from M<sup>me</sup>. Palladiense, of New Bond-street, some very excellent reproductions of pictures and studies of cattle by Verboeckhoven, an artist whose animal paintings are full of character and power of drawing.

IN reference to the elevation of Sir Edmund Beckett to the peerage, the *Times*, in giving its usual short biographical sketch of the new peers, after mentioning some things for which Sir Edmund Beckett is justly distinguished, adds "and he is an authority on ecclesiastical architecture." This extraordinary statement has been copied into newspapers all over the country. We presume the gentleman who does this work for the *Times* wishes to be accurate. It is a pity that he did not inquire from some authentic source of information before making this statement. Sir Edmund Beckett is not and never was an authority on ecclesiastical architecture. No person who does understand the subject would care a button for his opinion on it. His reputation in this respect rests solely upon the fact that he writes letters to the *Times* asserting that he is an authority, and that a number of dunces are silly enough to believe him.

#### CATHEDRAL FAÇADES.\*

THE rapid glance that we have taken at the work of these architects will enable us to realise the huge burden of originality which is expressed in the façades of our three English examples at Lincoln, Peterborough, and Salisbury. We will consider Lincoln first, as the fact that we see the front crowned by twin towers may seem to give it some points of comparison, though not of likeness, with the French façades; and, further, because it is certain that the designer of Peterborough, and probably also the Salisbury architect, observed and studied the Lincoln building.



The Norman Front of Lincoln.

The original west front of Lincoln Cathedral was built in Norman times by Remigius, and consisted of five semicircular arches of graduated heights; four of them remain as they were built; the centre one, which corresponded to the section of the Norman nave, having been replaced with a pointed arch when the front was expanded. The two outermost arches cover apsidal recesses like huge niches, and deeply recessed beneath the three central arches are the celebrated doorways, unrivalled at home for the delicacy and beauty of their sculpture. A little above these doorways the piers are crossed by a frieze of most interesting Early Norman bas-reliefs; but beyond this front exposed its sternly bare walling up to the delicate ornamental arcade

\* Continuation of a paper by Mr. A. Beresford Pite read at the meeting of the Architectural Association on the 26th ult. (see p. 251).

above the arches. Then came three enriched Norman gables, which were returned to the north and south, where they still exist behind the screen; and above all rose the two very beautiful later Norman towers, dedicated to St. Mary and St. Hugh. This original front must have formed a charming and picturesque group with its quaint disposal of plain and ornamental surfaces, bold light and shade, picturesque gables, and beautiful towers. The architect who would disturb all this must be bold to audacity, and possess some loftier and new ideal to replace this most satisfactory early front. The cathedral as we now see it was built from St. Hugh's choir westward, seemingly a tacit acknowledgment to the claims of the front to preservation; and though wider than the nave of Remigius it was still thought best not to disturb the west end, but complete the work against the eastern faces of the towers. Thus a bay of the Norman nave has been left between the towers; but the vault was rebuilt at a greater height, and with it, the central arch of the front. Two large and beautiful chapels were erected in the position of western transepts on either side of the nave, thus adding width to the front. When these works were completed, it was decided, in the episcopate of the celebrated Bishop Grosstete, that the Norman front, with all its impressive beauty, was not of sufficient scale and grandeur for the cathedral now in contemplation; but the front was too good and too well loved to be pulled down and replaced; and thus it remains to us, a striking instance of the preservation of an ancient building by those ruthless destroyers of historical monuments, the unrivalled architects of the thirteenth century; an exception to all their known methods of procedure.



The Façade Expansion.

The architect, whose was the task of dignifying the west front of Lincoln Cathedral, set about his task without hesitancy or fear; he conceived that this was an occasion which released him from all bonds of known precedent. The cathedral was practically complete, and a front had to be added commensurate with its importance. If he ventured to remove or efface the ancient front in obedience to his instincts, displeasure and perhaps dismissal would ensue. So, instead of enriching and decorating the bare Early work he decided to build upon and around it. He first removed the Norman gables covered with a curious diamond pattern that crowned the arches in front of the towers, and reared upon the delicate intersecting arcade, another of his own period, of very fully developed Early English design. This arcade reached up to the base of the new nave roof, and finished beneath a string that surmounted the central arch. The nave roof was terminated by a very fine enriched gable, and from its base line a massive Decorated parapet extended northwards and southwards in an unbroken horizontal line to the turrets which bound the façade. From behind this parapet the Norman towers, their faces covered with delicate arcading, almost piteously peeped, scarcely rising to the height of the gable that mushroom-like had sprung up between them. The architect's *coup de main* had reduced them to mere cyphers in the composition, as his façade was to consist of a central gable and long horizontal parapets of the severest outline, terminated by great octagonal turrets. The towers were not wanted in his ideal, and though not destroyed, were for a time extinguished.

Here we must remark what is an interesting Nemesis, if the architect had no ulterior intention of raising the Norman towers. Bishop Grosstete also prepared the base for a magnificent lantern, two exquisite stages of which only are his work, and there he had to leave it. The



next architectural generation raised upon it the unrivalled central tower, to complete the composition of the cathedral, which now possessed, besides the façade, the angel choir. There can be little doubt that such a lantern as this was conceived at the same time as the façade, though delayed an epoch in its execution. But did the architect dream that the spirits of those Norman towers of St. Hugh and St. Mary, whose light he so rudely sought to extinguish in days gone by, would again rise from behind his screen, drawn upwards from their sleep to the honourable and necessary function of balancing his now realised central tower? For we find that the erection of the elegant Perpendicular belfries upon the Norman towers followed the completion of the lantern, re-asserting their importance and dignity above the façade. This, we are conscious, is not detrimental to the success of the composition. An original designer is often apt to over-insist upon the emphasis of his particular idea, and Groulté's architect seems to have been so convinced of the power and dignity of an unbroken horizontal sky-line as to have overlooked the demands of the completed building for an imposing western group.

The circumstances of site and manner of approach are important considerations in façade design, and must here be dealt with. Lincoln Cathedral is situated on the edge of a great cliff, to which it presents its south elevation, and from which no direct approach can be gained. There was sufficient open space at the eastern end of the building to insure proper perspective for its grouping; but at the western end the precinct boundaries are close upon the church. No gradual view could be obtained of this front, which was practically invisible till the spectator had passed beneath the Exchequer gateway, and found himself within a few yards of the nave door, immediately opposite. No side view could be obtained to give the front perspective; the only view was a sheer elevation. This fact must have powerfully directed the architect's ideas to a façade without perspective or large features, for he spread a great curtain wall across the end of the church, and covered it with rows of small arches, whose size could be easily grasped by the eye, and whose repetition in regular tiers gave relief and leisure to the mind, while a company of statues enriched the upper arcades. The façade was expanded sufficiently not only to cover all the buildings of the west end, but also to occupy the whole plane of vision. Neither the transept, galilee porch, nor central tower can be seen till the corner of the front has been passed. The great width of the façade is a very interesting matter for thought, for other reasons besides those which we have just been considering. It was probably determined to obtain as good a proportion as possible for each half of the front, as it was only viewed from its central axis. All its horizontal lines between the parapets and ground are divided at the central recess. Each half of the façade is, therefore, proportioned to itself; but the entire expanse is too long, and requires the central group of towers and gable to give it dignity.

Though vastly differing in effect and treatment from the Lincoln front, the façade of Peterborough Cathedral is connected with it by such strong links, and by so many important points of resemblance, that the former might at first sight be thought to be the prototype of her neighbour, both in idea and execution. The resemblances, as we shall see, point distinctly to a close study of the Early Norman front of Remigius at Lincoln, and have but few points and qualities in common with the contemporary work of the thirteenth century. The architect of Peterborough Cathedral west front, shares many sympathies with the early Norman designer. They both appreciate the power of lofty arches, and the poetry of their continuous lines; both love the mysterious shades of the recesses, and also value the rhythm and lightness of the repeated crowning gables; both throw their façades forward in front of their buildings in an unbroken plane, obtaining grouping and distance, as well as massiveness and grandeur, by raising towers in the rear; both men also return gables against the north and south sides of the towers. These evidences of the appreciative study of successful Norman work by the thirteenth-century architect are most interesting, and mark him as a man with a truly great mind. With his work before us we feel that the designer of the Peterborough façade was possessed

with the loftiest order of genius; his conception stands alone in its mysterious, solemn impressiveness; the mind never seems to tire of trying to unravel the secret of its poetry and grace. Is it not idle to call it unrivalled? All through the ages till now men have wisely kept out of the lists of its competition, and left it alone in solitary wonderfulness. The genius of similar capacity has not yet appeared or can be looked for; and if the designer of Peterborough had conceived another façade, would not his genius have led him to leave this work unrivalled? Lofty architectural conceptions are not to be produced nowadays, by the reproduction of great ideals already attained, but only by following the instincts of the heaven-bestowed measure of the gift of design. Let not the beholder think the great arches possess the secret of success alone, for the spirit of Peterborough will laugh his arches to shame. If he would have arches for arches' sake, let him go to Rome and copy Caracalla's Baths, which he may be able to understand better than those of Peterborough.

Among the grounds upon which we can compare the west front of Peterborough with Lincoln, is its site and manner of approach. The cathedral precincts are reached through a gateway central with the front, from which it is separated by a square enclosed green. On entering, the eye is immediately filled with all the extent and glory of the façade; the suddenness of the *coup d'œil* is in astounding contrast with the stately sublimity with which this wonderful façade rises out of the earth; we are filled with an exciting enthusiasm for the triumph of the poetry of its arches over the prose of walls, and are charmed with the graceful lightness of its crowns of pinnacles and gables, and of towers and spires which set at nought the restraints of the horizontal line. Compare these effects with those obtained by the Lincoln designer of this period, where, when facing the building, he sought with huge breadth of wall and severe simplicity of line to impress the beholder; for the contrast is complete.

The striking beauty of pointed arches of great size in full view, can scarcely be appreciated when seen in the single span of a cathedral vault, or in a nave arcade, however lofty, as only one arch is completely viewed at a time. For this reason we can partly account for the special interest of the central pointed arch in the Lincoln front, which is displayed in an open field of wall. The magnificent Pointed arch in the centre of the Peterborough façade is such a one as would span the nave, the width of which is reproduced in its piers, enriched with all the beauties of thirteenth-century mouldings, bands, and carving. We must not stay to speculate upon the reasons which here determined that the Norman nave should be retained, and all effort concentrated upon the façade,—exactly the opposite counsel to that which prevailed at Lincoln. We are contented, though probably the architect viewed the lumpy old Norman nave which he had to retain with jealous contempt, for, instead of being restricted within the narrower confines of internal nave architecture, this supreme genius was set free to build the façade, and in so doing he has amply revenged himself upon the Norman nave.

The peculiar qualities and mysteries of nave architecture have been bestowed upon this façade. Observe the lowering shadows of his nave arches cast across the narrow side aisle walls upon the walls beyond, behind which rise the towers external to this nave; the clustering shafts and piers of his grand crossing arches; the refined internal surface arcading and doorways, in his aisle walls; the lofty, graceful windows inclosed in delicate interlacing arches; and the very perfect groining;—all the beauties of nave architecture are here, in hitherto unattained grandeur and scale, while the vaulting shafts spring up with pinnacles and spires to the blue vault of heaven.

We must now hurriedly pass on to the west front of Salisbury Cathedral, which resembles the later work of the Lincoln façade, being a curtain wall flanked by turrets; the nave gable is brought on to the centre of the front, and alone breaks the horizontal sky-line. The architect was, however, entirely without any restraint of site, the ample precincts offering unequalled opportunities for varying groups and piles, of which the best advantage was taken on behalf of the central spire, round which the building most beautifully groups.

This fact makes the reason for the choice of a façade for the west front, a matter of some mystery. There was no foreshortened building to be hidden, as the cathedral has no important direct road in front, nor was there rudor work to be surpassed or adapted. The façade is practically contemporary with the whole scheme, and must have been adopted from purely fanciful reasons. The fact that the arcades have been filled with sculptured figures can scarcely be taken as an indication that opportunity was required for such a display, which could only be afforded by a façade; for we do not find that the arches and niches are designed specially for this purpose, as a glance at the Lincoln tier of arches shows. The end of the nave is brought fully to the front with a majestic gable, great triplet window, and porches below which give direct access to the nave; and buttresses are placed on each side to resist the thrusts of the nave and triforium arches. Half arches spring from the outer shafts of the triple window to the buttresses. Large windows light the side aisles, and also have repeating halves that penetrate the buttresses, and above each of them are two windows to light the triforium. Within the simple and dignified lines of this façade, we find a most extraordinary freedom reigning, that must be called licence. As far as possible all continuous lines have been broken up, though the front is not in any way recessed; neither the great band of diamond ornament, or any of the arcades connect the wings of the façade with each other, and there are definite variations in the setting out of the arcades to prevent vertical lines from ruling the composition in the necessary buttresses which we have observed are covered by the arches, niches, and sculptures, so that when seen in façade elevation, their vertical lines should be as unobtrusive as possible. The very bold and striking band of quatrefoils inclosed in diamonds is broken at the centre bay, and a portion suddenly appears above the window, to be broken again over the middle arch. The arcades which enrich the turrets are allowed to return into the wall anywhere, and anyhow, as if all points of view except the front were occasions for recklessness. The side aisle windows are allowed to break up the magnificent band of figures which would have brought the whole front together, and done much to heal its weaknesses. The details are as beautiful as any other work of the thirteenth century; but there is such a loss of rhythm and continuity of line that we are inclined to think it all wasted. And the windows, too, which light the interior, seem, by their repeating arches, to desire to share the work of covering the front view arcades.

The two methods of façade design which came under our notice in considering the three French cathedrals, reappear at Salisbury,—viz., the proper expression of the building upon its exterior, and the desire to take advantage of the opportunities of producing grand imposing façades by the free use of architectural forms. Purely imaginative design inspires the later work at Lincoln, which transformed the front into a façade, and is the motive of the whole Peterborough design, where the architects' courageous treatment of their respective fronts released them from the duty of incorporating the internal arrangements within their façades. But at Salisbury this powerful handling was lacking, and the successful French method of compromise apparently unknown, unthought of; with the result that we find elements at war. The imaginative parts of the architect seem to cry piteously, "See what would have done if we had fair play. The nave windows,—how they have broken up the boldly-designed band of diamond and quatrefoil ornament! These aisle lights,—how they split up our family array of figures into mere handfuls! And these wretched buttresses how they tumble up and down to the distance of everything!" And, almost dog-in-the-manger-like, we hear the voice from interior remarking that "If they want a façade to must manage it without interfering with comfort." And this hopeless discord will go still the façade is pulled down, or, as there is too much light for the interior, the windows are blocked up.

We must conclude our consideration of the subject by taking leave of Salisbury as an instructive example of the difficulties and dangers attendant upon the design of a cat-



dral façade; which must deepen our appreciation of the tact with which the French architects arranged the difficulties of their fronts into successful compositions, and stimulate our enthusiasm for the bold originality, and the fine imagination, with which the architects of Lincoln and Peterborough stepped away from all hindrances, and triumphantly erected their magnificent cathedral façades.

The President, in opening the discussion, said that although the subject was one not at all easy of treatment in a short paper, yet Mr. Pite had handled it in a very thoughtful and critical manner. The first point touched upon was the effect of the central tower, which gives the utmost importance to the general design. In the case of Durham and Lincoln, one saw the combination of commanding position and of happy design; while in the case of Salisbury or Gloucester there was poor position for the cathedral, with excellent outline. Winchester, again, was poor both in general lines and position. There, it must be admitted, however, that Wykeham never finished his work, or he might have put a large central tower to balance the composition. The fact remained that at a short distance from the town, the cathedral, though large, was quite lost. The west front of Winchester was, perhaps, the simplest form of elevation-design that could be found, the lines of the sloping aisle and nave roofs being exhibited in the façade in a commonplace way. Lincoln, Peterborough, and Salisbury possessed, however, real *façades*, which had practically little to do with the buildings behind them. They were there for architectural effect and their own impressiveness. He believed they were all agreed that the west front of Peterborough was the finest in England. With regard to Salisbury Mr. Pite was right in what he said. From the eastern point of view it could not be called satisfactory, and the detail was not worked out in anything like a masterly manner. The west front of Wells Cathedral, although, perhaps, designed too much with the one view of giving a large field for the sculptor, was, at the same time, beautiful and suggestive. Tewkesbury and Dunstable were examples worthy of study. Turning to foreign façades that of Strasburg Cathedral stood foremost in the mere impressiveness of its first effect upon the spectator. At the same time they could not do better than accept Mr. Pite's opinion, that the best west front they could possibly study was that of Notre Dame.

Mr. W. J. N. Millard thanked Mr. Pite for showing the members his method of study, not bothering himself with the details, but going right to the root of the matter, and finding out the original design. It was uncommon for young students to take so broad a view of the subject. He proposed a vote of thanks to the lecturer.

Mr. Leonard Stokes, in seconding the vote of thanks, remarked that he had been rather struck by one point in the paper. Mr. Pite, on a former occasion, came to the conclusion that the plan of Peterborough Cathedral looked best upon paper when hung up on end. Now, however, the conclusion had been arrived at that Peterborough west front was the finest of any English Cathedral, and he agreed with Mr. Pite that it was a long way beyond any of the others in conception and completeness of scheme. He was afraid that Mr. Pite was going to praise Salisbury, which to his mind was hardly satisfactory. Notre Dame, on the other hand, was most satisfactory, the old architecture owing much of its beauty to the effect of the horizontal lines displayed in the design.

Mr. H. W. Pratt thought that Mr. Pite had brought this old subject before them in a somewhat new light. He had done well in limiting his remarks to three French and three English cathedrals. Great stress had been laid upon the west front of Peterborough, the effect of which, on passing through the gateway was that of vastness, leaving eventually the impression that there was a want of skill about it when looked at in connexion with the rest of the building. It seemed, therefore, a mistake to place the façade of Peterborough before the student as an example of what a west front should be. He did not know whether Mr. Pite considered it legitimate to design buildings in confined situations as façades, or in open situations where they could be seen all round, treat-

ing the façade as a façade in itself. When one had roamed about Italy, and seen how much the façade was thought of, and how shabby the back part was, one got sick of the fine fronts. He should be sorry if any one went away with the idea that in designing large buildings, he should study the main front so much, and not the perspective, the grouping, and the success of the building lines. In Gothic work the *raison d'être* was to keep the whole thing together, and not have one part independent of the rest of the building, while the exterior should represent not only the interior, but also the plan. In the case of Notre Dame the horizontal bands being carried straight through the façade, seemed to cut off the upper part of the towers from the building, and he rather preferred the carrying up of the vertical lines of the towers from the bottom. At Salisbury Cathedral the bands were not carried right across the façade, but still the effect was very good, as the connecting lines were carried across sufficiently by the eye.

Mr. F. G. F. Hooper remarked that Mr. Pite, in his treatment of the subject, had taken him by surprise. He thought that questions would have been raised with regard to the balance of parts, the fenestration, proportions of the doorways, and so forth. The illustrations before them contrasted strangely with each other with regard to the proportions of the doorways, and it would be an interesting matter for discussion to compare the several entrances. It had been said that the doorways of Notre Dame were like the entrances to bee-hives, and these were in contrast to the three grand arches of the west front of Peterborough.

The resolution was then put, and very cordially received.

Mr. Pite, in returning thanks, asked if he was stating something awful in saying that no great architect had really accomplished a grand imaginative work without having what was called a "sham" in it? He did not like the term "sham"; it was a miserable word. To call the façade of Peterborough Cathedral a "sham" was positively intolerable. In spite of Mr. Pratt's special pleading, he could not agree with him as to the west front of Salisbury Cathedral. It was too much to say that the towers of Notre Dame were cut off, as they were in one plane with the rest of the front.

#### EDINBURGH

##### ARCHITECTURAL ASSOCIATION.

THE usual fortnightly meeting of the Association was held, on the 4th inst., in the Professional Hall, the President, Mr. G. Washington Browne, in the chair. After the usual preliminary business, Mr. Simon read a paper on "Wood-carving, with special reference to Germany." Remarking that the art had been practised from the earliest ages, he proceeded to trace its development from the rudely-carved handles of implements in the stone age, and of its application to domestic utensils in the ages immediately succeeding that. According to Pausanias, the statues were carved in wood, and this material continued to be so employed down to the Middle Ages, many examples still remaining in the cities of Germany, France, and England; but the art has long been applied to the interior decoration of churches, houses, furniture, &c. Referring to Germany, where it had reached its fullest development, especially in the numerous altarpieces of the fifteenth and sixteenth centuries, Mr. Simon observed that of the various schools, the Swabian claims pre-eminence, with Ulm as its chief centre, where the celebrated carvers, Jörg Syrlin, the elder and younger, executed numerous beautiful works, especially the choir stalls in the Cathedral of Ulm, Augsburg, also an important seat of this school. Its influence spread far into Switzerland and Bavaria. The lecturer referred to the works of Michael Pacher in Austria, and those of the celebrated Veit Stoss. The latter belonged to the Nuremberg school, but for a while was resident in Krakow, in Poland, where he executed a large altar-piece in the cathedral between 1477 and 1484. Other masters of this school were then mentioned, with a notice of medallion portraits executed in wood; some of them, of great merit, being in the Louvre in Paris; and the hope was expressed that the art may yet be restored to the place in public estimation which it formerly occupied. At the close of the meeting, a hearty vote of thanks was awarded Mr. Simon for his paper.

#### TECHNICAL EDUCATION FOR ARTISANS IN IRELAND.

In a "Note" a fortnight ago (p. 192) reference was made to the mention by Mr. Philip Magnus at the Plumbers' meeting of the useful work which has been carried on in Dublin for some time past by Mr. W. R. Maguire. By a coincidence, Mr. Maguire read a paper on "Technical Education for Artisans" at the general meeting of the Institution of Civil Engineers of Ireland, held in Dublin on Wednesday, the 3rd inst. The paper included a comprehensive view of what has hitherto been done at home and abroad in the way of providing technical education for artisans. "Real technical education" was defined by Mr. Maguire to be "that which applies the principles of the natural sciences to the practice of the mechanical arts and industries connected directly with the future careers and occupations of the students." The following extracts from the paper have special reference to the needs of Ireland in this matter:—

"It seems to be most important to the future prosperity of Ireland that facilities for technical education, in the industries suited to our circumstances, should be offered to all who may be competent to profit by it, that our country may be given a supply of properly-qualified technical teachers, and that a more abundant and suitable supply of young people may be presented for technical training.

In any scheme of technical education for artisans in Ireland, there may be five grades or sections properly defined for consideration and arrangement:—

1. Primary education outside, but leading up to the point whereof of fourteen are fitted to commence a course of technical training.
2. Daily secondary technical education for persons who can afford to devote time for two or three years to a complete system of technical education, to fit them as foremen, managers, builders, with use of laboratories and workshops.
3. Evening technical education for apprentices and artisans engaged at their work by day, with lectures, and use of laboratories and workshops.
4. Technical art education, as applied to manufactures.
5. Higher technical instruction for employers, managers, and technical teachers, with lectures, demonstrations, and opportunities for original research in laboratories.

In all these grades proper and ample provision should be made alike for male and female education.

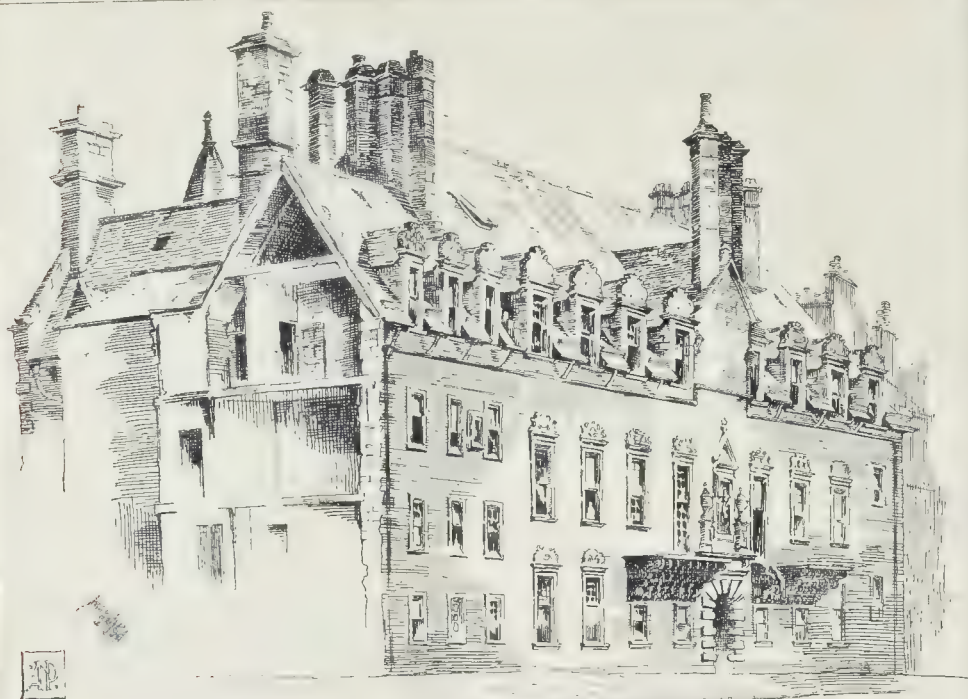
In Ireland the want of technical instruction is greater than in England or Scotland, because we want here to recover lost and to create new industries. It is well also to bear in mind that the classes for whom this special education is so urgently required are not able to pay for it, are not likely to clamour for it, and when it is provided, may need considerable inducements to cause them to accept it at first, and for some time. So that unless the State, the municipalities, or individuals, singly or in groups, will voluntarily urge on and assist the establishment of such institutions, and will maintain them even in the face of much discouragement, we may be sure that our Irish industries will remain at a low ebb.

The primary education of the children of artisans, farmers, and the lower middle classes in Ireland is almost exclusively under the National schools system.

The primary education of children of all classes, apart from questions of social position, which, by the way, are more considered in Ireland than in any other country in the world, might with advantage be the same in degree and in kind for all children up to the age of twelve; here the kind and degree of education must necessarily begin to differ, for some children must soon after be earning their living, while others, whose parents intend them for higher industrial or commercial pursuits, or for professions, will continue their education for many years. For children of artisans up to twelve or thirteen years of age, we may be content with the National schools, provided always that rudimentary drawing, elementary geometry, and the use of ordinary tools be included in the compulsory curriculum of that system of education. If the National Board will revise their class-books, to afford better rudimentary instruction in science, and will furnish their children with instruction as well taught as their reading, writing, spelling, and arithmetic, the children will be placed in the very best possible position, and with the requisite knowledge to enter the technical day schools or night classes.

In recommending the teaching of the use





Old University Buildings, Glasgow.

of tools to young children, let it be quite understood that such teaching is simply intended as useful discipline for the eyes and hands, an exercise for the senses of sight and touch, to quicken the perception of form, size, roughness, straightness, and measurement, and to encourage general handiness; but not to teach any handicraft, not to occupy any of the time required for other studies, and not to have any bearing upon the terms of apprenticeship.

The teaching of the use of ordinary tools to ordinary children at an early age would have a very important and useful effect, especially on the Irish nature; it would tend to break down absurd class distinctions; it would teach that there was nothing derogatory in handwork; it would tend to abolish the stupid idea that the clerk at his desk is in a higher grade of life than the artisan at his bench; it would show that a steel file was as noble a tool as a steel pen, and even less liable to create mischief in the world; it would most surely have a tendency indirectly to develop tastes which would turn many likely youths to honourable and well-paid manufacturing industries, instead of to the over-crowded, badly-paid, drudgery of clerkship.

In concluding his paper, Mr. Maguire thus recapitulated the requirements of technical school promoters in Ireland:—

- 1st. That primary education in the national and other schools in Ireland be remodelled and made compulsory.
- 2nd. That technical schools, as described, be established in every city and town in Ireland, to prepare young artisans for their trades, both in day schools before they engage in actual work, or, as continuation, evening schools during their apprenticeship term.
- 3rd. That the apprenticeship customs be encouraged and re-established, with clauses in indentures to compel apprentices to attend evening technical schools.
- 4th. That employers support and encourage technical schools, and employ only such artisans as show the desire for technical improvement by attendance on technical classes.
- 5th. That the State aids liberally with funds the efforts made to establish and maintain primary, intermediate, and higher technical education, through the length and breadth of the land.
- 6th. That the artisans and apprentices should themselves appreciate and take advantage of the benefits offered by technical schools.

In olden times, added the lecturer, success in manufactures and commerce was greatly due to

local advantages, but now, owing to the progress of engineering, industrial competition has become one of intellect, and the best educated nation, as well as the best educated artisan, will henceforth be the most prosperous. This paper has been written in the hope that it may, in some degree, tend to show the greatness of the need for the technical education of Irish artisans, and may thus far help to supply that need, and secure the resurrection and future success of our lost and languishing industries."

#### THE PROPOSED CATHEDRAL AT LIVERPOOL.

A MEETING of the Cathedral Committee was held at the Walker Art Gallery, on Tuesday, for the purpose of further considering the designs sent in by the architects. The bishop of the diocese occupied the chair, and there were present Sir W. B. Forwood, Mr. Arthur Earle, Mr. W. Bartlett, Rector Stewart, the Rev. John R. Eyre, Mr. Alfred Turner, the Rev. S. Wilkinson, and Canon Warr.

It was moved by Sir W. B. Forwood, seconded by Canon Warr, and resolved:—"That Mr. Ewan Christian be invited to inspect the plans of the competing architects and furnish the committee with his report thereon at the earliest possible moment."—*Liverpool Post*.

#### Extensions at Woolwich Arsenal.

Several new buildings of a large and costly character are being erected at Woolwich Arsenal. They include a new torpedo factory, which will cover about an acre of ground. The brickwork contract for this building has been taken at 7,000l., and in clearing the ground for it, a large timber-built storehouse has been removed bodily on rollers across a roadway, and on to a vacant piece of land one hundred yards distant. The cartridge factories are likewise being enlarged, and new stores and workshops are being erected for the Royal Gun Factories and the Royal Carriage Department, whilst a second main is being laid down for hydraulic purposes between the Royal Arsenal and Shooter's Hill.

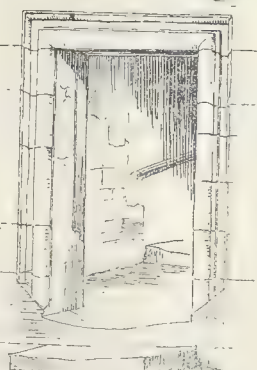
#### OLD COLLEGE BUILDINGS, GLASGOW.

This interesting old building, in which the business of the more ancient of our two great Scotch Universities was conducted for about two centuries and a quarter, stands in the High street of Glasgow, and is at present used as a railway station. The *profanum vulgus* throngs its courts and carmina non prius audita shrill against its grey walls.

To meet the ever-growing requirements of *Alma Mater*, the University migrated in 1870 to the beautiful pile of buildings erected in the west-end of the city by the late Sir Gilbert Scott, and the old buildings have suffered a partial demolition, which is soon to be completed. It is, however, satisfactory to be able to record that the principal gateway in the facade, with which so many historical associations are connected, and which yet recalls many a student's prank and many a student's triumph to the memory of the present generation, is to be preserved and re-erected as a gatehouse to the grounds of the new building.

The old college was commenced in the thirteenth century, and, after many struggles with the adverse times and the solicitation of subscriptions from all classes of the community, was completed about 1660. The original subscription list, which is still preserved, is headed by King Charles I. with a donation of 200l., entered in his own hand-writing, dated at Seton in 1633, and a note is added that this sum was paid by the Lord Protector in 1654.

Mr. Billings, in his "Baronial and Ecclesiastical Antiquities of Scotland," in which there are five valuable and interesting sketches of the buildings, says of the general style of the edifice that it is a mixture of the English Elizabethan with the peculiar architecture which Scotland borrowed from France in the seventeenth century. It has the balconies, the tall rectangular chimney stalks, corner turrets, and the variously-decorated window tops of the former; while the narrow rocket-topped towers of the latter, polygonal or circular, are conspicuous in the quadrangle. The massive



Old University Buildings, Glasgow.

## BRITISH ARCHÆOLOGICAL ASSOCIATION.

At the meeting of this Association on the 3rd inst., the chair was taken by Mr. Geo. R. Wright, F.S.A. It was announced that the Bishop of Durham had suggested July 26th for the commencement of the congress, to be held in the county of Durham under his presidency, and that the council had agreed to the date named. Visits will be paid to Durham city and cathedral, Raby Castle, Finchale, Dinsdale, and many other places. Mr. Loftus Brock, F.S.A., exhibited a collection of ancient engravings of German and Flemish towns, mostly of sixteenth-century date, showing the system of Medieval fortification, fortified bridges with tower and barbican, and many interesting details of early arrangement. Among the number was a bird's-eye view of the Abbey of Einsiedlen. Etton church, Northants, was described by Mr. J. T. Irvine, and illustrated by some well-executed drawings. Mr. Earle Way reported the recent discovery of a series of brick arches, the basement of a portion of the Duke of Suffolk's palace in the Borough, Southwark, which were revealed during some works of rebuilding on the site. A large number of fragments of pottery were exhibited, but these indicated the earlier occupation of the site by some Roman building, since they were the work of that people. A paper was then read by Mr. Brock on behalf of its author, the Rev. C. Collier, of

Andover, on the remarkable excavations now in progress at Winchester Cathedral, under the direction of the dean, and referred to at length in another column of the *Builder* this week. About 5 ft. of earth is being removed from the base of the cathedral walls, and search for the site of the new minster has been rewarded by the discovery of the wall, apparently of the south side of the church, which stood parallel to the cathedral. The ancient crypt of the latter is also being cleared out. An old record of ancient earthworks at Alfriston and Wolstonbury was then read, prepared by Mr. A. Cope.

## ROYAL SCHOOL OF MINES.

PROFESSOR WARINGTON SMYTH, F.R.S., in continuing his lectures upon mining, in the theatre of the Geological Museum, Jermyn-street, devoted his attention to the various means by which ground of a watery or loose character may be driven through. After commenting upon the ordinary method of *spilling*, he directed attention to the Thames Tunnel as being one of the most instructive pieces of work of the kind, the history of which ought to be studied by the student with every care. Two failures had already taken place in an attempt of a similar kind, one at Gravesend in 1799, and the other at Rotherhithe in 1801. The second one had been carried 923 ft., and to within 150 ft. of the opposite shore, but difficulties of an insuperable character were then met with, and the work was abandoned. Brunel, the engineer of the Thames Tunnel, sank a shaft 50 ft. in diameter 150 ft. from the river on the Rotherhithe side. He effected this by constructing on the surface of the ground a substantial cylinder of brickwork of 50 ft. diameter, the walls of which were 3 ft. in thickness, and 42 ft. in height, and then by raising the earth from the interior was enabled to sink the whole structure to a depth of 65 ft., when a smaller shaft 25 ft. in diameter was put down. By this means he was able to pass through the bed of gravel and sand 26 ft. deep, full of water, of which geologists had advised him to beware, and which, in fact, had rendered the second attempt previously referred to impracticable at the last moment. At a depth of 63 ft. the horizontal excavations for the body of the tunnel was commenced. The whole area of the excavation, which was 35 ft. in breadth, 22 ft. 6 in. in height, and the base in the deepest part of the river 76 ft. below high-water mark, was constantly covered and supported by an iron shield. The shield consisted of twelve great frames, lying close by each other, and which frames were 22 ft. in height and 3 ft. in breadth. They were divided into three stories, thus presenting thirty-six chambers or cells for thirty-six workmen. While the miners cut down and secured the ground in front the bricklayers were simultaneously engaged in carrying forward their work.

## Illustrations.

## LIVERPOOL CATHEDRAL DESIGNS.

WE give this week a view of the central western porch of Messrs. Bodley & Garner's design, a view in the choir, and the two principal sections. The longitudinal section shows the seating of the great central spire. The view in the choir shows how very closely the architects in this portion of the building have followed the suggestions of Lincoln Cathedral.

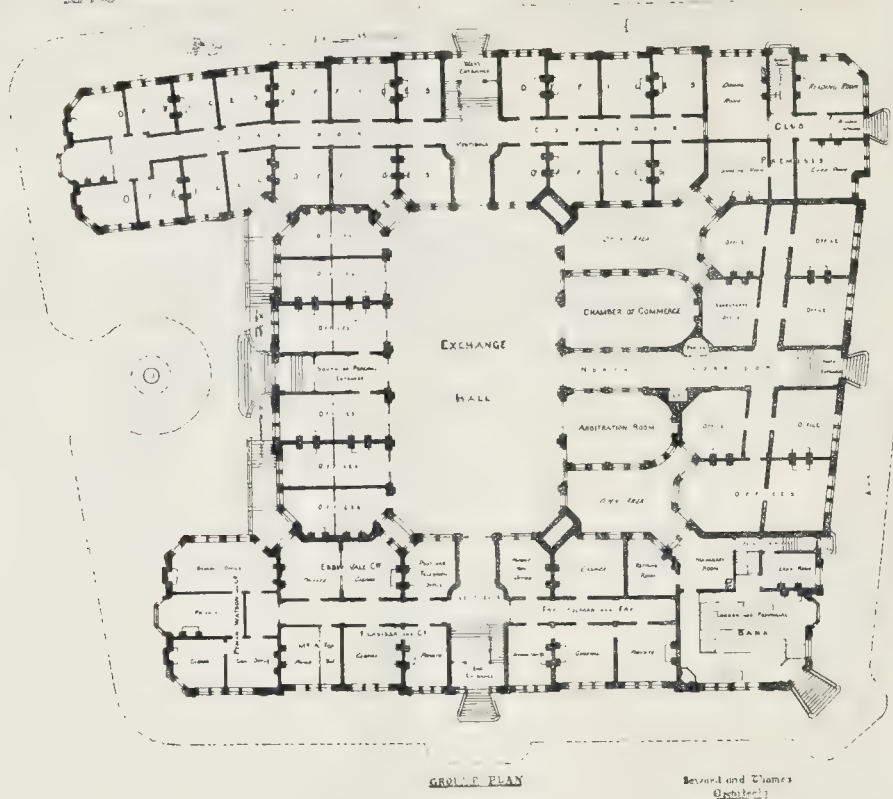
We may observe that in one of the exhibited drawings the architects have introduced an alternative loft, cutting off the large spire and showing the great lantern only. The effect, though very different in regard to the whole balance of the composition, is perhaps not inferior to that of the spire, and does away with all idea of constructional risk. In a future number we will give the remaining longitudinal elevation in this form, so that our readers can judge of the effect.

We should observe that the lithographs of the longitudinal section and the view in the choir are somewhat deficient in clearness of definition, owing to the fact that they had to be photographed at the Liverpool Exhibition under very disadvantageous light. As the defect is from causes beyond the lithographer's control, we think it better to give the illustrations, merely explaining the cause of their partial defect.

stair, with its stone balustrade, surmounted by curious old carvings of the Scottish lion and unicorn, mentioned by Mr. Billings, has been removed to the new building at Gilmorehill. The sketches show the principal façade, with its arched gateway and sombre windows, and a doorway and turret top in what was the principal quadrangle. There are also some details of the richly-ornamented window-tops, and of a curious old leaden rhone from the front of the building.

**Highgate School.**—The roof to the apse of the school chapel, which is dedicated to St. Michael and All Angels, has just been richly decorated. The surface which has been treated is divided by curved ribs from the apex into five compartments, which are each subdivided into three panels. The lower and largest tier of panels is filled with figures in groups of three, representing St. Michael, supported on either side by the other Archangels, with the Virtues, Principalities, and Powers, all being painted in colours on a gold background. The panels above are filled with constellations in raised gold on a blue ground, and above that again plain gold radiating from the apex. The ribs, mouldings, and cornice are picked out with gold and colours. The work has been executed by Messrs. Heaton, Butler, & Bayne, of Garrick-street, under the supervision of Mr. C. Pemberton Leach, architect, of Conduit-street.





The Exchange Buildings, Cardiff.

## THE NEW EXCHANGE, CARDIFF.

The new Cardiff Exchange, as we briefly stated last week, was opened on the 1st inst. It has been erected by a limited liability company on a site in Mount Stuart-square, from plans prepared by Messrs. Seward & Thomas, architects, Cardiff. We give a view and plan.

At starting, considerable difficulty was anticipated in meeting with proper foundations for so extensive a building, but it was not until actual trial shafts had been sunk by the builder, Mr. Burton, of Cardiff, to whom the contract for the first part had been let at 25,550*l.*, that the true state of affairs in this respect was ascertained. The site was then found to be composed almost entirely of the alluvial mud which prevails in that district. The substratum was here found to be about 30 ft. in thickness, and of the consistency of butter. In certain places, also, the ground had been honey-combed and filled in with slag from the old Cardiff Glass Works, which existed about half a century ago on that portion of the moorlands now occupied by Mount Stuart-square and its surroundings. Few more serious problems could present themselves to everyone concerned than to erect a large building upon such ground as this, and a solution of the difficulty was regarded, not only with anxiety, but interest.

After considerable deliberation, the directors agreed to the proposal of the architects to excavate the mud until the gravel was reached. When this had been accomplished it was obvious that, owing to the large number of buildings in close proximity, it would be dangerous to proceed in the customary manner with trenches for foundations, so the plan adopted was that of sinking a series of shafts, but these had necessarily to be very small, owing to the treacherous nature of the surrounding mud. Concrete was then filled in, and upon

the piers built thereon were constructed massive arches, on which the whole building has been erected.

The present block, which covers the eastern part of the quadrangle, is formed by a centre pavilion and two wings covered by Mansard roofs, surmounted by lantern lights, which transmit daylight into the corridors traversing the building. The eastern block contains a large central hall, 100 ft. in length, 50 ft. in breadth, and about 50 ft. in height, which has been opened as the Cardiff Exchange. A broad flight of stairs leads up to the centre of the building, from the vestibule of which corridors lead on the right and left to suites of offices. The Exchange Hall is entirely surrounded by galleries giving access to the offices which flank it. These galleries are constructed on iron cantilevers. The roof is carried on massive semi-circular ribs of iron, the spandrels of which are decorated with volutes and scrolls of iron. An effective design of pilasters and arches covers each end wall of the hall, and the tympana of pediments in the upper part or filled with figure designs in *sgraffito* work. The designs are emblematic of Commerce and Industry. They are the work of Mr. Wormleighton, of Cardiff, as also is the carving throughout the building. The floor is covered with a design arranged in large panels of Maw's styles, with a margin containing prismatic pavement squares, giving light to a corridor in the basement. Small moveable offices, constructed in oak with tinted glass panels, made from the architects' designs by Messrs. Lewis & Lewis, Cardiff, will be placed on each side of the hall.

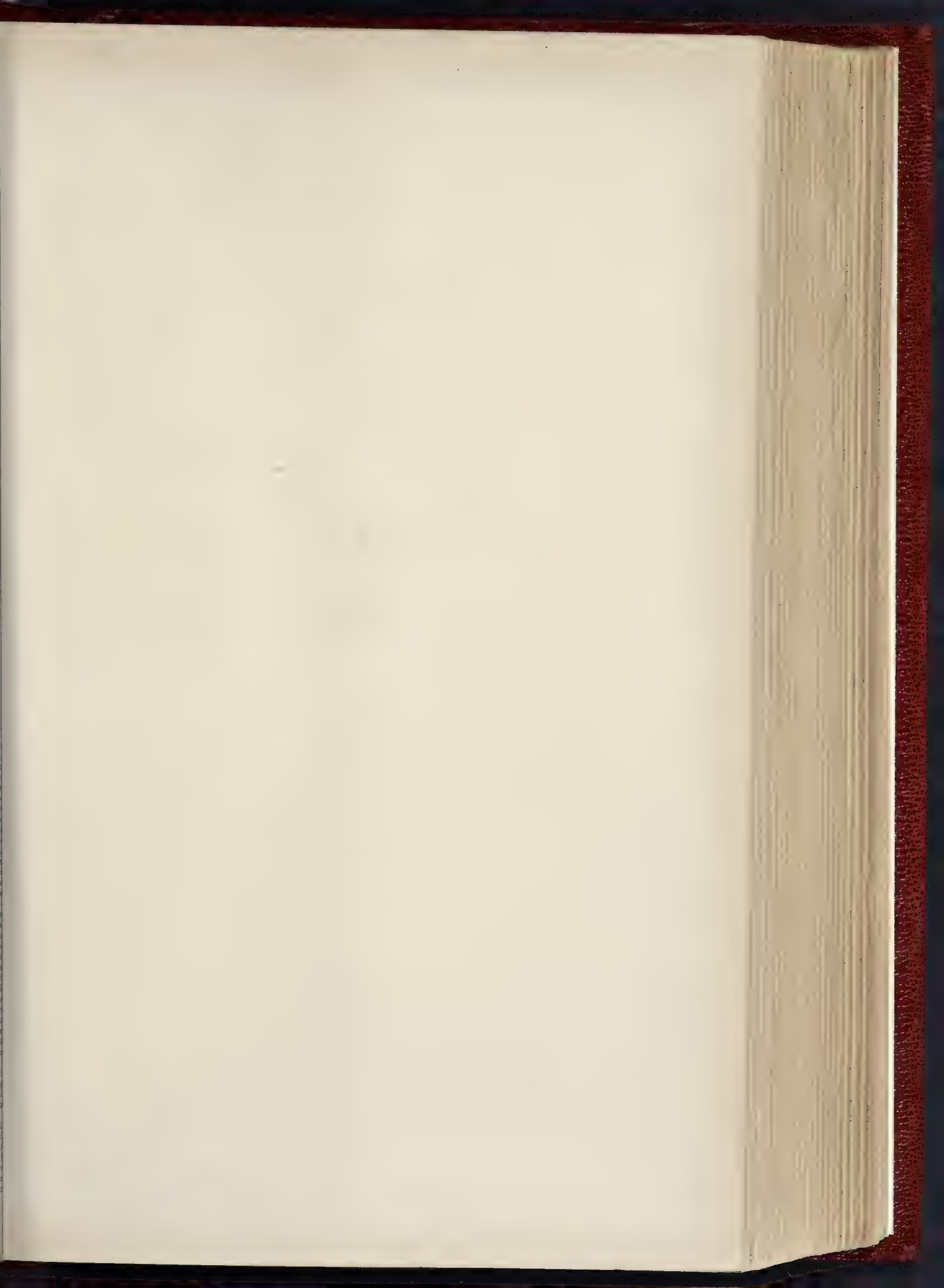
As stated above, the general contractor was Mr. C. Burton, of Cardiff. The wrought-iron roof-principals were supplied and fixed by Mr. A. D. Dawney, of London; the heating apparatus is by Messrs. James Allen, Sen., & Son, Glasgow. Messrs. F. Whitfield & Co. supplied the strong-room doors in the bank basement; and Mr. S. Evans, of West Smithwick, exe-

cuted the lead glazing, to the architects' design. Mr. J. Woodman, Cardiff, laid the gas main which are taken under the different corridors' false ceilings, with branches to the different suites of offices, and has supplied most of the fitting. The main staircase is of Stuart's "Granolithic" stone, with an ornamental cast-iron balustrade, by Macfarlane & Co., who also supplied the railing to the galleries around the Exchange Hall. The handrail of the staircase is in teak, and those to the galleries in pine, all handsomely moulded to special design. Messrs. Cordingley supplied the plaster enrich frieze panels in the hall; whilst the ornamental capitals were specially designed and modelled by Mr. Wormleighton.

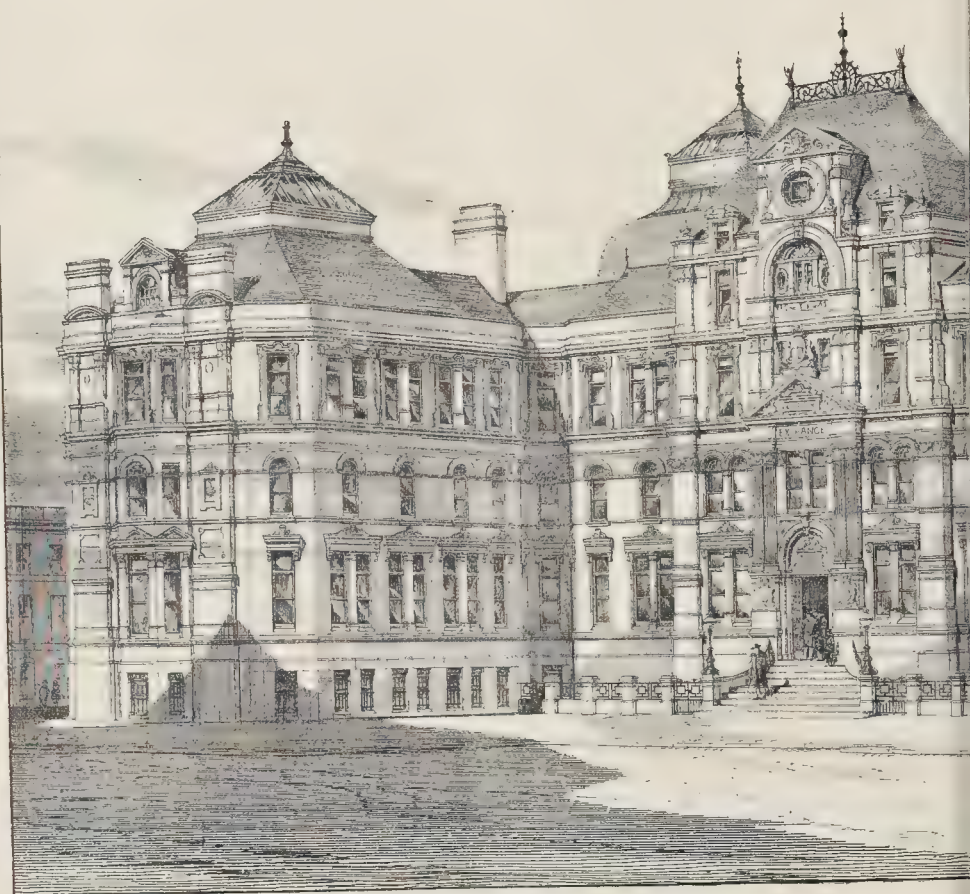
The false ceilings under corridors above referred to are utilised for the telephone-wires, as also for the zinc pipes by means of which the foul air from the different offices is conducted to a central ventilating extraction-shaft, 70 ft. high, which is heated by an iron flue-pipe from the boiler, assisted by a series of gas-jets, which will be lighted when the heating apparatus is not at work. The whole of the works under contract No. 1 have been executed in about 18 months to the satisfaction of the architects, Messrs. Seward & Thomas. Mr. F. J. Veall acted as architects' assistant and clerk of works since the commencement, and Mr. W. Williams was the contractor's foreman.

All the principal offices are occupied, and since the opening on the first inst. a large amount of business has been transacted daily in the New Exchange, which will doubtless be found a great convenience.

The contract for the southern block, now under course of erection, has been let to Mr. F. Lock, of Cardiff, for 5,300*l.* This work has been in progress about two months, and is expected to be finished by October or November. It will comprise an addition to the restaurant premises, rooms suitable for coffee-tavern purposes, and suites of offices.







Architects: J. & J. Smith

THE NEW EXCHANGE BUILDINGS

MAY 13, 1886.

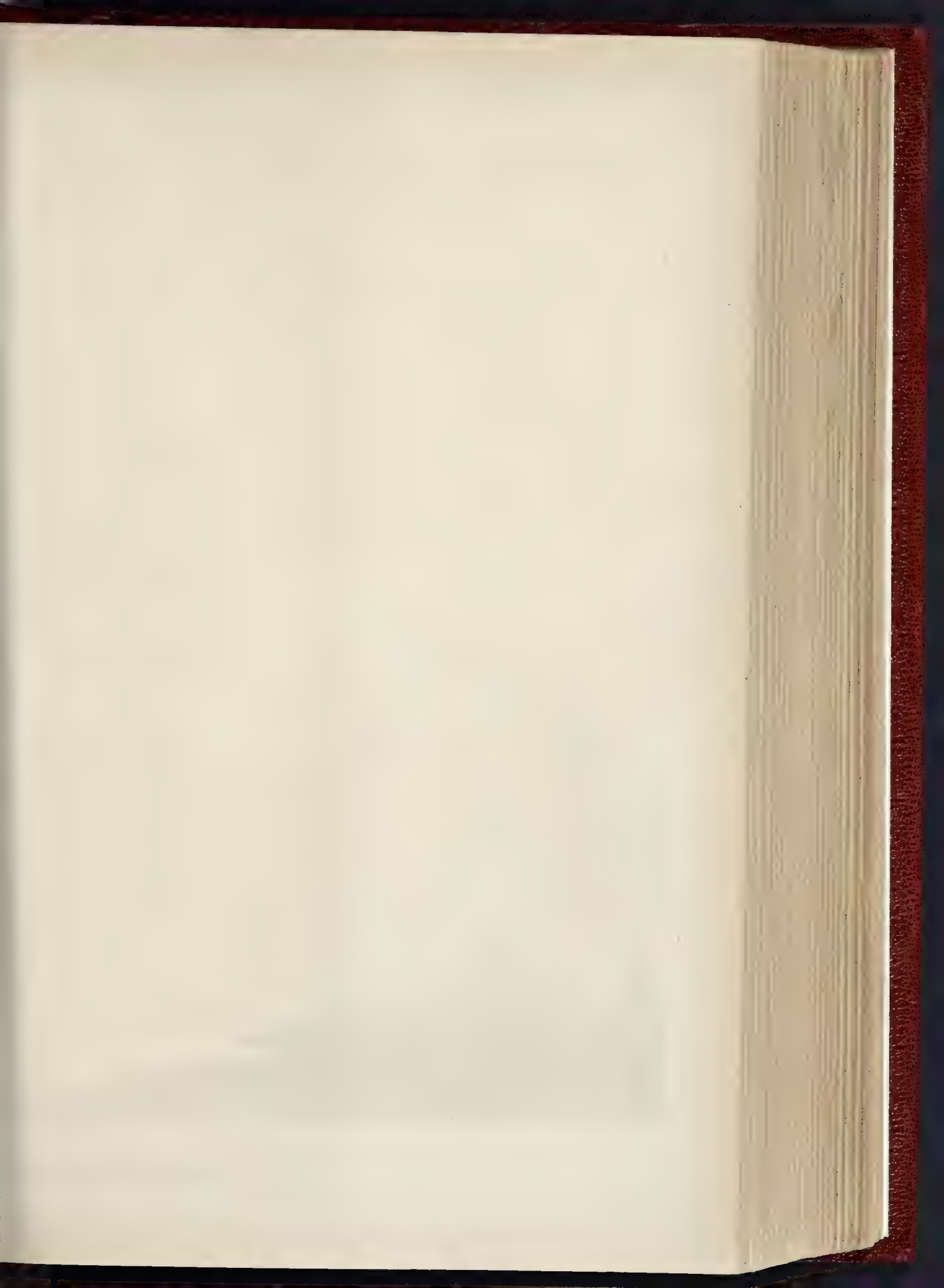


Opposite St. Louis, W.

MESSRS. SEWARD & THOMAS, ARCHITECTS.

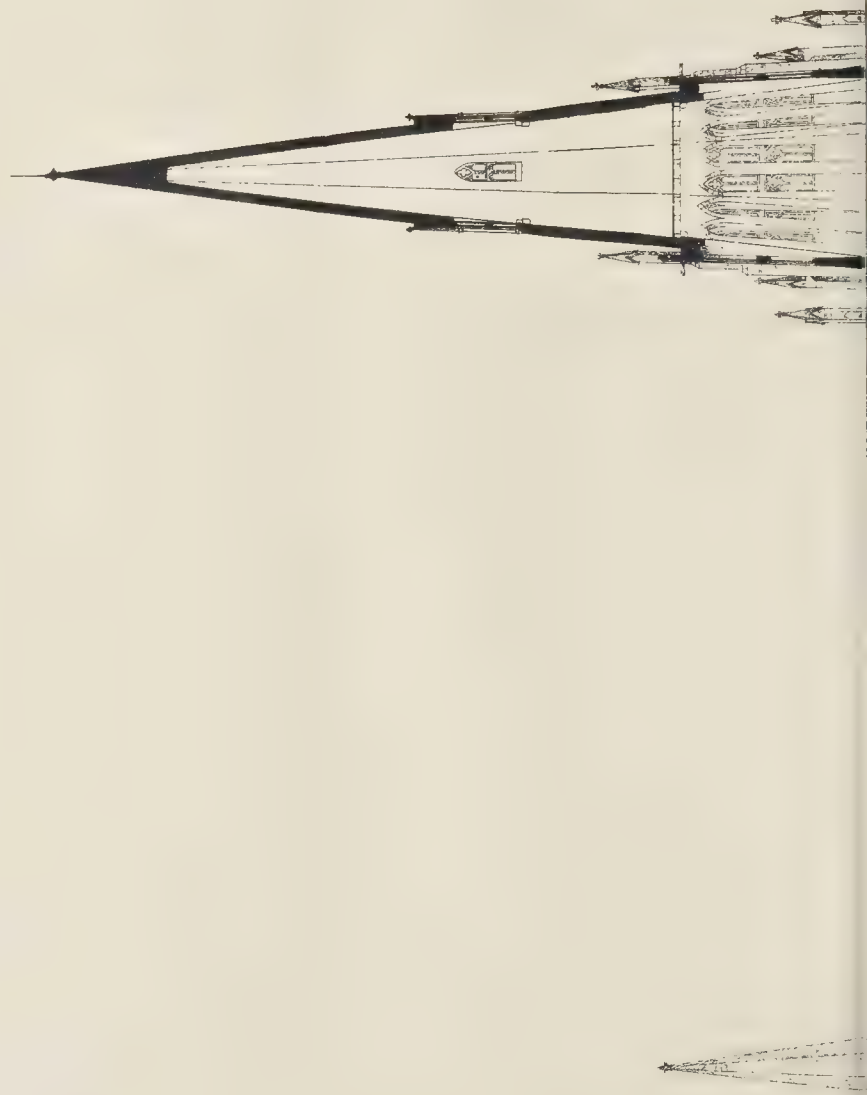








THE BUILDER, FEBRUARY 13, 1886.



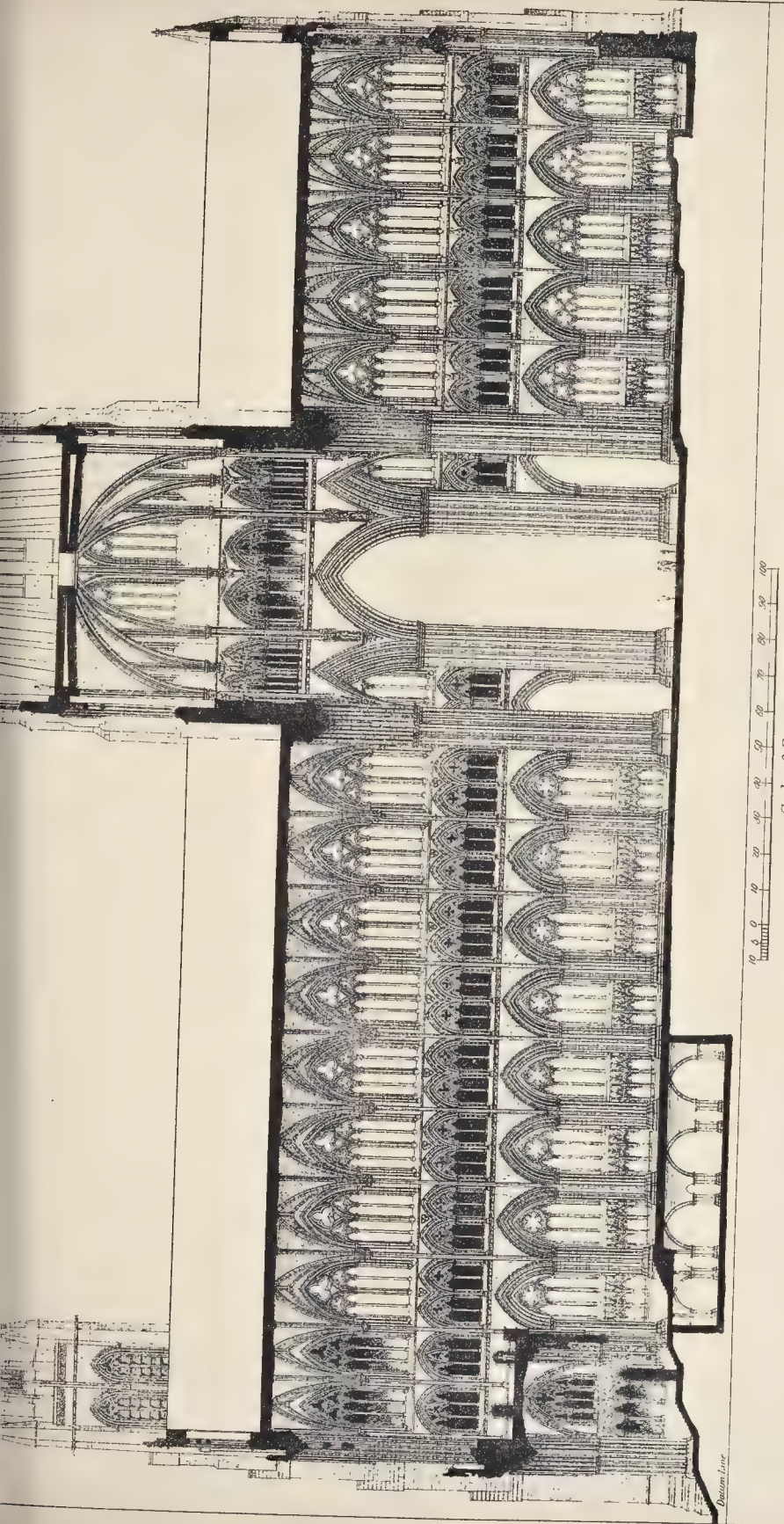


PHOTO LITHO SPRAGUE & CO LONDON

LIVERPOOL CATHEDRAL COMPETITION —DESIGN BY MESSRS G. F. BODLEY, A.R.A., AND T. GARNER.

LONGITUDINAL SECTION LOOKING NORTH









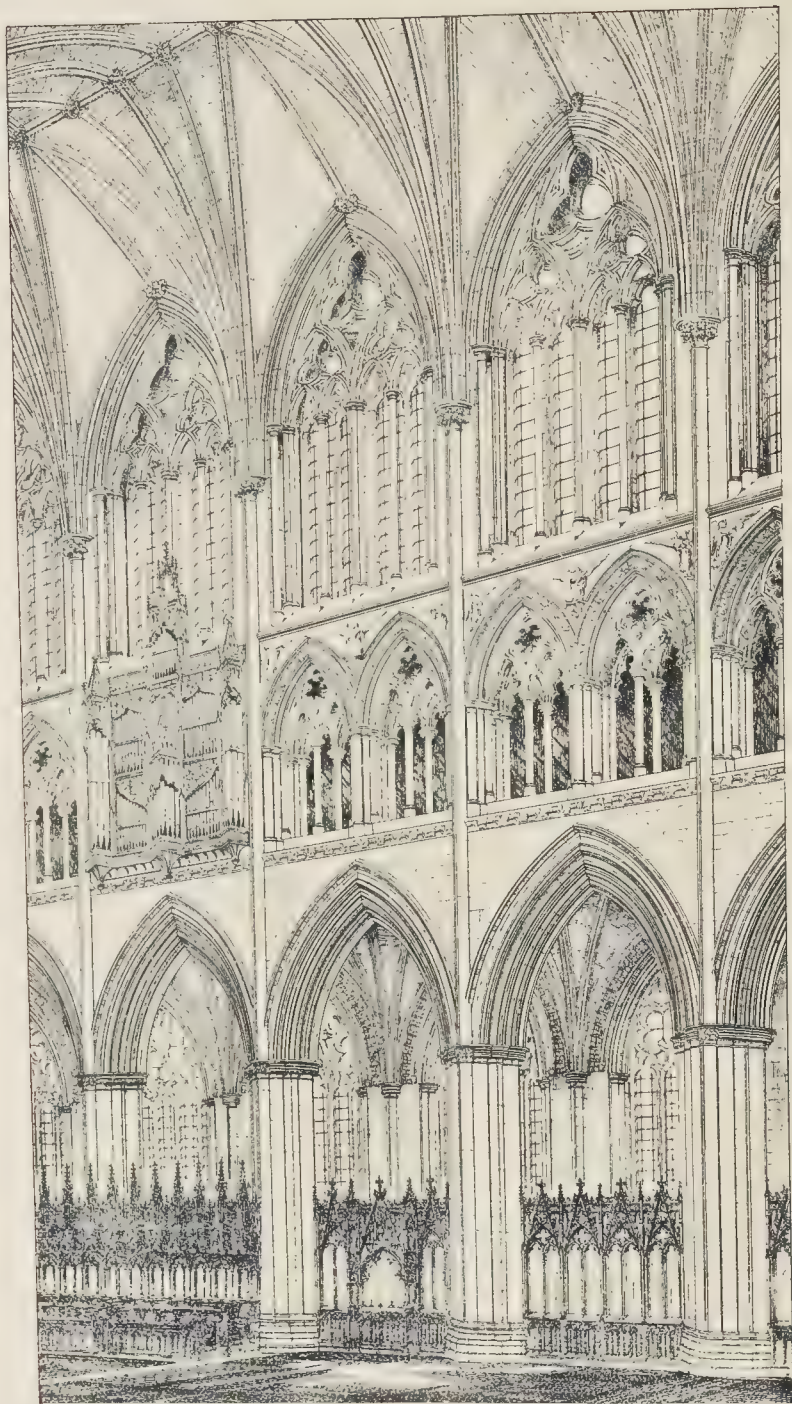


PHOTO. BY SPRAGUE & CO. LONDON

LIVERPOOL CATHEDRAL COMPETITION.—DESIGN BY MESSRS. G. F. BODLEY, A.R.A., AND T. GARNER

VIEW IN CHOIR



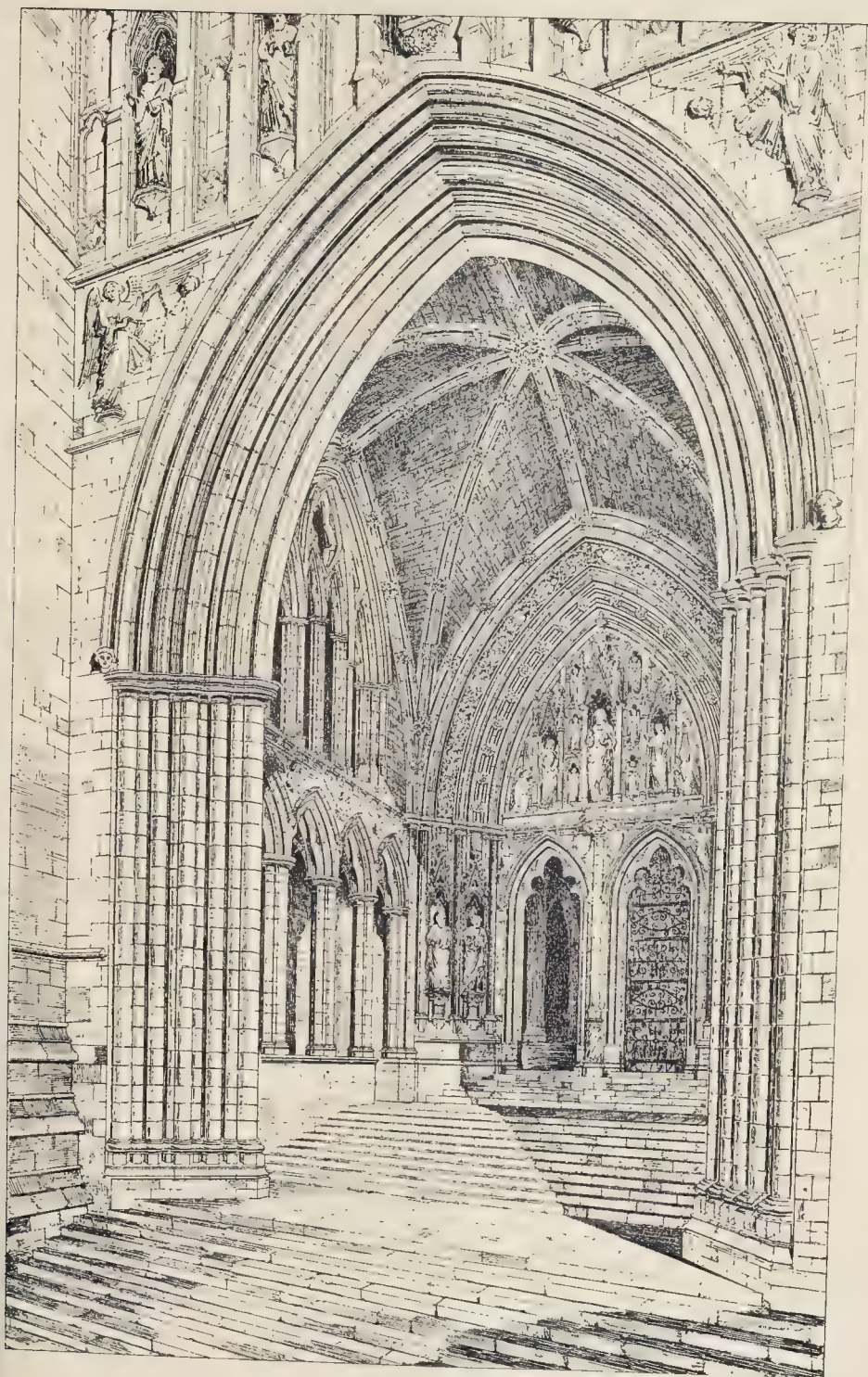
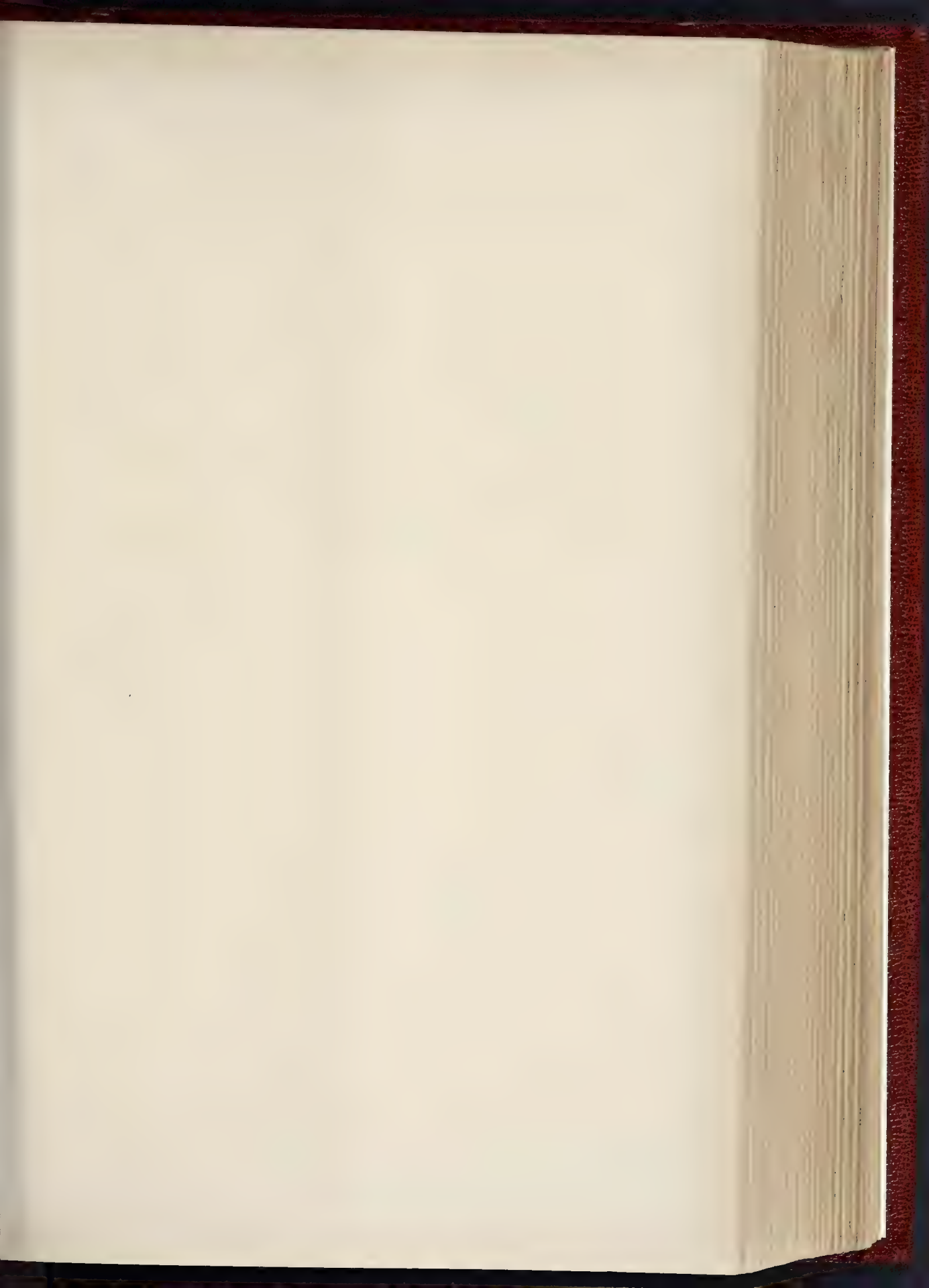


PHOTO LITHO SPRAGUE & CO. LONDON

LIVERPOOL CATHEDRAL COMPETITION—DESIGN BY MESSRS G. F. BODLEY, A.R.A., AND T. GARNER  
CENTRE WEST PORTAL



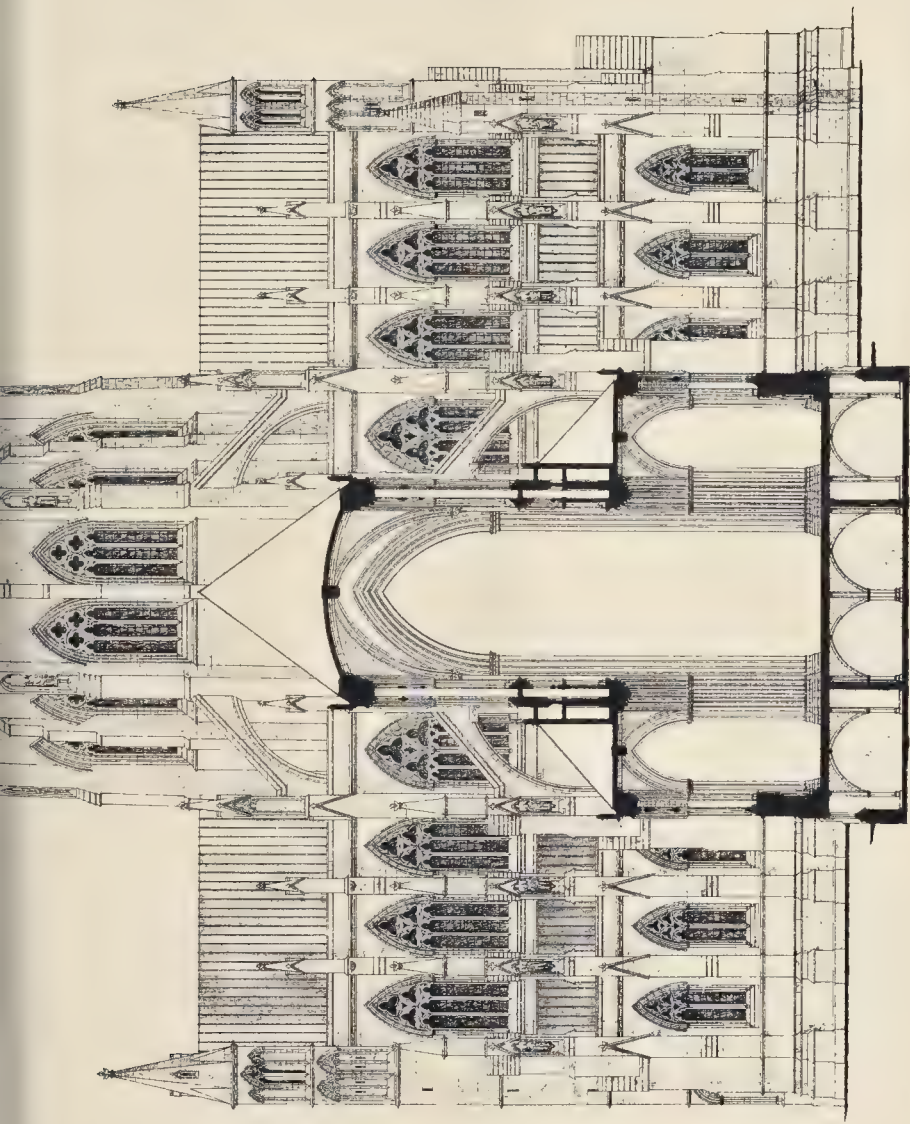






THE BUILDER, FEBRUARY 13, 1886





Section Nave looking East.

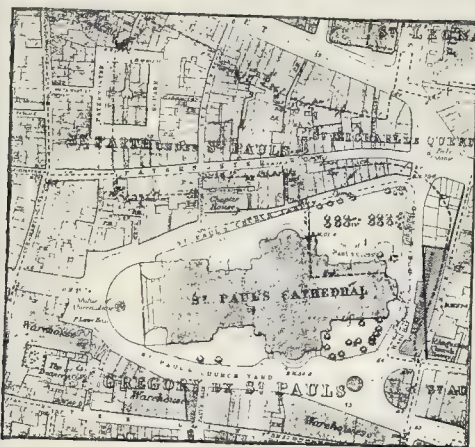


LIVERPOOL CATHEDRAL COMPETITION.

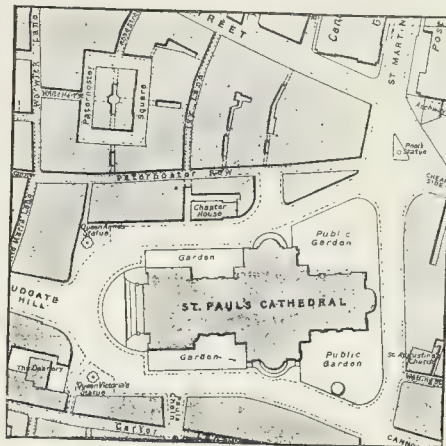
DESIGN BY MESSRS. G. F. BODLEY, A.R.A., AND T. GARNER.







As at Present.



[St. Paul's Cathedral Approaches.]

As Proposed by Mr. de Lisle.

## ST. PAUL'S CATHEDRAL APPROACHES.

THE annexed plans represent the present state of the approaches contiguous to the east end of St. Paul's Cathedral, and the plan proposed for modifying and improving them, in a pamphlet by Mr. Edwin de Lisle,\* who, in asking us to call attention to this suggestion for the treatment of the approaches, adds the following remarks:—

"Starting with the idea that ultimately all the buildings round the cathedral should agree with the parallax of Wren's noble temple, which is present is only the case with the Chapter House, it is urged that a line drawn from 42, St. Paul's-churchyard to the Church of St. Augustine and St. Faith is the true line of departure to the east end, with a view ultimately to carry noble and almost straight thoroughfare from Martin's-le-Grand to Queen Victoria-street, wide, airy, and direct to the Thames highway." By rebuilding east of this line, and knocking up the part of Old Change, adjacent to the site of St. Paul's Schools, I calculate that 2,290 ft. of building ground would be lost this spot, valued at about 45,800l. The circular building at the S.E. corner being valued at 70,000l., a straight road, of a good width and parallel to the transepts of St. Paul's, might thus be made for an approximate cost of 115,800l. This would, of course, spare the way for widening Old Change right to Lambeth-hill. Such an arrangement would involve the addition of no less than 11,700 are feet to the garden at the south-east angle of the cathedral. It would entail the loss, possibly, of some 3,000 square feet at the north angle of the north-east garden; but the large trees might be made to stand in causeway, as they do in Piccadilly, and the ring round the garden need not be higher than it is in Leicester-square, the whole square and the cathedral would have the appearance of being a lovely garden, especially if the suggestion of adorning the windows and balconies, and banks of flowers and grasses were carried out.

The next most practical feature in this scheme is the widening of Paul's Chain and Cannon-street to the width of Bennett's Hill. Such an improvement as this would decidedly fit the owners of the property on either side, no compensation would be necessary, it is just to say, for disturbance, —20,000l. to cover the whole cost. The Commissioners of Sewers might certainly look upon merely as the removal of a scandalous nuisance, and by one stroke give a fine view of north-east campaign, and at least one good path to St. Paul's from Queen Victoria-street.

## The Nineteenth Century Art Society.

On Monday, the 13th inst., has been appointed for private view of the Spring Exhibition of the Nineteenth Century Art Society, at the Conduit Galleries, and the Exhibition will open public on Monday, the 15th inst.

Majesty of London. By Edwin de Lisle, London, 1886.

## THE PRINCIPLES OF DOMESTIC FIREPLACE CONSTRUCTION.

THIS was the subject of the Friday evening discourse at the Royal Institution on the 5th inst., the lecturer being Mr. T. Pridgin Teale, M.A., F.R.C.S., who is already known to most of our readers as an investigator in this important field of applied science, and as a writer on sanitary subjects.

Mr. Pridgin Teale, at the outset, referred to the appropriateness of the use of the lecture-theatre of the Royal Institution for a lecture on this subject, seeing that Count Rumford, the founder of the Institution, devoted a great deal of attention to the study of the subject, which was particularly referred to in the prospectus of the Institution as "a very important part of the useful information to be conveyed in the public lectures of the Royal Institution." Correct principles, said the lecturer, have been habitually, and, until the last few years, almost universally, violated, and the rules so ably worked out, so earnestly and forcibly advocated by Rumford, have lain dormant, lingering here and there, chiefly in old-fashioned houses, and almost forgotten. Three evils result from the prevalence of bad principles in construction:—1. Waste of fuel and loss of heat. 2. Excessive production of soot and smoke. 3. Large addition to ashpit refuse by cinders, which are really unburned, and therefore wasted, fuel. These are matters of national concern, and it has been during the last four years to endeavour to convince the public that it is the interest no less than the duty of every householder, to burn his fuel towards the diminution of these evils. Heat is wasted in three ways,—either by combustion under the impulse of strong draught, which means rapid escape of heat up the chimney; or by imperfect combustion of the gases which are generated during the burning of the coals; or by escape of heat through the iron sides and back into the space between the range and the brickwork and its top into the chimney. The greatest offenders are the ordinary register-grates. Iron all over, back, and sides, and roof, they are usually set in a chamber open above to the chimney, and imperfectly filled in, or not filled in at all, with brickwork. The heat escapes through the iron to this chamber, and thence is lost. Another fault is that the "register opening," in other words the "throat of the chimney," being immediately above the coal, submits the burning fuel to the full concentrated force of the current to the chimney, converting the fire into a miniature blast-furnace.

The second result of faulty construction in fireplaces is "Undue production of smoke and soot." Smoke and soot imply imperfect combustion, and to this two defects in a fire mainly contribute,—one, too rapid a draught through the fire which hurries away and chills below burning point the gas rising from the heated fuel. The other defect is too cold a fire, i.e.,

too small a body of heat in and around the fuel, so that the temperature of the gases is not raised to a point at which they will burn.

A few years ago the prevalence of unusually dense fogs roused the metropolitan public to a sense of this great evil. The Smoke Abatement Society was formed, and under its auspices exhibitions of smoke-consuming apparatus and improved fireplaces were held in London and Manchester. Beyond the fact that certain grates were pronounced to be good in point of economy, and moderate in the production of smoke, and that the public has been led to take an interest in and inquire into the relative value and economy of various patent fireplaces, there has been but little advance in the education of the public in the principles which lie at the root of the whole question.

A third result of bad construction is the "production of cinders." With good coal, cinders are inexcusable. They are unconsumed carbon,—coke,—and imply a faulty fireplace. If thrown into the ashpit, as is the case in 99 times out of 100, they are a shameful waste, and more than waste, for they entail a great cost for their removal. The town of Leeds pays about 14,000l. a year for the scavenging of the streets and the emptying of ashpits. Nearly every house in Leeds supplies in the way of cinders at least twice as much ashpit refuse as it might do, were the fireplaces properly constructed. The ashpit refuse of Leeds is burned in a "destructor," and the cinders in the refuse provide not only heat enough for its reduction to a mineral residue, but spare heat for driving two 60-horse-power engines, and for consuming a reasonable amount of pigs, &c., killed by or on account of disease.

These three great evils, evils affecting not only individuals, but the community, waste of fuel and heat, production of soot, production of cinders, are a direct result of the violation of the correct principles in fireplace construction.

Let us next inquire what are the principles which promote good combustion in an open fireplace,—i.e., what are the conditions which are essential to enable fuel to give out to a room "good money's worth in heat." That such a result may be obtained, fuel must burn *well*, but *not rapidly*. Two things in combination are essential to the combustion of fuel,—a supply of oxygen, and a high temperature,—i.e., plenty of heat around the fuel. If fuel be burned with a hot jacket around it, a very moderate amount of oxygen will sustain combustion, and if the supply of oxygen be moderate, combustion is slow. Burn coal with a chilling jacket around it, a rapid conductor like iron, and it needs a fierce draught of oxygen to sustain combustion, which means rapid escape of actual heat, and also of potential heat in unburned gases and smoke, up the chimney. This is the key to the whole position; this is the touchstone by which to test the principles of fireplace construction.

Few people probably realise the exact conditions of combustion, which may be well illustrated from the process of manufacture of coal gas.



In the manufacture of gas, coal is raised to a high temperature, and the gases are driven off by roasting the coal in an oven from which air, i.e., oxygen, is shut out. The gases are conducted away, cooled, purified, and stored for future use in a gasometer; the combined carbon and mineral residue, being non-volatile, is cooled down before being exposed to the air, and is sold as coke. Here we have a striking proof that high temperature in fuel does not of itself imply combustion. If air were admitted to the red hot coke, or to the gases as they escape in their heated condition from the furnace, they would burn. But when coke has become a gasometer, no amount of oxygen will of itself start combustion. The deduction from all this is, that complete oxydation, i.e., good combustion, is possible only when the fuel and gases are at a high temperature, and that high temperature of fuel does not produce combustion until oxygen is introduced; therefore we can have a high temperature of fuel without rapid combustion, provided we control and limit the supply of oxygen. My attention was first directed to the question of waste of fuel at the time of the coal famine some twelve years ago. I read in the *Times*, and acted upon the suggestion, made, I believe, by the late Mr. Mechi, to economise coal by inserting an iron plate on the grid under the fuel so as to cut off all draught through the fire. This undoubtedly induced slow combustion, and economised fuel, but the fire was dull, cold, and ineffective. The plan was abandoned. It taught me, however, the fact that combustion could be controlled by cutting off the underdraught, but I did not then see why combustion was spoiled. The reason was that the under-surface of the fire was chilled, and the fuel lost its incandescence owing to the rapid loss of heat through the iron towards the open hearth chamber. To some persons even now "slow-combustion stoves" are an abomination, and are supposed to be synonymous with bad combustion. The next stage in my fireplace education was the adoption of the Abbotsford grate. I thereby learned that the reason why an Abbotsford grate was an advance upon the iron plate lay in the fact that the solid firebrick bottom stored up heat and enabled the fuel to burn more brightly resting upon a hot surface,—not upon a cooling iron plate. But Abbotsford grates, and the other class of grates with solid firebrick bottoms, the "parson's" grates, have disadvantages. They are apt to become dull and untidy towards the end of the day, and do not burn satisfactorily with inferior coal. There is a better thing than a solid firebrick bottom, and that is the chamber under the fire closed in front by an "economiser." Some five years ago I made, somewhat accidentally, the discovery that the burning of coal in an ordinary fireplace could be controlled and retarded by the adoption of a very simple and inexpensive contrivance, applicable to nearly every existing grate, and that this result could be attained without impairment of, and often with increase of, the heating power of the fire. This contrivance, which I have named an "Economiser," was simply a shield of iron, standing on the hearth, and rising as high as the level of the grid at the bottom of the grate, converting the hearth space under the fire into a chamber closed by a movable door. The effect was twofold. The stream of air, which usually rushes through the bottom of the fire, and causes for a short time rapid combustion at a white heat, was thereby cut off, and the air under the fire was kept stagnant, the heated coal being dependent for its combustion on the air passing over the front and the upper surface. The second point was that this boxing up rendered the chamber hotter, and this increased temperature beneath the fire-grate, i.e., under the fuel, added so materially to the temperature of the whole, even of the cinders coming into contact with the iron grid, that the very moderate supply of oxygen reaching the front and upper surface of the fuel was sufficient to maintain every portion in a state of incandescence. Moreover, I observed that combustion was going on at an orange, not at a white, heat. Let us contrast a white with the orange heat. A white heat in a fire means rapid combustion, owing to the strong current of air, oxygen, which passes under the grate, through the centre of the fire, and up the chimney. As soon as the heart of the fire has been rapidly burned away at a white heat, the fuel cools; the iron grid cools also; and the cinders in con-

tact with the grid are chilled below combustion point. They then cease to burn, and the bottom of the fire becomes dead and choked. The poker must now be brought into play to clear away the dead cinders, and to re-open the slits in the choked grid. New coal is added to the feeble remnant of burning embers, with no reserve of heat in the iron surroundings; and in time, and perhaps very slowly, the fire revives, and rapid combustion sets in afresh under the influence of the renewed current of oxygen passing through the heart of the fire. An orange heat means that the coke, i.e., the incandescent cinder, is burning with a slowly applied stream of oxygen, a degree of combustion which is only possible when the coal is kept warm by the hot chamber beneath, and by a reasonable limitation of loss of heat at the back and sides by firebrick, either in contact with the fuel, or, at least, close behind the iron surrounding it. This effect is seen, partially, in the grates with solid firebrick bottom, but far more perfectly in the grates with the chamber closed by the "Economiser."

This hot chamber has the following effects:—The incandescent coal remains red hot from end to end of the grate until nearly all is consumed, thus maintaining a larger body of the fuel in a state to radiate effective heat into a room. The cinders on coming into contact with the iron grid remain red hot, and so continue to burn away until they fall through the grid as a fine powder. This allows the fire to burn clearly all day long almost without poking. When the fire is low, and new coal is added, the reserve of heat in the hot chamber is such that the addition of cold fresh fuel does not temporarily quench the embers, and the fire is very quickly in a blaze after being kindled.

Having made the discovery by the observation of a grate supplied to me with an "Economiser," the value of which, I suspect, was hardly appreciated by the makers, I applied "Economisers" one by one to all my grates, kitchen included. The result surpassed my expectations. There was a saving of at least a fourth of my coal. The experience of many friends, who at my advice adopted the system, confirmed my own results. It was, therefore, clear to me that I was bound to make widely known a discovery which was fraught with such benefit to myself, and was likely to prove a great boon to the public. My chief aim hitherto has been to persuade the public to apply the "Economiser" to existing fireplaces. After steady exertions for four years, some impression has been made on the inertia of the public, and extensive trials of the "Economiser" are taking place in many parts of the country. To-day, however, my aims are more complete. It is my wish to advocate not one principle alone, although that is the cardinal one, but to urge all the best principles which enter into the construction of a really effective fireplace, and to induce those whom it may concern to replace bad by an entirely new construction, right in every point. The rules of construction which I shall lay down have been arrived at entirely by my own observation of what appeared to be the best points in various fireplaces. It was, therefore, no less a satisfaction to me than a surprise to discover, on reading Rumford's work in preparation for this lecture, that nothing which I have to advocate is new, but that every principle, and the "Economiser" is hardly an exception, was advocated no less enthusiastically by him at the very commencement of this century.

**Rule I.**—"As little iron as possible."—The only parts of a fireplace that are necessarily made of iron are the grid on which the coal rests, and the bars in front. The "Economiser," though usually made of iron, for convenience in construction, might be of earthenware, and so would be more perfectly in harmony with this rule.

**Rule II.**—"The back and sides of the fireplace should be of brick, or firebrick." Brick retains, stores, and accumulates heat, and radiates it back into the room, and keeps the fuel hot. Iron lets heat slip through it up the chimney, gives very little back to the room, and chills the fuel.

**Rule III.**—"The firebrick back should lean over the fire, not lean away from it," as has been the favorite construction throughout the kingdom. The lean-over not only increases the power of absorbing heat from rising flames,—otherwise lost up the chimney,—but the increased temperature accumulated in the fire-

back raises the temperature of gases to combustion point, which would otherwise pass up the chimney unconsumed, and thus be lost. Rumford discovered accidentally the value of this "lean over," and at once realised its immense importance. He does not, however, seem to have carried out his intention of working out for general adoption this form of back. Of recent years "lean over" backs have been re-invented and sparingly used. The "Milner" back, invented by a Lincolnshire clergyman, and adopted by Barton & Co., is excellent. It burns fuel well and gives out a great heat. But it is extravagant in consumption unless controlled by the "Economiser." Captain Douglas Galton saw the virtue of the "lean over," and adopted it in the grate which goes by his name. The "Bee-hive" back was the same in principle and very good, and having a very small grid, was economical. The "Rifle" back, adopted by Nelson & Sons of Leeds, gives an admirable fire, little short of perfection; but observation shows that the "tall" flame extends far beyond the bend, and is, therefore, soon lost as a heating factor, the heat being wasted in the chimney.

**Rule IV.**—"The bottom of the fire, or grating, should be deep from before backwards probably not less than 9 in. for a small room nor more than 11 in. for a large room." This is a corollary to Rule III. We cannot possibly have the back of the fireplace overhanging the fire when there is a shallow grid. If for no other reason than the demands of the "lean over," depth of fire-space is essential. But there is gain, thereby, in another direction. It affords plenty of room for the burning fuel to lie down close to the grid, and away from swift air currents, and prevents the tendency of the fire to burn hollow.

**Rule V.**—"The sides or 'coverings' of the fireplace should be inclined to one another at the sides of an equilateral triangle." The working out of this rule has cost me much thought and experiment. It was worked out more or less empirically with a view to attain certain objects, and, having attained them, I discovered that I had unwittingly selected the sides of an equilateral triangle. It is of some importance, and may be of interest, to tell how the question arose. In my earlier fireplace the sides or "coverings" were parallel to each other, and had the defect that they radiated most of their heat from one to the other, up into the room, with the probable result that much of such heat would eventually escape to the chimney. It was clear then that the sides must be set at an angle with the back, so as to face towards the room. But at what angle? My first experiments were determined by the shape of the corner bricks which were in the market. These determined the inclination of the sides to be such that, if prolonged, they would meet at a right angle. This is the angle laid down by Rumford as the angle of selection, but as the largest angle admissible in a good fireplace.

This angle, however, brought me into difficulties with my "lean over" back. The openness of the angle made the back, as it extended, spread out so rapidly that what was gained in width was lost in height. Moreover, my critics objected to its appearance as ugly. What then should determine the inclination of the sides? The point was thus determined. Seeing that a heated brick throws off the greatest amount of radiant heat at a right angle with its surface, the "coverings" should be at such an inclination to each other that a perpendicular line from the inner margin of one "coving" should just miss the outer margin of the opposite "coving." Where "coverings," as in my earlier attempts and Count Rumford's fireplaces, are at a right angle to each other, this perpendicular line misses the opposite margin by several inches. It was clear, therefore, that the inclination might be made more acute. Guided by this idea, and having determined the principle on which the shape of the grate should depend, an inclination arrived at which turned out to be an angle of 60°, i.e., the inclination of the sides of an equilateral triangle.

**Rule VII.**—"The 'lean-over' at the top of the fireplace should be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend so far forwards that the chimney where it recedes towards the chimney should be vertically over the insertion of the cheek of the fire-grate. This will be from 34 in. to 28 in. from the level of the top of the front bars, it should extend almost to the throat of the chimney, which, as a rule, will be about 28 in. from the hearth, or 16 in. from the top of the fire, should extend



from the front of the fireplace, according to the size of the grate.

**Rule VIII.**—"The shape of the grate should be based upon a square described within an equilateral triangle, and the size to vary in constant proportion to the side of the square." For a moderate room, 8 in. determines a very useful size; for larger rooms, 9 in., 10 in., or even 11 in., may be necessary. An area of grating of 100 in. in the square of the corners would give a grate fireplace large enough for a room 20 ft. by 25 ft. This rule secures sufficient depth from front to back, and a constant proportion between depth and width, whatever be the size of grate. Whenever a grate proves too large for a room, and in summer, when a smaller fire is needed, the size should be reduced in width by fire-bricks, the full depth being retained.

**Rule IX.**—"The slits in the grating, or grid, should be narrow, perhaps  $\frac{1}{4}$  in. for a sitting-room grate and good coal,  $\frac{3}{8}$  in. for a kitchen grate and bad coal." When the slits are larger, small cinders fall through, and are wasted.

**Rule X.**—"The front bars should be vertical, that ashes may not lodge, and look untidy; narrow, perhaps  $\frac{1}{4}$  in. in thickness, so as not to obstruct heat; and close together, perhaps 1 in. apart, so as to prevent coal and cinder from falling on the hearth."

**Rule XI.**—"There should be a rim 1 in. or  $\frac{1}{2}$  in. in depth round the lower insertion of the vertical bars." The object of this is to conceal the ash at the bottom of the fire, and to enable the front cinders to burn away completely by protecting them from the cold air. This rim contributes greatly to tidiness, and, as a rule, will prevent the need of any sweeping up of the hearth during the day.

**Rule XII.**—"The chamber under the fire should be closed by a shield or 'Economiser,'" this has been already spoken of, and described as the central principle which enhances greatly the value of all the rest.

**Rule XIII.**—"Whenever a fireplace is constructed on these principles, it must be borne in mind that a greater body of heat is accumulated about the hearth than in ordinary fireplaces. If there be the least doubt whether wooden beams may possibly run under the hearthstone, then an ash-pan should be added, with a double bottom, the space between the two plates being filled with artificial asbestos, slag-wool,  $\frac{1}{2}$  in. in thickness."

**Rule XIV.**—"A fireplace on this construction must not be put up in a party-wall where there is no projecting chimney-breast, lest the heated brick should endanger woodwork in a room at the other side."

#### TIMBER MEASUREMENT.

**SIR.**—As you surmise, we have got into a Comedy. Errors, and it will take a little space to put matters straight.

**1.** Mr. Wardale asks (p. 64), "Why do the sliding-rule and the tables used by timber merchants do [his oak butt] to be 75 ft.?" The original inventor of the principle of the sliding-rule, Lord Napier, the discoverer of logarithms 300 years ago) says virtually, "Give me the correct side of a piece of equal-sided stone or atmospheric air, or any other substance, and its length, and I will, by rule, enable you to arrive at its cubic contents without the trouble of multiplication."

**2.** I say (p. 143), "He [Hoppus] found a practical custom in use throughout the land, and framed tables in accordance therewith."

It is not probable that he did so. The tables are the sliding-rule reduced to print (for printing-house convenience, no doubt), which tables were of old only intended for angular stances; but Hoppus, being Surveyor to the London Assurance Company, was necessarily unaided with and accustomed to the practical, high ignorant, method of measuring round timber by string in use throughout all the country of his experience. He took the existing rule of obtaining the "side" as he found it, and simply said, "You will get the same result more fully from my tables than from the sliding rule or application."

What was the poor man to do (even if he knew no error, which I doubt)? Was he to take his ink and scrip, and tramp through the length and breadth of the land,—a sylvan Peter the Hermit, chiding a crusade in favour of a correct measurement, which he never could have made intelligible, except to possible practice? All Hoppus's risks show him to have been a rule-of-thumb and incapable of detecting spontaneously the error which his tables helped to make easy. He said, in his "Practical Mensuration" (London), says, "Multiply the square of one-fourth of

the circumference or quarter girth by the length, and the product will be the content, according to the common practice" (*sic* italics).

He makes no further remark, but gives Rule 2:—"Multiply the square of one-fifth of the girth by twice the length, and the product will be the solidity nearly" (*sic* italics).

There is 21 per cent. difference between the two measurements, which Nesbit must have known to be common knowledge amongst all whom it concerned, and therefore he calls no especial attention to the anomaly. The contents can be obtained from the tables by his first incorrect rule; but where is your "side" for the second, correct?

It would take more space than would be justifiable to show why an alteration from the one-fourth girth measurement is barely possible; and I do not see any benefit to arise from such alteration, could it be made general. Nobody buys timber trees in the rough who does not know what he can make of them in conversion, measure how you will; and that regulates the price per foot cube.

Now take Mr. Wardale's own case. An unhappy destiny has saddled him with a large oak butt. I assume that he wants to dispose of it; but it is not a thing to be offered generally, or to be sent to the nearest market like a sack of potatoes; he must, therefore, apply to a timber merchant to buy it.

If the timber merchant offers him 2s. 6d. a foot for it in the ordinary way, without any express stipulation on the part of the vendor, and the latter accepts, the merchant will take the measure by the one-fourth girth method, and custom will bear him out in it. If the vendor stipulates for the strict geometrical rules, the merchant will give him only 2s.

If hewing up and caliper measure are insisted on, our friend will get only 1s. 6d. The parties may, therefore, toss up for the measure and make their minds easy.

GODALMING.

[Finis coronat Hoppus.]

\* \* We will act on the hint of "Godalming's" audacious pun, and consider the correspondence closed.

#### "PLUMBERS AND PARLIAMENT."

**SIR.**—In order to make my meaning perfectly clear to the conveniently obtuse intelligence of "F. M.," allow me to inform him that I consider it is "dabbling in a noisy and ostentatious manner in matters which are being dealt with by others" when "C. A. M. B." dictates to the Plumbers' Company the course they should take instead of that which they are taking for the benefit of their trade, and when "F. M." has recourse to the press to obtain information which, if he is a member of the Association, as I presume he is, he could have obtained from the Secretary,—and can still obtain if he be so inclined,—respecting the work of the Association, which is altogether at variance with, and contradictory to, the assertion made by him in your last issue.

He may have some crude notions floating in his brain of schemes he thinks would benefit the trade. Why does he not submit them to the test of discussion? Is he nervous as to the result of their being found impracticable; or are they of such a character that the self-interests of builders would be touched? If the latter, he appears to know full well the reception they would meet with. At the present time a great effort is being made to obtain redress for one of our members. This entails some amount of sacrifice, and it is amusing, but at the same time regrettable, to hear the excuses which are put forward by some of the members in order to wriggle out of their share of moral responsibility.

Having had the honour of occupying the position of President for three years, which is one year longer than the recognised time, I may fairly claim to know something of the advantages which have accrued to the trade by the action of the Association during that time, and of which I would gladly furnish you with a list were it not contrary to the rules of the Association to do so. They are, however, of a character such as a President may well be proud of as having occurred during his occupancy of the office. An example of what we are doing appears in the letter of your correspondent, "H. S.," p. 252.

I hope my successor, when appointed, will be able to furnish a better record; but, if it be as good, the trade will have much reason for satisfaction.

I think that I shall not be transgressing the rules of the Association by stating that a not inconsiderable benefit has been secured by the

\* Correspondents who write anonymously can hardly be called "associations."—E.

manner in which the matters of difference which have from time to time cropped up between masters and men have been met. Had we desired popularity, such matters could easily have been fanned into a flame; but we preferred peace, and the consequence is that more amicable relations exist now than have been the case for years.

The Association is still without any overture from the Plumbers' Company as to co-operation; therefore, as we do not wish to force their hand, the Association or Builders' Institute will have to take into consideration, as well as they, the question of certifying plumbers as competent, being careful, however, not to put a stumbling-block in the way of a most desirable object.

F. J. DOVE,  
President of the Central Association  
of Master Builders.

**SIR.**—From long experience of the inconveniences arising from the working hours of plumbers being diverse from those of the other trades engaged in building operations, I quite agree with your correspondent "F. M." that this matter should be dealt with, and I cannot but think that the Central Association of Master Builders exhibits a want of generalship in not taking up this question, now that so many matters affecting plumbers are under discussion.

It would, I feel certain, be a great benefit to the employers and all those in charge of building works, could the hours of labour be made uniform for all trades, and they would owe you a debt of gratitude if such a result should arise from the discussion carried on in your columns. C. E.

\* \* This correspondence must now close.

#### NEW BY-LAWS FOR CONCRETE BUILDING IN THE METROPOLIS.

**SIR.**—With reference to the above, I beg to state that since you embodied a letter of mine in a leader in your valuable paper of October 2, 1885, I have erected in and about Southwark buildings in Portland cement concrete to the value of over 100,000l.,—some of these large warehouses let for as much as 1,000l. per annum, and stored with seed from floor to ceiling, to the height of 60 ft. This, I think, is allowed to be one of the most severe tests a building can have, and which my buildings have stood for several years without the slightest fracture.

In 1884 and 1885 I erected in Zoar-street, Southwark, two blocks of artisans' dwellings, one containing seventy, the other eighty, rooms. These, as well as the warehouses mentioned above, have all been built of London refuse (viz., broken bricks, stone chippings, slag and clinkers from furnaces and gas retorts, broken York flags, &c. on paving, with a small proportion of Thames sand).

There is more than enough of this refuse to erect buildings for the London poor. Why should it be carried miles out of the metropolis at a great cost as rubbish?

Why should we be forced to build houses of bricks when we have at our command abundance of this hard and incombustible material, procurable at little or no cost, with which we can erect walls known and proved to be less impervious to the atmospheric changes of our climate, than any other material that can be used for walling? Why do the Metropolitan Board, when at last forced to acknowledge concrete as a building material suitable for wall construction, seek by means of new laws to stamp it out? They do not come to see, or try to find out, if what has been done is bad; but make a new law which shall enforce the use of one-third more cement. This is certainly a prohibitory law.

The Metropolitan Board is a body elected to assist the public, not to stand in the way of the advancements of the age, because they will not give themselves the trouble to find out that which is good for them to know.

Fifteen years ago, I, after twelve months' delay, obtained from the Metropolitan Board the first licence for the erection of a concrete building granted in London. That licence ordered that the proportion of cement used should be one to eight, and it is in these proportions that all my work has been done. The walls stand wonderfully against all the steel tools and sledge-hammers that can be brought against them when alterations have been required, which I should be very pleased to show you, or any members of the Metropolitan Board, at any time. The proposed new by-laws state that the cement used shall be in the proportion of one to five, which means that this valuable London refuse shall still be carted away or carried out to sea, and shall not be used for building purposes.

Why is the system not more generally adopted? Because it is to the interest of so many connected with the building trade to stamp out that which is cheap and inexpensive. With labourers instead of bricklayers, and London refuse instead of bricks, no one has any idea how cheap walls may be erected.

Another great reason that this class of building has not advanced as the merits of the material would warrant, is the dreadful ordeal of red tape the



poor builder has to go through. For fifteen years I have been bound in this red tape, and when at last I break through my bonds by the decision of the Magistrate at the Southwark Police-court, on Sept. 9th, 1885 (published in the *Builder* of Sept. 19th, 1885), the Metropolitan Board attack me afresh with new laws, which, if passed, simply mean the stopping of concrete building in the Metropolis, and of the solving of the great problem "Housing the London poor."

H. GOODWIN.

P.S.—The Peabody Dwellings at Bermondsey are entirely of concrete.

## The Student's Column.

### FOUNDATIONS.—VII.

RIGHTS OF ADJOINING OWNERS.

It will be convenient to consider in this place the effect that the vicinity of land or buildings, the property of other persons, has upon the foundations of a new building.

It appears to be thought by many persons that, in building on a town site where the owner desires to make the most of his land, he may put his footings or even his concrete partly upon his neighbour's land. It has even occurred that an owner has acted upon a belief that he can assume the willingness of his neighbour to allow a party-wall to be built upon the boundary line of the properties, and to pay in due time one-half the cost. However prudent or convenient that course may be to an adjoining owner in many cases, it must never be assumed that he will consent to it, and the foundation must, in the absence of a clear arrangement to the contrary, be made entirely upon the land of the building owner. A 9 in. wall built with footings and concrete, as required in the metropolis, will thus stand 8½ in. away from the boundary line, and that space will be wasted as also will a similar space adjoining it on the ground of the adjoining owner. There is, in fact, a waste of 2 ft. 2 in. in comparison with the result obtained by agreeing to build one 9 in. party-wall, and this consideration is usually sufficient to bring about an agreement between the parties.

But apart from considerations of waste of space, it is imprudent to build close up to your neighbour's land if it can be avoided, so that a house that is not intended to be built with its side walls made into party-walls should be kept well away from the boundary of the adjacent property. The adjoining owner may decide upon making a deep excavation on his land, either for building or for obtaining materials, and he may go to the full limit of his land so long as he does nothing that would cause his neighbour's land to fall in. But he is not bound to take any extra precautions that are rendered necessary by the extra weight of a new house on that land.

If you dig close to your neighbour's land you must take care that you do not let it fall into your excavation, nor any old house that is upon it.

A heavy building built upon a soil that is somewhat soft will by compressing the soil lower the foundation of an old house that stands near to it so as to cause the walls to crack. It is, therefore, advisable in such a case to carefully form the foundation on a deeper and more solid stratum, so that no settlement may occur. If, in order to do this the water has to be pumped out of the deeper excavation, this is very likely to cause subsidence and consequent damage to the building of an adjoining owner; but the law does not give him any remedy for the consequences of the abstraction of subsoil water. Foundations, like all other works, must be done according to law, and the above hints may prevent legal difficulties by inducing foresight and preventing works that are in dangerous proximity to adjoining property being done without proper consideration and advice.

Deep Foundations are required in exceptional cases, and in providing them ample space to execute the exceptional works is desirable. Where it is necessary to obtain a solid foundation in a stratum lying so deep below the surface that the building of walls in the ordinary way would be too costly or difficult, the work may be done in one of three ways. If the depth is not very excessive walls with very large openings may be built; for greater depths piers may be built at intervals along the course of the walls, but for very great depths some form

of piling, a process quite distinct from anything that has been here described, must be used.

Walls with wide openings are put where the foundation has to be obtained, at about the depth of one story lower than the lowest story that is to be made useful in the building. The object is economy in brickwork, against which has to be set the cost of constructing the arches above the openings, and the inverted arches beneath them. The arches above the openings will be constructed with the ordinary precautions as to the relation of rise to span, and as to abutments, or girders may be used instead of arches. The arches below the openings are commonly made to a sweep of about one-third of a circle. The resistance of the earth against the end of each wall is a considerable advantage in the matter of abutment, but some sufficient abutment is as necessary for an inverted arch as for any other arch; therefore the piers at each end must be sufficiently large and the arch must not be too flat. The object of these inverted is to spread the weight of a building over the whole length of the foundation of its four walls, as the soil may not be so satisfactory as to justify reliance upon it if great weights should be thrown on particular spots.

Building upon piers is carried out by sinking a small number of shafts under the angles, and at wide intervals, along the course of the walls, and carrying up concrete and brickwork to the level of the floor of the lowest story. Arches may be turned from pier to pier, with the ordinary precautions, and subject to the risks incidental to arched construction; but iron girders should as a rule be put (with or without relieving arches), so as to prevent the dangers of outward thrust. If the girders are buried in wet soil, cast-iron is, in such a situation, much more durable than wrought-iron. Sometimes the piers are carried up as high as the top of the lowest story, or the story above that, as in the cases where there is a basement below the ground-floor, and the piers are carried up to the level of the first floor. The walls that are necessary to enclose these stories may be built as thin as possible, and carried on a foundation of ordinary depth, if that should seem sufficient to carry them. In putting in the concrete for these piers (and all piers that have to carry considerable weight), great care must be taken to see that the bottom of the excavation is free from dirt or soft mud, as this would squeeze out under pressure, and the pier would sink to a very appreciable extent. In all such works, and, indeed, in all works that are below the level of the ground, it is highly desirable to build the brickwork in cement, or at least in hydraulic lime mortar.

In order to avoid the necessity for such deep foundations, the expedient, which has already been alluded to, of covering the whole site of a building with a substantial thickness of concrete, is sometimes adopted, and usually with success. But as there will probably be some settlement over the whole site, it is important to ascertain that the soft soil is pretty uniform in thickness throughout, or the building may settle down more on one side than on the other. If that seems a likely result, it is better to adopt some form of deep foundation that will be entirely reliable.

### CHURCH-BUILDING NEWS.

**Hernant.**—It has been decided to build an entirely new church for the parish of Hernant, in the diocese of St. Asaph, and Mr. Lawrence Booth, F.R.I.B.A., of Manchester, has been commissioned to prepare the necessary plans and designs with a view to an early commencement of the work. The Earl of Powis, Sir Watkin W. Wynn, Mr. Bamford Hesket, and other influential landowners, are giving their support to the movement, and Sir Watkin has promised to lay the corner-stone.

**Bamber Bridge (Lancashire).**—It is proposed to considerably enlarge and improve St. Saviour's Church, Bamber Bridge, near Preston, Lancashire, by erecting a new chancel, north and south transepts, organ-chamber and vestries, to take out the present square pews from the nave, and place new open pitch-pine benches, and to effect many other important improvements internally, from designs prepared by Mr. T. Harrison Myres, A.R.I.B.A. (Myres, Veevers, & Myres), of Preston, at a cost of over 3,000l.

**Brockham.**—An oak reredos, subscribed for by the parishioners, has lately been unveiled in

Brockham Church, Surrey. The subject, which occupies a space of over 7 ft., is the "Last Supper," the figures being in high relief. The work has been designed and carried out by Messrs. Mayer & Co.

**Liverpool.**—St. James's Church, Marsh-lane, is an important addition to the churches of Liverpool, and was solemnly opened on Sunday the 7th inst., after being some eighteen months in course of erection. It succeeds a smaller church, which has had to be removed, to give place to the extensive works of the Lancashire and Yorkshire Railway Company, and affords sitting accommodation for over 1,000 people. It consists in plan of a nave and aisles, with tower and entrance at the south-west corner, a baptistery at the end of the north aisle, and a range of confessionals adjoining the chancel and side chapels, with stone-vaulted ceilings, and a south aisle. On the south side are choir and clergy vestries, communicating with a commodious clergy-house. The total internal length is 148 ft., and the total breadth across the aisles within, 64 ft. The style is founded on a careful study of English church architecture of the Early Decorated period, dating about the middle of the thirteenth century, and the aim of the architects has been, while keeping closely to the character of the style, to design a building in every way suited to modern requirements, and to its individual position as a town church in a very populous district. With this view the external details are simply and broadly treated, and undue ornamentation is avoided, and its lofty proportions and a long unbroken ridge from east to west make the church a landmark amongst the surrounding buildings. The materials are local red sandstone, and the roofs are covered with green Westmoreland slates. The nave has an arcade of six lofty arches, carried on alternately circular and octagonal columns, 25 ft. high. Above a coupled clerestory windows of two lights each, and the church is well lighted by windows in the aisle walls, placed at a good elevation above the floor, and by two five-light geometric windows in the nave and chancel gable walls, the sills of which are about 30 ft. from the ground. The nave has a panelled and arched ceiling, with massively moulded beams and rafters, the space between being plastered, and the floors are laid with 2-in. pitch-pine flooring, the chancel steps and footpaths being of encaustic tiles. Messrs. Carter, Johnson, & Co., of Worcester. The interior proportions of the church are on the principle of the width and height forming the sides of an equilateral triangle. The heating is by low-pressure hot-water pipes, by Mr. C. Seward, of Preston, these pipes having been given to the subject of ventilation. The plans and details of the church have been prepared by Mr. C. Hadfield, of the firm of Messrs. Hadfield & Son, Sheffield, the preceding church of St. James being one of the earliest works of the late Mr. E. Hadfield. The contractor was Messrs. G. Woods & Son, Stanley-road, Bootle, for whom Mr. Bishop was foreman, and William Haworth acting as clerk of the works.

**John Hunter's House.**—Nature publishes three small illustrations of some of the portions of John Hunter's house and grounds at East Court, concerning which Dr. B. W. Richardson writes:—"The first drawing supplies the view of the house looking into the meadow, the second view the house is, I believe, nearly the same as it was when Hunter lived in it. The sketch is that of the Lion's House or or situated at the end of the meadow at the back and to the right of the house, but quite visible from the windows. The Lion's House, as it is seen, is a raised mound of earth. The structure upon an arched structure, which, at the time of my last visit, was in an excellent condition, although ever since Hunter's time it has been a cowhouse, and has done nearly a century of useful service. At the top of the mound there is a little wall, of a circular shape enclosing a small open space. The third sketch illustrates the famous copper in which the giant was boiled to a skeleton. The space above the copper up to the flue from the fire is covered in, but two doors open in front at the mouth of the copper. The whole of the structure has remained in good preservation. The sketches are selected from views by Bertram Richardson has taken during the autumn, as part of a series of homes birthplaces of illustrious men."



# RECENT PATENTS.

## ABSTRACTS OF SPECIFICATIONS.

10,393, Ventilators. C. Lawrence and T. Wintour.

Relates to ventilators provided with wire gauze or other perforated surfaces, and consists in disposing of the said surfaces in a direction inclined, preferably at an angle of about 45 per cent., to the surfaces to which they are applied, such latter surfaces preventing any direct through passage of the air.

13,213, Paving Blocks. A. Pimm.

The blocks, square or rectangular in cross section, are formed with a hole running through them longitudinally. From the surface, openings communicate with these internal passages, which are intended to serve as drains for rain-water. They are dowelled or bolted together, either over the whole surface of the road or over only a portion, forming wheel-tracks. They may be made of iron, concrete, or any sufficiently hard material. Specially formed blocks are used for flanged wheels, like those of tram-cars; in this case, if the groove is made in the centre of the block a strengthening rib is cast underneath it. Large flat blocks, having a number of parallel holes running through them side by side, are made for use between the wheel-tracks. The blocks may also be made reversible.

16,057, Cupboard Turn. J. Rhodes.

The cupboard turn is fixed by passing the slotted spindle through the door, and putting on first the washer, then the tongue fitting the square portions of the spindle, and finally the slotted cap, which, when screwed to the door, holds the tongue in place.

15,670, Drainage Flooring for Stables, &c. A. Ward.

The floor of the stable or stall slopes from the manger to the front, and also towards the sides, where longitudinal channels are provided, communicating in front with another channel, which may run the whole length of the stable.

16,192, Ventilating Billiard and other Rooms. Henderson and McNiel.

A flue in or near the ceiling is provided with branches or inlets at various parts, and opens to a chimney or upcast shaft. Within this flue, or attached to it, is a second flue also opening to the chimney, and provided with inlets having dome or one shaped ends placed above the gas or oil burners employed for lighting the room. The produce of combustion, in passing through the second flue, heat the air in the first flue, and thus produce an outflow of warm air from the room.

# NEW APPLICATIONS FOR PATENTS.

Jan. 29.—1,319, J. Picketlock, Draught, Rain, and wet Excluder.—1,322, L. Dettmer, Portable Electric Burglar Alarm.—1,325, R. Hunter and W. Joffatt, Cooking Ranges.—1,332, E. Hill, Supporting Window Sashes.

Jan. 30.—1,351, H. Holland, Preventing Down draughts in Chimneys.—1,372, J. Watson and H. orwood, Dog Grates, Fireplaces, and Stoves.—380, W. Webb, Yarn, Hinges, and Fastenings.—Feb. 1.—1,414, J. H. Hating, Glass Tiles.—1,416, J. Fletcher, Fasteners for Doors, &c.—1,459, J. E. Supard, Opening, Closing, or Adjusting Fanlights.—1,453, L. Sepulchre, Reflectors.—1,457, A. Tomkins and F. Cracknell, Heating Kilns.

Feb. 2.—1,491, R. Jenkins and J. Cox, Enamelled Coloured Plaster.—1,496, T. Crampton, Electric He.—1,513, T. Spoilright, Joiner's Bench Hooks.—534, A. Clark, Combination Locks.—1,546, A. ew, Pipes for Sewers, Drains, &c.—1,553, W. oke, Rock Drilling Tools.—1,557, W. Lake, Door latches.

Feb. 3.—1,604, E. and A. Ashby, Cement Kilns. Feb. 4.—1,650, E. Cameron, Halfcast Nail.—154, A. Gold, Hinges.—1,658, C. Smith, Mechanical wries.—1,663, T. Melvin, Floor Cloths and Tiles. 1,664, T. Wright, Socket Coupling for Pipes.

# PROVISIONAL SPECIFICATIONS ACCEPTED.

15,112, J. Armistead, Ventilating Rooms, &c.—429, C. Clarke, Socketed Pipe Joints.—15,485, Smith, Heating Stoves.—15,630, L. Platanauer, sks.—15,556, J. W. Thompson, Slate or Glass ing.—15,877, J. Dettmer, Dressing, Polishing, and Squaring Stone.—16,012, J. Kenyon and J. Con- g, Water-closet.—16,076, B. Finch, Sanitary nes and Joints.—69, R. Steeves, Dry Gearing.— J. Mackenzie, Securing Metal Sash-bars in s.—223, G. Hardingham, Lattice Bridges.—229, tandra and W. Gooding, Stair Treads, Door Steps, rings, &c.—523, J. Smith, Automatic Electric e Alarm.—15,597, G. McCarthy, Window Pas- or.—15,625, F. Collins, Self-acting Bolt.—15,751, Joy, Charging Cement Kilns.—153, O. Elphick, charging Water from Flushing Cisterns.—157, Benson, Curing Smoky Chimneys.—175, H. idan, Ventilators, Chimney and Smoke-stack s.—210, J. Hargreaves, Gullies.—247, R. Bow- d, Water Waste-preventer.—269, J. Barry, Pipe gs, Wrenches, &c.—405, H. Eobringer, Locks.

# COMPLETE SPECIFICATIONS ACCEPTED.

Open to opposition for two months.

275, T. Oakley, Domestic Fire-grates.—4,413, Pope, Securing Sliding Window-sashes and tters.—5,094, S. Sutcliffe, The Hearths and Cheeks of Grates, &c.—5,264, E. Clowes, ges.—15,546, J. McConachy, Ventilators for Air

Valves.—15,685, J. & T. Jennens, Pattern-maker's Cap Dowels.—4,101, H. Walker and J. Clark, Dust Bins.—4,668, W. Wilson, Ornamenting Wall Papers.—6,327, D. Rogers & Son, Fire-grates.—3, J. McKay, Disinfecting Apparatus.

# RECENT SALES OF PROPERTY.

## ESTATE EXCHANGE REPORT.

FEB. 1.  
By HORNE, SON, & EVERSFIELD.  
Haver-square, Grosvenor-place—Profit rental of 228l. for three years..... £4'0  
Lambeth, Wandsworth-road—Rent charge of 100l. for 21 years..... 1,240

FEB. 2.  
By DEDHAM, TAWSON, & CO.  
Berthamstead, Hert's—The residence called "White Hill," and 6½ acres, freehold..... 3,500  
By SEDGWICK, SON, & WEALL.  
Watford—61 to 67 odd, St. Alban's-road, freehold..... 785

FEB. 3.  
By TONY & SONS.  
Mile End-road—9 to 15 odd, Willow-street, 4½ years, ground-rent 5l. 5s..... 710  
By A. & A. FIELD.  
Camberwell—24 and 26, Tindal-street, 74 years, ground-rent 8l..... 350

FEB. 4.  
By GEORGE HEAD & CO.  
Harewood-square—3, Melbury-terrace, 23 years, ground-rent 25l..... 555  
By DOUGLAS YOUNG.  
South Lambeth—9, Thorpe-street, 46 years, ground-rent 5l..... 300

By WILKINSON & SON.  
Brighton—44, Sussex-square, freehold..... 1,760

# MEETINGS.

SATURDAY, FEBRUARY 13.

Architectural Association—Visit to houses being erected in Collingham-road, South Kensington, from the designs of Messrs. George & Peto.

MONDAY, FEBRUARY 15.

Royal Institute of British Architects.—Mr. Alexander Bealey, M. Inst. C.E., on "Swedish Building Law." 8 p.m.

Royal Academy of Arts.—Lectures on Sculpture: Mr. A. S. Murray on "The Works of Polykleitos and Lysippos." 8 p.m.

Victoria Institute.—The Rev. Canon Isaac Taylor on "The Hittite Monuments."—8 p.m.  
Architectural Section of the Philosophical Society of Glasgow.—Mr. John Rennie on "Hydraulic Machinery for Buildings."

TUESDAY, FEBRUARY 16.

Royal Institution.—Professor C. T. Newton, C.B., on "The Unexploited Portion of the Greek and Roman Sculptures in the British Museum." 3 p.m.

Institution of Civil Engineers.—Mr. L. F. Vernon-Harcourt on "The River Seine." 8 p.m.

Manchester Architectural Association.—Paper by Mr. J. S. Crowther. 7.30 p.m.

WEDNESDAY, FEBRUARY 17.

Carpenters' Hall, London Wall.—Mr. Thos. Blashill on "Timber, its Growth, Seasoning, and Preparation for Use." 8 p.m.

British Archaeological Association.—Mr. J. Romilly-Allen on "Pre-Norman Stones at Keysham and Halton, Lancashire." 8 p.m.

Builders' Foremen and Clerks of Works' Institution.—Ordinary meeting. 8.30 p.m.

Society of Arts.—Prof. George Forbes on "Some Points in Electrical Distribution." 8 p.m.

THURSDAY, FEBRUARY 18.

Royal Academy of Arts.—Lectures on Architecture: Mr. G. F. Bodley, A.R.A., on "English Architecture of the Middle Ages." 8 p.m.

Society for the Encouragement of the Fine Arts.—Mr. G. C. Haite on "The Tendencies of Modern Art." 8 p.m.

Royal Institution.—Professor Chandler Roberts-Austen, F.R.S., on "Metals as affected by small quantities of Impurity." 3 p.m.

Society of Antiquaries.—8.30 p.m.  
Sanitary Engineering Association.—Mr. A. B. Burleigh on "Sanitary Engineering." 7.30 p.m.

Edinburgh Architectural Association.—Mr. W. Scott Morton on "Colour." 8.30 p.m.

FRIDAY, FEBRUARY 19.

University College.—Professor C. T. Newton, C.B., on "Greek Myths illustrated by Fictile Vases." 4 p.m.

# Miscellaneous.

**Croydon Street Improvements.**—The Corporation of the new borough of Croydon having advertised for designs and estimates for widening the three principal streets in the centre of the town, adjoining the Town-hall, twenty-four competitors entered the lists, and the result has been announced as follows:—First prize, 100l., has been awarded to design marked "A," by Mr. J. M. Beydon; second prize, 50l., to design marked "Ad Rem," by Messrs. J. D. Hayton and W. F. Potter; and third prize, 25l., to design marked "Tria juncta in uno literatim."

**Birkbeck Institution.**—Mr. J. D. Cogan will deliver a lecture on Wednesday evening, February 17th, at the Birkbeck Institution, Chancery-lane, entitled "Pottery and Porcelain." The lecture, which will be historically and practically illustrated, will commence at eight o'clock.

**Obituary.**—We announce with much regret the death of Mr. Thomas Fraser, aged 72, a surveyor and clerk of works, who was killed on the North London Railway on the evening of the 5th inst. He was an old member of the Provident Institution of Builders' Foremen and Clerks of Works.—The death is announced of M. Loison, the well-known French sculptor, which took place suddenly last week at Cannes. The deceased artist, who was formerly a pupil of David d'Angers, executed a considerable number of works, several of which were purchased by the French Government.

# The Earthquake as a Restoring Power.

We are so in the habit of regarding the earthquake as an agent of destruction, that it may sound paradoxical to assert that the phenomenon is surpassed by no other as a regenerative and restorative agent. Yet this is strictly the case. But for earthquakes, our continents would continually,—however slowly,—diminish in extent through the action of the sea-waves upon their borders, and of rain and rivers on their interior surfaces. "Had the primeval world been constructed as it now exists," says Sir John Herschel, "time enough has elapsed, and force enough, directed to that end, has been in activity, to have long ago destroyed every vestige of land." It is to the reproductive energy of the earth's internal forces that we are alone indebted for the very existence of dry land. To the same cause, undoubtedly, we owe the gradual process of change in the configuration of continents and oceans which has been for ages and still is in progress,—a process the benefit derived from which cannot possibly be called in question. Our forests and our fields derive their nourishment from soils prepared, for long ages, beneath the waves of ocean; our stores of coal and of many other important minerals, have been in like manner prepared for our use during the long intervals of their submergence; we build our houses, even, with materials many of which owe their perfect adaptation to our wants to the manner in which they have been slowly deposited on what was once the bed of ocean, and compressed to a due solidity and firmness of texture beneath its depths.—Mr. R. A. Proctor in "Knowledge" for February.

# Ancient Egyptian Textile Fabrics.

Herr Theodore Graf, of Vienna, who brought from Egypt the celebrated papyri, afterwards purchased by the Archduke Rainer, of Austria, has recently completed a fine collection of ancient Egyptian textile fabrics of wool and linen. He has obtained no less than 300 different specimens, which are all in an excellent state of preservation. They were procured from sepulchres, and represent the result of many years of labour in collecting and cleaning them. Every specimen is stitched upon a sheet of cardboard, and is protected from dust, &c., by fly-leaves. The size of the relic ranges from a foot square upwards. One of the largest and finest is an entire Roman toga, which is believed to be the only complete article of its kind that has been preserved from antiquity. The collection not only comprises many varieties of woven cloth, but also specimens of knitting, crevel, and needlework.

**The Ventilation of Sewers.**—There never will or can, we are convinced, be a final settlement of this issue until the absurd theories and devices of those who confound the behaviour of gas and vapour with that of water, and whose judgment is vitiated by other fallacies, have been utterly cast aside and abandoned. The particularly ridiculous notion that sewers can be ventilated by an arrangement which amounts to the construction of an inverted syphon,—the pure air to be drawn at the mouth of a low-level pipe, and the foul air ejected at the open mouth of a high-level pipe,—is probably one of the most mischievous and obstructive of prevailing misconceptions. As a matter of fact, there is only one way of effectually ventilating close drains and sewers, and that, happily, is an easy one. Pipes, which ought to be not less than 4 in. in diameter, as perpendicular as possible, and protected by a cowl at the summit, should be carried up from the drain or sewer to a point well above the level of the roofs of adjacent houses, and placed far away from chimneys. By means of these pipes the sewers may be properly ventilated. Sooner or later low-level or "surface" ventilators will be prohibited. We believe that to the agency of such apparatus, as disseminators of sewer gas, is to be ascribed much of the sickness which prevails in many localities.—*Lancet*.



**Sanitary Assurance Association.**—The fifth annual meeting of the Association was held at the Offices, 5, Argyll-place, Regent-street, on the 8th inst. Sir Joseph Fayer, K.C.S.I., F.R.S., in the chair. The secretary, Mr. Joseph Hixley, read the annual report and balance-sheet. The report mentioned that "The properties inspected during the year have, as usual, been of the most varied character, including cottages and residences of every class in London and the country, also mercantile offices, trading premises, and institutions of a public character. In every case of first inspection the sanitary arrangements have been found to be more or less defective; but with newly-built property there has been a marked improvement, necessitating fewer alterations to secure the sanitary certificates." The income of the year was 4621. 1s. as against 3101. 17s. 9d. in 1884, and after meeting all liabilities, a balance was carried forward. Sir Joseph Fayer proposed the adoption of the report. Professor Roger Smith, in seconding the motion, said that it was very satisfactory to hear of the improvement in newly-built property. This seemed to imply that the demand for houses with good sanitary arrangements was on the increase. Lord Fortescue, Dr. Danford Thomas, Lieut.-General Burne, Mr. Mark H. Judge, A.R.I.B.A., Mr. Andrew Stirling, Dr. Stevenson, and Mr. Kennett-Barrington spoke in support of the report, and it was adopted unanimously. Sir Joseph Fayer and Mr. Henry Rutherford were re-elected, and Mr. Henry Currey, F.R.I.B.A., was elected member of the executive council. Sir Joseph Fayer was re-elected President, and Professor Roger Smith was re-elected Vice-President of the Association for the ensuing year.

**The Æolus Waterspray Ventilating Company** have sent us three sheets of designs for casings for turret ventilators. The designs accord with various styles of work, and while hiding the naked unsightliness of the ventilators, the turrets are no planned as not to interfere with effectiveness of ventilation. The sheets will be found useful for reference. The Company have just received instructions to apply their complete system of heating, cooling, and ventilating to the Mary-street Memorial Schools, Taunton; to the Church of St. Barnabas, New Humberstone, Leicester; and to the Conservative Club, Birmingham.

**The New Street from Piccadilly-circus to New Oxford-street.**—The Works and General Purposes Committee of the Metropolitan Board of Works have decided to recommend the Board to name the new street from Piccadilly to Bloomsbury "Shaftesbury-avenue." As we have already observed (see p. 192, ante) there will be a certain appropriateness in the selection of this name, seeing that the Board has already granted a site in the prominent part of the new street for the erection of a statue to the late Lord Shaftesbury.

**The Committee of the School of Art Wood Carving**, which is now carried on at the Technical Institution, Exhibition-road, Kensington, have made arrangements to reduce the fees in the classes to students connected with the carving trade, thereby giving them an opportunity of advancing themselves in the knowledge of their business by studying under proper supervision and instruction a higher class of work than generally falls to the lot of apprentices and improvers in the workshop.

**Northumberland Avenue Hotel.**—The American Elevator Company have just been awarded the contract for the hydraulic elevators for the Northumberland Avenue Hotel. They are to be four in number, and of the standard hydraulic type. The water is to be furnished by means of a Worthington steam-pumping engine, so that the cost of working all four of these elevators will be simply the cost of fuel necessary to work the pump.

**Wellington (Somerset).**—Messrs. Russell & Gibbs have just finished a series of stained leaded windows for the new woollen warehouses of Mr. Egerton Burnett. They consist of heraldic achievements in rich colours on a tinted ground, with coloured borders. They will be on view for the next few days at Messrs. Russell & Gibbs' establishment, Wells-street, Oxford-street.

**At St. Mary's Abbey, Mill Hill**, a turret-clock, by Mr. J. W. Benson, of Ludgate-hill, has been erected by order of the Lady Abbess. The new clock shows time on a copper dial, 2 ft. 6 in. in diameter, striking the hours and chiming the quarters on two hemispherical bells.

**Rating of Mining and Manufacturing Machinery.**—The system adopted by many unions in the rating of the machinery at mines, iron, and other works, has long been looked upon as a serious grievance, but the trouble, annoyance, and cost of appealing have prevented those so taxed from appearing in court to test their liability. In some cases the plant and engines of all kinds, as well as the buildings, are valued and assessed. At works where there is a large expenditure of steam the engines are taxed for rating purposes, and this, as a rule, has been submitted to, for the reason already given. But we are glad to find that a change is now being made for the purpose of testing the question as to whether certain machinery is liable to be rated or not. The question, very properly, has been taken up by a most influential body, the Iron Trades Employers' Association. The appeal, in which the nominal appellants are Sir Joseph Whitworth & Co., of the Openshaw Works, near Manchester, will, of course, be fought out to the far end, regardless of expense, funds for that purpose being raised principally by the Lancashire members of the Association. The appeal was opened at the Salford Court of Sessions, when it was stated that the overseers had assessed the works on the rateable value of 8,327l., and this included all the machinery which increased the value of the works as a going concern, and such as might be let in the event of their being transferred or sold. On the part of Sir Joseph Whitworth & Co. it was contended that the light machinery and tools, which might be considered movable, were not assessable, but only that portion which constituted the first motive power and was thoroughly affixed to the freehold. It was stated that the appellants were most anxious to have the case taken to the House of Lords for an authoritative and final decision. The result will be looked forward to with no ordinary interest by mine-owners and large users of steam power throughout the country, more especially those connected with the iron and engineering industries.—*Mining Journal.*

**Conservation of Water.**—Mr. Tarbotton, the Borough Engineer of Nottingham, in his report attached to the Report of the Water Committee for 1885, observes:—"Another point is the conservation of the water. I have so repeatedly referred to this, that I need not now enlarge upon it. I do not mean, for a moment, the restriction of delivery; or, on the contrary, the most reasonable and proper supply in all directions; but there is a great tendency on the part of the public to disregard the value of water, and the cost of obtaining it. Taps are allowed to run, in many cases, half their power; in multitudinous instances to dribble, and the aggregate of all these means a serious waste. I believe the waste inspectors are doing their duty, and there is a very vigilant inspection of all fittings, but still there is much loss which might be prevented. If the public would aid the Committee, by individually reporting defective fittings at the Water Office, either by a simple post-card, or by calling, they would contribute greatly to their own benefit. All taps are relathered at the cost of the department, and the effect of allowing water to escape without being properly used is to damage the houses externally and internally; to produce personal nuisance; to cause a wasteful expenditure of money, and to increase the cost of public water supply. There is no doubt that those who cause wanton or mischievous waste should be persistently punished, under the powers which the Corporation, with other corporations and companies, fully possess."

**Building at Clapham.**—There are few portions of the metropolitan suburbs where building has been going forward at a greater rate during the last few years than in that part of Battersea and Clapham in the immediate locality of Clapham Junction. It is computed that no fewer than 6,000 houses and shops have recently been erected in the neighbourhood. These are now being further increased by a large number of new residential buildings which are in course of erection on the St. John's Hill Estate. This estate, which extends from the foot of St. John's Hill, opposite Clapham Junction, to Battersea Rise on the south, and to a portion of Wandsworth Common on the west, and stretching to the boundary grounds of the Freemasons' Schools, was sold about twelve months ago for 16,000l., and will shortly be covered with between four and five hundred houses.

**The National Providence League** for promoting universal insurance against destitution in sickness, infirmity, and old age is doing good work in calling attention to the subject of thrift, and the lessons of the present time of depression are likely to go a long way in enforcing attention to its proposals. In the *Reporter*, the quarterly organ of the League, there is a great deal of interesting matter bearing on the subject, including an address by Mr. James S. Randall (of the well-known firm of Randall & Saunders), who is a member of the Central Council of the League. Mr. Randall, in commencing his address, invited attention to the great effort in thrift that was being made, evidenced by the 92,000,000. in the savings banks, by the large yearly contributions paid to friendly societies, and by the amounts paid to the industrial life insurance and burial societies. The savings of the industrial classes are largely and important, and he expressed his regret that the large amounts invested in friendly societies and insurance societies did not work out for them the benefit to which the self-denial exercised entitled them. He maintained that the inadequacy of the present organisations was evidenced by the numbers who, notwithstanding all their thrift and self-denial, in their old age gravitated to the workhouse. Mr. Randall set before the meeting the organisation proposed by the Rev. Canon Blackley, that everyone should secure themselves against pauperism, and urged that the ages eighteen to twenty-one were those when a minimum provision for sickness and old age should be secured; that this minimum provision secured, and all fear of pauperism removed, would place each individual worker on a better platform for advancement in life; that there would then be in a better position to secure themselves further protections, either by entering on sound friendly societies with payment arranged on the honest basis of the members having all they pay for, or other sound investment of their savings; and concluded with the observation, that in the organisations proposed by the Rev. Canon Blackley stability is assured.

**Dunfermline.**—The new High School at Dunfermline was opened on the 5th ult. Messrs. Holme & Mercer, of Liverpool, are the architects, and Mr. W. Swinton fulfilled the duties of master of works. The contractors for the various works were:—Mr. George Dick, for mason's work; Messrs. Mitchell & Kinghorn, for joiner's work; Mr. A. Rolland, for plumber and gasfitter's work; Messrs. M'Quinn & Lamb, for slater's work; Messrs. A. & J. McGregor, for plasterer's work; Messrs. Bennett & Son, for ironwork; Mr. A. Lowe, for glazier's work; all of Dunfermline; Messrs. Stuart & Co., Edinburgh, for granolithic work; Messrs. Robinson & Son, Edinburgh, for heating work; Mr. Roger Lowe, Farnworth, for wood block flooring work; Mr. Hooper, Glasgow, for ornamental glass work; Mr. Stevens, Leeds, for ventilation extractors; Mr. H. Thompson, Birkenhead, for gasfittings; Mr. James Ross, Liverpool, for grates and stoves; and Messrs. Bonnar & Sons, Dunfermline, for ornament ironwork, railings, gates, &c. The carving was done by Mr. W. Neilson, Edinburgh. The designer was Mr. A. Lawrie, George-street, Edinburgh. A view of the school was published in the *Builder* for Nov. 14 last.

**Association of Public Sanitary Inspectors.**—At the usual monthly meeting of the Association, held on Saturday last, a paper was read by Mr. Buckworth (St. Savion District Board) on the legislation regulating the preparation and sale of "Food and Drugs." The paper concluded by pointing out that the public analyst was now far more in request than formerly. A discussion followed, in which the Chairman (Mr. Jerram, C.E.), and Messrs. Rains, Alexander, Fisher, Hall, and others took part. Most of the speakers complained of the Act as rendered almost inoperative through the leniency of magistrates, who inflicted ridiculously small in amount; and some of them were of opinion that officials other than the sanitary inspector should be charged with duty of carrying out the Act.

**"A Large Gasholder."**—We are asked mention that the gasholder for the Imperial Continental Gas Association's works at Ebbw Vale is a "triple-lift telescope," and that it has been designed and is in course of construction by Messrs. C. & W. Walker, of the Midland Iron Works, Donnington, near Newport, Salop. The tank and the building which will cover the holder are already completed.



* Accepted.	T. H. Selvidge, Leicester ..	6d.	1s. 3d.
H. W. Ward, Worcester ..	E. Tempest, Keighly (Yorks) ..	6d.	1s. 1d.
J. B. Leitch, Glasgow ..	B. W. Ward, Worcester ..	7d.	1s. 1d.
(Leicester-shire)	* Accepted.		
J. Robinson, jun., Bury ..	LONDON - For repairs and decorations at St. Stephen's Church, Coleman-street, City. Mr. J. Ebenezer Saunders, architect ..		
A. Mason & Sons, Haverhill ..	Calls ..	£347	0
G. E. Smith, Bury ..	Smith ..	275	0
A. H. Hancher, Bury ..			
Everett & Sons, Colchester ..			
F. Tuckie, Bury ..			
Shelton & Son, Bury ..			



**LONDON.**—For extension of St. George's in the East Workhouse and Infirmary, Prince's-street, Old Gravel-lane, for the Guardians of the Poor of the Parish of St. George-in-the-East. Messrs. Wilson, Son, & Alcock, architects, East India-street. Quantities supplied:—

F. R. Tozer .....	£15,971 0 0
John Currow .....	15,970 0 0
W. L. Kellaway .....	14,967 0 0
W. J. Hack .....	14,484 0 0
G. & J. Green .....	14,303 0 0
Staines & Son .....	14,250 0 0
Balsam & Co. ....	14,150 0 0
F. & J. Wood .....	13,951 0 0
Samuel Chasen .....	13,901 0 0
Kirk & Randall .....	13,763 0 0
J. Hearle & Son .....	13,449 0 0
W. F. Crocker .....	13,442 0 0
J. Walker .....	13,343 0 0
W. Johnson .....	13,113 0 0
J. T. Chappell .....	12,973 0 0
Harris & Wardrop ..	12,781 0 0
H. Hart .....	12,777 0 0
W. Bras & Son .....	12,634 0 0
Kirk & Randall .....	12,244 0 0
G. W. Wyatt & Co. ....	11,981 0 0
Charles Cox (accepted) ..	10,999 0 0
M. A. Palmer & Co. ....	10,999 0 0

**LONDON.**—For proposed Artisans' Dwellings, Cartwright-street, Whitechapel, for Mr. Alfred C. de Rothschild, Messrs. Wilson, Son, & Alcock, architects, 2, East India-street, Leadenhall-street. Quantities supplied:—

Cender .....	£9,852 0 0
Mount .....	9,789 0 0
Hall, Beddall, & Co. ....	9,698 0 0
Bywaters .....	9,564 0 0
Kirk & Randall .....	8,387 0 0
Sparks .....	7,484 0 0

**LONDON.**—For repairs, &c., to the Britannia public-house, Latimer-road, Notting hill, for Mr. Edmunds, Mr. H. I. Newton, architect, Queen Anne's Gate:—

Riddle .....	£698 0 0
Speacer & Co. ....	521 0 0
Burman & Son .....	400 0 0
Steel Bros. (accepted) ..	375 0 0

**LONDON.**—For building workshop at the rear of 165, Pentonville-road, for Mr. H. B. Tr. Messrs. Watson & Soames, architects, Nottingham-pis e:—

Barnford .....	£275 0 0
Cosper .....	370 0 0
Turner .....	361 0 0
Riley Bros. (accepted) ..	349 0 0

**ORPINGTON (Kent).**—For erecting four cottages, Broom-hill. Mr. F. J. Chambers, architect:—

Lorden & Son, Upper Tooting (accepted) ..	£260 0 0
---	----------

**RICHMOND (Surrey).**—For foreman's cottage, stores, &c., in the Parish-yard. Mr. W. Brooke, & M. Inst. C.E., Town Surveyor. Quantities by Mr. C. M. Houghton, surveyor, Portsmouth:—

C. Eldridge, Richmond .....	£1,450 0 0
Sweet & Loder, Richmond ..	794 0 0
J. G. B. Marshall, Brighton ..	725 0 0
C. Maton, Kew .....	690 0 0
Peirce & Lansdowne, Richmond ..	679 0 0
F. Sims, Richmond (accepted) ..	675 0 0

[Surveyor's estimate, 7387]

**RICHMOND (Surrey).**—For additional stabling in the Parish-yard. Mr. Walter Brooke, Town Surveyor:—

C. Eldridge, Richmond .....	£153 0 0
J. G. B. Marshall, Brighton ..	141 0 0
F. Sims, Richmond .....	155 0 0
Sweet & Loder, Richmond ..	127 0 0
Peirce & Lansdowne, Richmond ..	121 0 0
C. Maton, Kew (accepted) ..	123 0 0

[Surveyor's estimate, 1317]

**STOCKTON.**—For the construction of reservoirs for the Stockton and Middlesbrough Water Board:

Contract No. 8.—Fighting Cocks Reservoir.	
Thos. Hunt, South Stockton .....	£7,717 9 9
Robert Wilkinson, Middlesbrough ..	6,787 19 9
Jonathan Vickers, Bishop Auckland ..	6,401 14 0
Barry & Barry, Radcliffe-on-Trent ..	5,881 14 0
Foster & Barry, Radcliffe-on-Trent ..	5,781 4 1
Walker & Dickinson, Saltburn .....	5,189 1 3
William Kitching, Fighting Cocks ..	5,169 3 6
T. D. Ridley, Middlesbrough .....	5,123 11 8
Charles Pirb, Scarborough .....	5,072 9 0
S. W. Pilling & Co., Manchester ..	4,848 12 10
Abram Kellett, Belling, Middlesbrough ..	4,807 9 10
John Jackson, Westminister .....	4,638 19 3
E. H. & G. Allison, Sunderland ..	4,508 2 4
W. C. Atkinson, Stockton .....	4,393 9 4
John Wood & Son, Leeds .....	4,257 4 1
George Marshall, Darlington .....	

Contract No. 9.—Sauldridge Reservoir.	
Thos. Hunt, South Stockton .....	£27,637 13 4
W. C. Atkinson, Stockton .....	23,069 15 6
Robert Wilkinson, Middlesbrough ..	22,811 5 0
Perker & Sharpe, Batley .....	20,259 13 6
Foster & Barry, Radcliffe-on-Trent ..	19,868 18 4
T. D. Ridley, Middlesbrough .....	19,503 9 0
Abram Kellett, Belling .....	17,719 9 3
S. W. Pilling & Co., Manchester ..	17,616 1 4
John Jackson, Westminister .....	17,325 2 7
Walker & Dickinson, Saltburn .....	16,832 10 9
E. H. & G. Allison, Sunderland ..	16,557 0 3
John Wood & Son, Leeds .....	16,167 19 10
Geo. Marshall, Darlington .....	15,744 3 9
John Johnson & Son, Middlesbrough ..	

**SPECIAL NOTICE.**—Lists of Tenders frequently reach us too late for insertion. They should be delivered at our office, 46, Catherine-street, W.C., not later than four p.m. on THURSDAYS.

### TO CORRESPONDENTS.

Registered Telegraphic Address, "THE BUILDER, LONDON."

We have failed to see the article "Electric Light on the Stage" (the arrangement was carried out long ago at the Savoy). Therefore, on its main point—S. H. M. & Co.—we cannot see anything to be gained by printing unpracticable proposals.—C. E.

All statements of facts, lists of tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication. We are compelled to decline pointing out books and giving addresses.

Notice.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

Letters or communications beyond mere news items which have been duplicated for other journals, are NOT DESIRED.

All communications regarding literary and artistic matters should be addressed to THE EDITOR, all communications relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

### PUBLISHER'S NOTICES.

Registered Telegraphic Address, "THE BUILDER, LONDON."

#### CHARGES FOR ADVERTISEMENTS.

**SITUATIONS VACANT, PARTNERSHIPS, APPRENTICESHIPS, TRADE, AND DOMESTIC ADVERTISEMENTS.**  
Six lines (about fifty words) or under ..... 3s. 6d.  
Each additional line (about ten words) ..... 1s. 6d.  
Terms for notice of Trade Advertisements, also for special Advertisements on front page, Competitions, &c., Sales by Auction, &c., may be obtained on application to the Publisher.

**SITUATIONS WANTED.**  
FOUR Lines (about THIRTY words) or under ..... 2s. 6d.  
Each additional line (about ten words) ..... 1s. 6d.

**PAYMENT IS ABSOLUTELY NECESSARY.**  
\*\* Stamps must not be sent, but all small sums should be paid by Cash in Registered Letter or by Money Order, payable at the Post Office, Covent-garden, W.C. to

DOUGLAS FOUNDRY, Publisher.

Addressed to No. 46, Catherine-street, W.C.

Advertisements for the current week's issue must reach the Office before THREE o'clock p.m. on THURSDAY.

The Publisher cannot be responsible for DRAWINGS, TESTS, or any recommendations that of the latter COPIES ONLY should be sent.

**SPECIAL.**—ALTERATIONS IN STANDING ADVERTISEMENTS. Must reach the Office before TEN o'clock on WEDNESDAY mornings.

PERSONS advertising in "The Builder," may have Replies addressed to the Editor, 46, Catherine-street, Covent-garden, W.C. free of charge. Letters will be forwarded if addressed envelopes are sent, together with sufficient stamps to cover the postage.

### TERMS OF SUBSCRIPTION.

"THE BUILDER" is supplied weekly from the Office to residents in any part of the United Kingdom at the rate of 15s. per annum. For all parts of Europe, Australia, and New Zealand, 20s. per annum. To India, China, Ceylon, &c., 30s. per annum. Remittances payable to DOUGLAS FOUNDRY, Publisher, No. 46, Catherine-street, W.C.

### Best Bath Stone, for Winter use.

WESTWOOD GROUND,  
Box Ground,  
Combs Down, {  
Corsham Down, and { Summer  
Farleigh Down. { Dried.  
RANDELL, SAUNDERS, & CO., Limited  
Corsham, Wilts. [ADVT]

### Box Ground Stone

is the best for use in all exposed positions, being a well-known and tried Weather Stone, 50,000 ft. cube in stock.  
PICTOR & SONS,  
BOX, S.O., WILTS. [ADVT]

### Doubling Freestone.

The stone from these quarries is known as the "Weather Beds," and is of a very crystalline nature, and is doubtless one of the most durable stones in England. It is of the same crystalline nature as the Chelchynch Stone, but finer in texture, and more suitable for fluted moulded work.

THE CHELYNCH STONE.

THE BRAMBLEDITCH STONE.

HAM HILL STONE.

Greater facilities have been provided for working these quarries, and the stone can be supplied in large quantities at short notice.

Prices, and every information given, on application to CHARLES TRASK & SON.

Norton-sub-Hamdon, near Ilminster, Somerset.

London Agent—Mr. E. WILLIAMS,

16, Craven-street, Strand, W.C. [ADVT]

**Doubling Free Stone** For prices, &c., address S. & J. STAPLE.

**HAM HILL STONE.** Quarry Owners, Stone and Lime Merchants.

**BLUE LIAS LIME.** Stoke - under - Ham.

(Ground or Lump), Ilminster. [ADVT]

**Ham Hill Stone!** Ham Hill Stone!

For Ham Hill Stone of best quality and workmanship, apply to JOHN HANN & SON, Quarry Owners, Montacute, Ilminster. Establishments.

1837, Agents, MATTHEWS & GEARD, Albion Wharf, Regent's Park Basin, N.W. [ADVT]

**Asphalte.**—The Seyssel and Metallic Ltd.

Asphalte Company (Mr. H. Glenn), Office, Poultry, E.C.—The best and cheapest material for damp courses, railway arches, washers, floors, flat roofs, stables, cow-sheds, and mix rooms, granaries, tan-rooms, and terraces. [ADVT]

**Asphalte.**—The Seyssel and Metallic Ltd.

Asphalte Company (Mr. H. Glenn), Office, Poultry, E.C.—The best and cheapest material for damp courses, railway arches, washers, floors, flat roofs, stables, cow-sheds, and mix rooms, granaries, tan-rooms, and terraces. [ADVT]

**Asphalte.**—The Seyssel and Metallic Ltd.

Asphalte Company (Mr. H. Glenn), Office, Poultry, E.C.—The best and cheapest material for damp courses, railway arches, washers, floors, flat roofs, stables, cow-sheds, and mix rooms, granaries, tan-rooms, and terraces. [ADVT]

**Asphalte.**—The Seyssel and Metallic Ltd.

Asphalte Company (Mr. H. Glenn), Office, Poultry, E.C.—The best and cheapest material for damp courses, railway arches, washers, floors, flat roofs, stables, cow-sheds, and mix rooms, granaries, tan-rooms, and terraces. [ADVT]

**Asphalte.**—The Seyssel and Metallic Ltd.

Asphalte Company (Mr. H. Glenn), Office, Poultry, E.C.—The best and cheapest material for damp courses, railway arches, washers, floors, flat roofs, stables, cow-sheds, and mix rooms, granaries, tan-rooms, and terraces. [ADVT]

**Asphalte.**—The Seyssel and Metallic Ltd.

Asphalte Company (Mr. H. Glenn), Office, Poultry, E.C.—The best and cheapest material for damp courses, railway arches, washers, floors, flat roofs, stables, cow-sheds, and mix rooms, granaries, tan-rooms, and terraces. [ADVT]

**Asphalte.**—The Seyssel and Metallic Ltd.

Asphalte Company (Mr. H. Glenn), Office, Poultry, E.C.—The best and cheapest material for damp courses, railway arches, washers, floors, flat roofs, stables, cow-sheds, and mix rooms, granaries, tan-rooms, and terraces. [ADVT]

**Asphalte.**—The Seyssel and Metallic Ltd.

Asphalte Company (Mr. H. Glenn), Office, Poultry, E.C.—The best and cheapest material for damp courses, railway arches, washers, floors, flat roofs, stables, cow-sheds, and mix rooms, granaries, tan-rooms, and terraces. [ADVT]

**Asphalte.**—The Seyssel and Metallic Ltd.

Asphalte Company (Mr. H. Glenn), Office, Poultry, E.C.—The best and cheapest material for damp courses, railway arches, washers, floors, flat roofs, stables, cow-sheds, and mix rooms, granaries, tan-rooms, and terraces. [ADVT]

**Asphalte.**—The Seyssel and Metallic Ltd.

Asphalte Company (Mr. H. Glenn), Office, Poultry, E.C.—The best and cheapest material for damp courses, railway arches, washers, floors, flat roofs, stables, cow-sheds, and mix rooms, granaries, tan-rooms, and terraces. [ADVT]

**Asphalte.**—The Seyssel and Metallic Ltd.

Asphalte Company (Mr. H. Glenn), Office, Poultry, E.C.—The best and cheapest material for damp courses, railway arches, washers, floors, flat roofs, stables, cow-sheds, and mix rooms, granaries, tan-rooms, and terraces. [ADVT]

**Asphalte.**—The Seyssel and Metallic Ltd.

Asphalte Company (Mr. H. Glenn), Office, Poultry, E.C.—The best and cheapest material for damp courses, railway arches, washers, floors, flat roofs, stables, cow-sheds, and mix rooms, granaries, tan-rooms, and terraces. [ADVT]

**Asphalte.**—The Seyssel and Metallic Ltd.

Asphalte Company (Mr. H. Glenn), Office, Poultry, E.C.—The best and cheapest material for damp courses, railway arches, washers, floors, flat roofs, stables, cow-sheds, and mix rooms, granaries, tan-rooms, and terraces. [ADVT]

**Asphalte.**—The Seyssel and Metallic Ltd.

Asphalte Company (Mr. H. Glenn), Office, Poultry, E.C.—The best and cheapest material for damp courses, railway arches, washers, floors, flat roofs, stables, cow-sheds, and mix rooms, granaries, tan-rooms, and terraces. [ADVT]

**Asphalte.**—The Seyssel and Metallic Ltd.

Asphalte Company (Mr. H. Glenn), Office, Poultry, E.C.—The best and cheapest material for damp courses, railway arches, washers, floors, flat roofs, stables, cow-sheds, and mix rooms, granaries, tan-rooms, and terraces. [ADVT]

**Asphalte.**—The Seyssel and Metallic Ltd.

Asphalte Company (Mr. H. Glenn), Office, Poultry, E.C.—The best and cheapest material for damp courses, railway arches, washers, floors, flat roofs, stables, cow-sheds, and mix rooms, granaries, tan-rooms, and terraces. [ADVT]

**Asphalte.**—The Seyssel and Metallic Ltd.

Asphalte Company (Mr. H. Glenn), Office, Poultry, E.C.—The best and cheapest material for damp courses, railway arches, washers, floors, flat roofs, stables, cow-sheds, and mix rooms, granaries, tan-rooms, and terraces. [ADVT]

**Asphalte.**—The Seyssel and Metallic Ltd.

Asphalte Company (Mr. H. Glenn), Office, Poultry, E.C.—The best and cheapest material for damp courses, railway arches, washers, floors, flat roofs, stables, cow-sheds, and mix rooms, granaries, tan-rooms, and terraces. [ADVT]

**Asphalte.**—The Seyssel and Metallic Ltd.

Asphalte Company (Mr. H. Glenn), Office, Poultry, E.C.—The best and cheapest material for damp courses, railway arches, washers, floors, flat roofs, stables, cow-sheds, and mix rooms, granaries, tan-rooms, and terraces. [ADVT]

**Asphalte.**—The Seyssel and Metallic Ltd.

Asphalte Company (Mr. H. Glenn), Office, Poultry, E.C.—The best and cheapest material for damp courses, railway arches, washers, floors, flat roofs, stables, cow-sheds, and mix rooms, granaries, tan-rooms, and terraces. [ADVT]

**Asphalte.**—The Seyssel and Metallic Ltd.

Asphalte Company (Mr. H. Glenn), Office, Poultry, E.C.—The best and cheapest material for damp courses, railway arches, washers, floors, flat roofs, stables, cow-sheds, and mix rooms, granaries, tan-rooms, and terraces. [ADVT]

**Asphalte.**—The Seyssel and Metallic Ltd.

Asphalte Company (Mr. H. Glenn), Office, Poultry, E.C.—The best and cheapest material for damp courses, railway arches, washers, floors, flat roofs, stables, cow-sheds, and mix rooms, granaries, tan-rooms, and terraces. [ADVT]

**Asphalte.**—The Seyssel and Metallic Ltd.

Asphalte Company (Mr. H. Glenn), Office, Poultry, E.C.—The best and cheapest material for damp courses, railway arches, washers, floors, flat roofs, stables, cow-sheds, and mix rooms, granaries, tan-rooms, and terraces. [ADVT]

**Asphalte.**—The Seyssel and Metallic Ltd.

Asphalte Company (Mr. H. Glenn), Office, Poultry, E.C.—The best and cheapest material for damp courses, railway arches, washers, floors, flat roofs, stables, cow-sheds, and mix rooms, granaries, tan-rooms, and terraces. [ADVT]

**Asphalte.**—The Seyssel and Metallic Ltd.

Asphalte Company (Mr. H. Glenn), Office, Poultry, E.C.—The best and cheapest material for damp courses, railway arches, washers, floors, flat roofs, stables, cow-sheds, and mix rooms, granaries, tan-rooms, and terraces. [ADVT]



## ILLUSTRATIONS.

Liverpool Cathedral Competition: West Elevation.—Design by Mr. Wm. Emerson, Architect	304-305
"Peace and Plenty": Decorative Design by Mr. R. A. Bell.—Awarded the Prize, Royal Academy Students' Competition, 1885	308-311
A Warehouse in Cannon-street, Manchester.—Messrs. Muirhead & Baldwin, Architects	314
Schools at Claygate, near Esher.—Mr. Richard J. Lovell, Architect	315

## CONTENTS.

A Book on Tapestry	293	Liverpool Cathedral Competition.—Design by Mr. W. Emerson	304	Books: Lacroix's Arts in the Middle Ages (Vartus, Spaul)	320
Notes	294	Decorative Design: "Peace and Plenty"	302	Architects', Builders', and Contractors' Pocket-Book of	320
The Unauthorised Sculptures in the British Museum: Greek	296	Warehouse, Manchester	302	Prices; Lockwood's Builders' and Contractors' Price Book;	320
Monuments, Chiefly Sepulchral	297	Schools at Claygate for the Thames Ditton School Board	301	Emile's James Nasmyth, Engineer (Murray; Chalmers)	321
Royal Institute of British Architects	297	Details from Staples Inn (Illustrated)	302	Combined Number and Weight Calculator (Lowe)	321
New Houses and Fairs at Kensington: Visit of the Archi-	298	Free Lectures to Artisans at Carpenters' Hall.—Timber: Its	302	Stoney's Strength and Proportions of Riveted Joints (Lowe)	321
tectural Association	298	Growth, Seasoning, and Preparation for Use.	302	McCallum's Particulars of the Municipal and Sanitary Works	322
Sewer Ventilation	298	Liverpool Cathedral Design	302	of Blackburn (Janson)	320
"The Practical Survey of Works in Progress": Architectural	298	St. Paul's Cathedral Design	302	Recent Patents	320
Associations	300	Architects' Power to Employ Surveyor	302	Recent Sales of Property	320
Competitions	301	Help for the Unemployed	302	Meetings	320
Obituary	301	The "Economiser"	302	Miscellaneous	321
Drawings for the Royal Academy	302	The Student's Column: Foundations.—VIII.	302	Prices Current of Building Materials	322

### A Book on Tapestry.\*



F a previous century is to be regarded as the period notable for the publication of encyclopædias and dictionaries, the present will surely be remarkable for the immense mass of books issued to in-

form people about art in all its numerous ramifications. Savary and Roland de la Platière attempted to bring into the compass of half a dozen portly folios all that had to be known in regard to commerce and industries, including among the latter those which nowadays are termed art industries. *Autres temps autres mœurs*, one may indeed say, when one glances over the materials for separate lists of books on art industries, each section of which is separately dealt with in hundreds of books. The production of these, many of them copiously illustrated by means of all the new processes of chromo-lithography, photogravure, engraving, and etching is astounding. Old information, raked out from unsuspected sources, is presented in new guise, and, bit by bit, a chain of history is forged to be handed down to posterity, and so to connect it with the misty past.

Thoughts like these occur to one on turning over the leaves (upwards of 500) of M. Jules Guiffrey's "Histoire de la Tapisserie," which has just been published at Tours, printed in good clear type, with all the charm of crisp definition common to the excellent typography of Messrs. Mame et Fils. The illustrations, for the most part, consist of impressions from delicately-cut blocks made from photographs of well-known, little-known, and typical samples of tapestries. Besides these, there are some four capital coloured plates, done in chromo-lithography, of hangings preserved in the Hôtel de Cluny at Paris, in the Cathedral of Angers, and in the Mobilier National at Paris. The accompanying text in which M. Guiffrey sets forth his history, is divided into long chapters. The first treats of tapestry before the fourteenth century, of which, according to the special sense of the title "tapestry," there are few traces. Next our attention is concentrated upon the important influence brought to bear upon the development of the industry by the Burgundian dukes and the French kings. In chapter III. we find a brief survey of the manufactures of tapestry during the fifteenth century which rose in France and Burgundy, under which

classification come Flanders and Brabant, and all that important district which includes the homes of the Van Eycks and Memling, whose characteristic drawing and colouring subjected innumerable imitators and influenced the preponderance of fifteenth-century tapestry designs. Allusion is also made to the tapestry-making centres in Italy, Spain, England, Germany, and Switzerland. From the ruin of the Arras manufactures until the abdication of Charles V., in 1555, forms another period. This is followed by one leading to the establishment of the Gobelins, Beauvais, and Aubusson factories. Then comes the decline of designs for tapestry, which occurred after the reign of Louis XIV. And the tenth chapter, in the meagre number of manufactures to which it relates, demonstrates a still further decline in the practice of the process.

The book is dedicated to the eminent artists who maintain the "glorious traditions" of the Gobelins manufacture of tapestry. For these gentlemen M. Guiffrey claims a superiority; at the same time admitting that sufficient recognition has not been paid to the fact that much fine work came from Artois and Flanders workmen long before the Gobelins factory was established. But these, in his zeal for the glory of France, he feels he has the right to claim as members of the one French family whose triumphs he sings. Thus a strong flavour running through his book is the assertion of a French monopoly in the art of tapestry making. This is certainly rather detrimental, and tends to obscure a calmer and more comprehensive survey of the circumstances which gave birth to this particular form of art industry, and somewhat needlessly makes the author appear as a prolix writer whose patriotic feelings supervene over those which one expects to direct an impartial historian, prepared, however, to make allowances for absolute statements that France alone has been the cradle of the art-industry, that she of all countries has inherited and cherished an uninterrupted practice of the art for six centuries, and that the reputation and superiority of her tapestries must be acknowledged as supreme, the reader of M. Guiffrey's History will find an abundance of information of a valuable character.

Following conventional lines, M. Guiffrey dips into periods of antiquity and glances at the important part which European relation with the East has played in the development of art in our continent, and thence proceeds to the oldest specimen of tapestry, the chief portion of which is now in the Museum at Lyons. This specimen, from the style of its pattern, probably dates from the thirteenth century. In it we have a series of repeated circular bands inclosing a group of apocalyptic beasts; the one a winged griffin with lion tail

and haunches; the other, beneath it, a chimerical bull. A small fragment of the border, a repeating four-branched scroll with a mask in the centre, is in the Kensington Museum.

At this point, one looks for a description of what constitutes tapestry as distinct from other textile productions made in a frame and having a warp and a weft. But Monsieur Guiffrey never once descends to so small a matter, so that when one encounters the reference to the first *haute-lisse*,—high warp or perpendicular frame,—and where it can have been used, the want of some concise explanation of this technical term is very apparent. Perpendicular and horizontal weaving-frames are to be found in use by various savage tribes, such as the modern Central African and the Mexican or Peruvian, whose degree of civilisation is lower than that of the peoples of France, England, and Germany in the thirteenth century. Weaving by this time had been brought to a high state of perfection in these countries, while for a thousand years previously the good people of Flanders had prospered as weavers. Hence the recorded use of a perpendicular frame or a horizontal frame at this period does not strike one as having much importance as directly bearing upon the origin of tapestry-making. In later times, the terms *haute-lisse* and *basse-lisse* have been appropriated to tapestry processes, but saving this appropriation the terms *haute* and *basse lisse* are equally applicable to ordinary weaving-frames, and both sorts of frames may have been contemporaneous in European employment during the thirteenth-century. Besides the weavers, of whose early history a good deal is known, a number of craftsmen known as *tapisseries* are mentioned in early records, and their name at once connects them with what would seem to be their probable productions, namely, *tapisserie*. Of the *tapisseries* there were two classes, *tapisseries sarrazinois* and *tapisseries noires*. The former possibly did work in the manner of the Saracens, whilst the latter did *notre*, or our work,—that is to say, a style of work in contradistinction to that of the Saracens. But it is to be observed that both classes have the same generic name of "*tapisserie*." Now, the "*tapisserie*" was, no doubt, the maker of those coarser fabrics which served as carpets and covers to cushions, hangings for curtains, and such like; and the appropriate method of making these articles may have been derived from the East, where carpets and rugs were long in use before French, English, or Flemings came to perceive their necessity as articles of comfortable use, or capable of rich decorative effect.

And now, looking to the actual method of making tapestries, either in a *haute-lisse*

Histoire de la Tapisserie depuis le Moyen Age jusqu'à nos jours. Par Jules Guiffrey. Tours: Alfred Mame et Fils, 1886.



or a *basse-lisse* frame, one sees that in its essential features of twisting various threads around warp threads, it closely resembles carpet-making. It is not, therefore, difficult to understand that an Oriental carpet imported into Flanders or France may have been sufficient suggestion to the dexterous weavers in inducing them to attempt an imitation of it. Instead of one carpet several probably came over; some, no doubt, with returning Crusaders, others in the ordinary way of trade, and hence imitations in method of work may have been simultaneously attempted at various places,—Rhenish towns, Flanders, Paris, and elsewhere, even London itself. A slight sketch of a theory like this might very well have engaged M. Guiffrey's facile pen, but he is somehow bent upon throwing cold water upon such commonplaces. He finds a register dating from 1294 in which records of carpets (*lapis à griffons*) are given as the property of a Count of Flanders at that time, but all he can say thereupon is in the shape of a question, "*S'agit-il de tapisseries proprement dites ou de toiles décorées d'un dessin rugueux?*" and this, too, when he has never given us an explanation of a *tapisserie proprement dite*.

In writing the history of an art it seems to be of the first importance that some clear outlines should be given of the particular art in regard to the process or craft as well as to the decorative effect which is aimed at in the exercise of the process. Undoubtedly the numerous illustrations in the book under discussion indicate many phases of design in its relation to tapestries. But here again one seems to want a closer and more compact suggestion of the way in which styles of design have linked themselves together, and how ideas set forth in one material have been repeated in another.

A leading feature, in the tapestries of what is usually considered the best period, is the rendering of figure subjects, expounding some religious or secular events or stories. The same character of expression is traceable in carvings, sculptures, paintings, and engravings produced at the same period. But the actual producer of the cartoons from which early tapestries of the fourteenth and fifteenth centuries are made, is rarely named. The names of the workers,—the *tapisiers*,—are of more frequent occurrence, but, beyond the antiquarian interest attaching to them, there is not much to engage useful thought in the mention, for instance, of Jehan, le *tapisier de Paris* (1308), of Jehan Bouilli, d'Arras, and Jehan Huoquedieu, *tapisier sarrainois*, of rather later date. M. Guiffrey has collected a good deal of information about one Nicholas Bataille, a distinguished tapestry-maker, who appears as the undoubted maker of a suite of six tapestries figured with subjects from the Apocalypse, some of which are preserved to this day at Angers in the cathedral. His name occurs in connexion with those of many of his royal patrons, particularly Duke Louis I. of Anjou. Brother of Charles V. of France, this Burgundian duke was remarkable for his taste for the arts, and at one time Nicholas Bataille was his *vaut de chambre*. It is in the relations of details like these concerning the patrons of the art, and the tapestry-makers themselves, that M. Guiffrey's book may be said to team. Besides this, we have many references to the transference, by sale or gift, of numerous sets of hangings; as, for instance, when in 1395 three pieces are presented to the king of England by the Duke of Burgundy, and again when the "Romance of the Rose," wrought in tapestry, is given by Duke "Philippe le Hardi" to his brother the Duke de Berry.

It would be interesting to classify the subjects of these earlier tapestries. We frequently meet with episodes,—such as the "History of the King of Cyprus in search of Adventures," the "Conquest of Babylon by Alexander the Great," the "History of Charlemagne," the "History of Bertrand du Guesclin," of "Hector of Troy," of "Parceval le Gallois,"—the hero of the Holy Grail,—"Miracles of Saints," Biblical incidents, "Eau and Jacob," the "Passion," "History of Judas Maccabeus," "History of the Twelve Apostles and Twelve Prophets," and hundreds of similar stories,—

more or less reflecting the chivalric, warriorlike, and religious temper of the times. Such as these are produced and reproduced over and over again, but from whose pencils the original designs came there is no apparent means of discovery. One main fact asserts itself, and that is the vast output of these decorative hangings. Paris and Arras, according to Monsieur Guiffrey, appear to have been the more thriving and industrious centres. That their productions were principally transcripts, in the matter of design, from the compositions of the early Flemish School of Painters, seems also to be established. At the same time there were factories in Flanders, at Brussels, Tournai, Lille, and elsewhere, whilst at Prague, in the fourteenth century, Charles IV. set up a factory under French *tapisseries*. Of England, M. Guiffrey has little to say, excepting that she seems to have made no effort to produce tapestries in the fourteenth century. Nevertheless, in 1344, Edward III. passed an Act regulating the manufacture of tapestries, whilst in 1392 the Earl of Arundel disposed by will of the tapestry hangings in his castle, which had been recently made in London in blue, with red flowers. These instances, which point to the organisation of the industry as likely to have taken place early in the fourteenth century, are mentioned by M. de Champeaux, another more modest writer on the subject, but are quite ignored by M. Guiffrey.

From the commencement of the general century onwards the evidence of the general making of tapestry in the northern portions of Europe is supported by many records, and it would seem that, from the middle of the fifteenth century to the commencement of the sixteenth, the more stupendous and splendid tapestries were made. Of these we have excellent engravings in M. Guiffrey's book, and it is scarcely to be wondered at that in a plethora of materials he should not have made some detailed mention of the many fine tapestries extant in England. At Coventry, Hatfield House, Hampton Court, and at the South Kensington Museum he would have found some most notable specimens,—amongst them a series of great hangings illustrative of the Triumphs of Petrarch, which we noticed in April, 1884. Like other subjects, various editions of these Triumphs were put forth by the tapestry-makers of different times, and recently a set of Petrarch's Triumphs, dating at least fifty, or even a hundred, years later than those at Hampton Court, have been lent by Lady Henry Somerset, for exhibition at South Kensington.

Notwithstanding that France has probably produced many more tapestries than any other nation, it seems that the gems of the art, stately in composition, finely drawn, and rich with sumptuous harmony of colour, have emanated from Flanders, in comparison with which the worsted and silken pictures from Gobelin and Beauvais cannot be discreetly named.

With the advance in the painter's skill to depict subtle effects of aerial perspective, atmosphere, and such like, the formality and flatness of drawing and composition, which so admirably lent themselves to great surface ornament, declined; and tapestry, after the middle of the sixteenth century, became a tame competitor with the painted canvas, striving to imitate the smallest nuances of tone and colour, which flowed from the painter's brush, so pushing aside real regard to the appropriate use of the material. Instead of hanging freely, the later tapestries came to be strained on panels and used as flat mural decorations. The fine borderings of well-arranged clustering flowers, fruits, and leaves, were superseded by woven imitations of the great, moulded frames of pictures, and the straggling *ormoulu* of Louis XV. Examples of these occur in the latter portion of M. Guiffrey's work. We have, however, probably said sufficient to show that whilst the book may not have answered our expectations in giving us food of a technical and æsthetic kind, it nevertheless abounds with varied historical facts interesting in themselves, quite apart from their association with the intrinsic elements of the art of tapestry-making.

## NOTES.

**A**FTER a fruitless existence, extending over eight years, the Lower Thames Valley Sewerage Board has just held its final meeting. It has, as all the world knows, failed in the object for which it was formed, viz., the designing and carrying out of a combined scheme of sewage disposal for the districts, embracing twenty parishes, of its constituent authorities. It has, moreover, spent over 40,000*l.* in the effort, and has nothing to show for the money but something under 300*l.* worth of furniture in the offices which it has occupied at Kingston. It seems generally admitted that the failure arose not from the impracticability of the object aimed at, or from any disproportionately large expenditure likely to be involved over that which would necessarily be incurred in the construction by the different composing authorities of distinct schemes, but rather from the keen and formidable opposition excited by the proposal to bring the sewage of twenty parishes to any one spot on the banks of the Thames and treat it there. The idea of this combined Board ran counter to the theory which regards sewage works, however perfect and however efficiently managed, as a necessary evil, which ought to be and can be best borne and dealt with by each parish separately. Several of the authorities of which the defunct Board was composed are already busy in the consideration of separate schemes in which large sums are about to be spent. The project of a comprehensive combined scheme for the Thames Valley, to which some eminent engineers have given a considerable amount of time and thought, seems destined to be in abeyance for some years to come. It is obvious that it would require some strong overruling power,—nothing less than a compulsory Act of Parliament, in the passing of which no account had been taken of local feeling or ideas,—to band together again these Thames Valley authorities for a purpose similar to that which the late Board attempted in vain, and at enormous cost, to carry out.

**T**HE recent announcement that the Invention Exhibition of last year has declared a loss, all the more serious inasmuch as it has swallowed up the savings of former exhibitions, is a pretty sure sign that these undertakings have been carried to an unreasonable extent. If true science were at the bottom of these things, any loss that resulted might well be put up with; but everybody knows that under the gilded pill lies amusement, pure and simple, and that the South Kensington Exhibitions are in reality, for the majority of those who frequent them, very little above the status of the Crystal Palace, the Albert Palace, the Aquarium, and other places of popular resort. A ten years' course of exhibitions was commenced by the late Sir Henry Cole, but it broke down ignominiously at the end of the third year; and the same fate will probably overtake any extension of the system after the Colonial celebration that will be opened next May. Probably very few people would regret their discontinuance, except those who make their money out of them, and we feel sure that the shopkeeping and manufacturing community would give a unanimous vote against their resumption,—at all events, for a considerable time. The day when we could show the world that we were superior to all competition is long past and gone, and there are now many other nations who have taken leaf out of our book, and who know well how to use it with advantage to themselves. It is doubtful, indeed, whether the Exhibition mania has brought any real and abiding profit to those who have been compelled to take part in it, and who have had for many years to pay a species of blackmail in the shape of large fees for space and carriage, besides experiencing a very decided hindrance to the steady progress of business. Viewing recent exhibitions even in the light of more enterprising ones, they are seldom financial successes; and when we look around London and note the dismal plight in which these undertakings are without exception, struggling to keep clear of bankruptcy, it must be conceded that the whole thing is very much overdone.



THE Metropolitan Board of Works, at its meeting on the 12th inst., spent about an hour in discussing the nomenclature of the new street from Piccadilly-circus to New Oxford-street, and a very amusing discussion it was. The Works and General Purposes Committee (as we stated in our last would be the case) presented a report recommending that the new line of thoroughfare be named "Shaftesbury-avenue." There were several amendments. The first one was that the name of the thoroughfare be "Ashley-street," on the more than questionable ground, adduced by the speaker, that if it were desired to commemorate the life's work of the late Lord Shaftesbury, it would be better done by the name "Ashley-street." This amendment was rejected by a very large majority. Mr. Selway (who at a previous meeting of the Board suggested the name "Piccadilly-East,"—a name as absurdly inappropriate as "Piccadilly-road," the original recommendation of the Committee) moved that the new thoroughfare be called "Dudley-street," on the ground that by the adoption of that course the old name of a part of the line of new thoroughfare would be retained; though, as was pointed out by another speaker, within living memory Dudley-street was called "Monmouth-street." This amendment, however, was negatived, as were others, one of which was that the street be called "Shaftesbury-street," thus boldly contravening the Board's By-law as to the naming of new streets. Another amendment was that the street should be called "St. Giles's-street," but this met with little support, one member saying that such a name would seriously depreciate the value of property in the street. In the course of the discussion, objection was taken to the term "avenue" by one member, because he said it could only be applied to "arborescent passages," and by another because it was American, or, as he put it, that it savoured of "Yankee Doodle." Ultimately the recommendation of the committee that the street be named "Shaftesbury-avenue" was agreed to by a large majority.

IN reference to our article last week on the discoveries at Winchester, the Dean of Winchester writes that he thinks it unlikely that the "New Minster" would have been built on the southernmost line of their territory, and that the remains laid bare are those of a Saxon church preceding the present Norman cathedral. He has just taken the dimensions, which are 157 ft. by 55 ft. There are no buttresses on the outside. The Dean's opinion that the Palace of William the Conqueror was placed due west of the New Minster and close to the High-street; in fact, where the map in the "Annals of Winchester" places it. He adds:—

"We have not found Prior Silktede's remains. There have been three bodies discovered,—(1) in the very centre of the Lady Chapel, a layman, his coffin without nails, tied up with beautifully plaited ropes of grass, and tarred outside (indicating, probably, removal from a distance). The body was in a winding-sheet of linen, and was entirely packed in hay, which remained perfectly sound. The hands are down by the sides, not crossed or on the breast. No jewel, ring, crozier, or other indication. It was in a place of great honour, and is a real puzzle. (2) Bishop Courtenay, in the crypt. (3) A bishop (not Prior Silktede), who lies under a great stone, with matrix of a splendid fifteenth-century brass, of a bishop, not a prior."

AS will be seen by a paragraph in another column, the scheme for the registration of plumbers initiated by the Plumbers' Company will commence on the 1st of March. In connexion with the announcement of this fact in the daily papers, two of those journals,—the *Standard* and the *Daily Telegraph*,—have, in leading articles published this week, waxed eloquent upon the shortcomings of plumbers and the consequent discomfort of householders. Incidentally both the journals named impute part of the blame for bad plumbing to District Surveyors, but the writers seem to be quite acquainted with the real duties of District Surveyors, which consist simply in seeing that the structural requirements of the Building

Acts are carried out, in order to secure stability and to diminish the spread of fires when they break out. District Surveyors, in their official capacity, have nothing to do with the plumbing or sanitary fittings of the buildings which they are appointed to oversee. It goes without saying that in the articles referred to, architects and clerks of works are, directly or by implication, blamed for bad plumbing in the houses of the people. The writers of such articles as those mentioned are evidently unaware of the fact that with the great majority of houses architects and clerks of works have nothing whatever to do.

THE Fulham Vestry-hall competition has again remained unsettled, the Vestry having, as mentioned in another column, carried an amendment to recall Mr. Currey and ask him to give further explanation as to his award. The whole matter appears, if half the reports circulated are true, to be very discreditable to some of those concerned in it. Architects, it is said, have been writing to Vestrymen, giving their names and asking for support in a competition which is nominally conducted under motto and on impersonal grounds. Vestrymen have been "nursing" their friends among the competitors. These kind of sub-plots are, unhappily, not uncommon in connexion with architectural competitions, but they seem to have found a congenial soil at Fulham, and to have flourished exceedingly. We hope the names of those architects who have attempted to get an unfair advantage over others by divulging their names and by personal canvassing will be made known.

THE designer of a public monument is naturally desirous that his work should be placed where it may appear to the greatest advantage. It is generally supposed that the most conspicuous position is the most desirable one, but an artist will prefer a spot where the new erection will most effectively group with the surroundings. A question of this nature has arisen between the local authorities in Edinburgh and Dr. Rowand Anderson with reference to the exact spot upon which the Bueclench Memorial is to be placed in County-square. The commonplace idea would be to erect the memorial in the centre of the square, but Dr. Anderson conceives that were it placed about 24 ft. west from the doorway of the cathedral the Memorial could then be placed facing to the west instead of the north, and would thus have the advantage of sunshine; it would also group more effectively with the cathedral, with which it assimilates in style, and would not form a harsh contrast with the Signet Library and County Buildings, which it would be apt to do were it placed in contiguity with either of them. The cathedral authorities object that if the proposed site were occupied by the memorial, the view of the great west doorway would be obstructed. This would be the case to some extent, but it might probably enhance rather than detract from the value of the doorway, which, like most Gothic features, is not most effective when viewed right in front. A similar objection was taken to the placing of the restored Market Cross at the east end of the cathedral, but it is found that, although it partially obstructs the view, the choir gains rather than loses by its proximity. Dr. Anderson was requested to prepare a perspective, showing the memorial upon the site proposed, to be submitted to a subsequent meeting.

THE death of Prince Torlonia at Rome is an incident well worth recording in any journal devoted to industrial affairs, because he represented a type of all that was most useful and necessary to a country, like United Italy, that is working its way steadily to a rapidly-improving condition of material prosperity. The Torlonias, who are now the wealthiest family in Italy, were really of French extraction, their name being Toulon, and their birthplace Auvergne, in France. The grandfather of the Prince settled in Italy and there introduced the manufacture of needles and lace, acquiring, during a tolerably long

life, a considerable fortune. The late Prince wisely determined to lay out a good portion of this in land, and eventually became the largest landed proprietor in the kingdom, being, no doubt, assisted in the matter by his having been in a position to lend money at various times to the Government, and by his having obtained the monopoly of tobacco, an income in itself. But Prince Torlonia spent his huge fortune as loyally as he made it, not only in unbounded charity, but in private and public works, on a scale such as had never before been undertaken, even with all the resources of the State. Of these the most magnificent was the drainage of the ancient Lake of Fucino, 50,000 acres in extent, a work which had been conceived by Julius Caesar, begun by Claudius Nero, continued by Trajan and Hadrian, and again attempted by Frederick II. and Alphonso of Arragon. The present enterprise was commenced in 1854 and terminated in 1876, no less than 1,725,000*l.* having been spent in the *emissarius*, canals, roads, and plantations. Unfortunately this vast outlay does not seem to have repaid itself so far, within the ten years that have elapsed since the whole was finished.

MR. MOON'S very plain speaking at the half-yearly meeting of the London and North-Western Railway Company, on the 16th current, should be pondered by all persons interested in railways. The earnings in the last half-year of the passenger trains, he said, were the worst they had ever had. They were less, per train mile, than had ever been earned on the line, and in addition to that, a train mile in 1885 meant something very different from a train mile in 1864. For example, the limited mail train weighed 55 tons in 1864. In 1874 it weighed 75 tons. In 1884 it weighed 165 tons. The Scotch mail train weighed 256 tons, driven at express speed, and at a pace never attempted twenty years ago. Thus, the work done per train mile was prodigiously increased, and yet the earnings per train mile were less. There had been a falling-off of 80,000 first-class passengers, of 160,000 second-class passengers, and of 350,000 third-class passengers, following on a decline of 250,000 of the last in the first half of 1885. Shareholders will thus fully concur in the hope expressed by the Chairman that "they would not be required to create any more capital for a year or two." Perhaps before they consent to do that, they may even ask for a debtor and creditor account of the low-priced mineral traffic.

MANY of our readers will see with regret the announcement of the death, on the 12th inst., at St. Augustine, Florida, of Mr. Randolph Caldecott. Mr. Caldecott was of a delicate physique, with a tendency to consumption, which was counteracted from time to time by a residence in Italy and the South of France during the most rigorous months of the year. Mr. Caldecott was as delightful personally as he was in his drawings, and all who knew him will remember with regret his gentle manners, and the quaint, old-world character of his conversation, which resembled very much his drawings in its humorous simplicity and entire absence of affectation.

AN important acquisition has been made by the French nation in the shape of the monument known in Jerusalem by the name of Qbour-el-Molouk, which has been for many years the subject of keen anxiety to French antiquaries. It is believed to have been the resting-place of the kings of Judah, and, as long ago as 1851, M. de Saulcy made some excavations here, and sent to the Louvre a fine sarcophagus-lid which was said to have belonged to the tomb of David. In 1864, the same explorer proposed to M. Isaac Pereire to join him in acquiring the ruins, and this was carried out after long and troublesome negotiations. Considerable building operations have taken place since, and a large wall built round the tomb, from which several remains of great interest have been extracted. The tomb has now been offered to and accepted by the State, and an inscription is



being put up recording the circumstances and the names of the donors and those connected with the works, such as M. De Saulcy, M. Pereire, M. Patrimoine, the French Consul at Jerusalem, and M. Mauss, the architect.

THE *'Εφημέρις* *Αρχαιολογική*, iii., 4, publishes a very interesting inscription, which gives back to us a sculptor of the fourth century B.C., who has hitherto been but a name. The inscription is engraved on a square block of Pentelic marble, built into a wall close to Beula's gate, in the Athenian Acropolis. The base originally supported a statue dedicated conjointly by two women, part of whose names only remains. Fortunately, beneath the dedication, the sculptor's name is complete, Πάνδιος ποιῆσαι: "Pandios made it." Oddly enough, all that literature tells us of this sculptor Pandios is a note by Theophrastus, in his "Hist. Plant.," ix., 13-4, in which he says that the sculptor Pandios went mad from eating the fruit of a plant while he was working in the sacred enclosure of Tegea. But just this mention of Tegea suggests to archaeologists that this very Pandios may have been at work there with Scopas, who was employed to rebuild the temple of Athene Alea; that temple which Pausanias noted as so "large and worthy to be inspected," and of the pediment sculptures of which, from the hand of Scopas himself, we have a few melancholy fragments.

ARE those of our readers who are London ratepayers aware of the nature of the little Bill which has been introduced into Parliament by the Metropolitan Board of Works? If not, we commend it to their consideration. It simply authorises the Board to make, or to oppose, any applications to Parliament that they may think proper "with respect to the supply of water in or near the metropolis"; and to defray the cost "as expenses of the Board." Viewed from the standpoint of the solicitor or the engineer who desires large schemes and long Parliamentary struggles, nothing can be more cheering; but how as to the ratepayers? The general outcome of the policy of the Metropolitan Board of Works, whether as regards their repeated and unsuccessful attempts to introduce a water supply of their own, or as regards their sturdy resolution to continue the pollution of the Thames, has hardly been such as to incline the ratepayers to make over to the uncontrolled pleasure of this body the right to expend any sum they please in fighting as to water supply for the next twenty years. Yet this,—with no limit, indeed, as to time,—is what the Bill proposes to authorise.

WE are glad to learn that a systematic attempt is to be made, by the co-operation of the Prince of Wales and the Mayors and principal authorities of the kingdom, to assist artisans in the provinces to visit the Indian and Colonial Exhibition, with due regard to economy. The exhibition will contain so much that will be valuable and suggestive in regard to art-workmanship, that it is to be hoped that a great number of those engaged in artistic handicrafts, more especially, may be enabled to see and study it. We will print the detailed proposals in our next.

IF, after the unhappy occurrence of the death of the poor boy who was run over the other day close to the Metropolitan Railway ventilator in Queen Victoria-street, the Railway Company do not take immediate steps to lower the ventilator, at least so far as to allow the drivers of vehicles to see crossing passengers, they will incur a very heavy responsibility in view of the recurrence of such an accident, which is by no means an unlikely contingency. It may be urged, no doubt, that if passengers exercised the precaution of not crossing close to the ventilator they would be in no danger of being run over; but it is impossible to reckon on the supposition that every person crossing at the spot should always bear in mind that there may be a vehicle unseen on the other side of the erection. It is necessary for public safety in a crowded city that drivers should be able

to see the roadway and passengers to see the vehicles; and the interposition in the middle of a street of a great erection which entirely blocks out drivers on one side of it from passengers on the other side is undoubtedly an element of public danger which ought to be removed without delay.

THE last number of the *Journal* of the Hellenic Society contains, with other interesting matter, an essay by the late Mr. Fergusson on "The Tomb of Porsenna," advocating the views which he had before set forth as to the probable form of this extinct monument, as consisting of a central and four angle steles on a square podium, with a *pelatas* or umbrella-like canopy over the whole. Mr. Fergusson infers from analogy the former existence of a numerous class of tombs or monuments on this model, and even suggests that the Taj Mahal, with its large centre pavilion and four smaller ones, may be a survival or development of this early form.

THE Burlington Fine Arts Club have in their lower room a small but very interesting collection of engravings from the works of Turner, specially intended as illustrative of the water-colour drawings now in the Burlington House Exhibition. A good many of these are shown in two or more stages of their execution. In some cases the earlier proofs are touched upon by Turner, and one, that of Derwentwater, bears on the margin of the trial proof the direction, in Turner's writing:—"More bold work; full of stones, large and small. N.B. The bow not so advanced by rock." Occasionally we seem to see how the "Turneresque" effect of the scene developed little by little, as in the four plates of the "Chain Bridge over the Tees," where the catalogue notes, in regard to the third impression, "later trial proof, with rays of light added"; that which was at first a wild mountain scene in the ordinary light of day having become in the third stage a shimmer of sunlight rays crossing the picture in a manner, on the whole, more after Turner than after Nature. In the fourth and last proof, the deep gloom of a crevice on the left of the view is lighted up by two or three birds in flight, showing white against the darkness behind.

THE exhibition of the "Nineteenth Century Art Society" in Conduit-street is rather better than some previous collections under the same title, though we still entirely fail to see the suitability of the name for an exhibition which does not contain a single work by the most eminent artists of the day, and which does not even represent any special tendency in contemporary art, beyond the exhibition of two or three "impressionist" works not of a very marked type. Miss Ruth Canton's terra-cotta mask of "Azrael" is fine. Among the exhibits may be mentioned "A Young Turk" (52), by Mr. Murray Cookesley; a fine study of Sea (76), by Mr. Shaw; "On the Derwent" (80), by Mr. E. H. Holder; portrait of the Rev. Jervis-Edwards (203), by Miss Alice Miller; "The Thames at Sutton" (386), by Mr. T. J. Soper; and a "Derbyshire Dale" (447), by Mr. F. Dixey, a fine and impressive evening study in water-colour. Miss Stacpoole's large portrait of a young lady (152) is an obvious attempt to repeat Mr. Herkomer's brilliant experiment last year in the portrait of Miss Grant, not very successfully.

SIR JOHN MILLAIS'S new picture, "Bubbles," now on view at Messrs. Arthur Tooth & Sons' Gallery, represents a little boy in a dress of green velvet, seated, and with his face turned upward, watching the rise of a large soap bubble which he has just blown. The child's head shows a light blond complexion and hair, and the flesh is painted in the artist's finest manner, but surely the head is large for the body, even making every allowance for the proportions of childhood. As a piece of colour the work is very pleasing, and it is noticeable that the attention of the child is really fixed on the object which is supposed to interest him, which is not the

case in some of the artist's child-pictures, where the accessory objects seem to have been put in as afterthoughts, without reference to the expression or direction of the countenance.

THREE large pictures by Mr. Long, representing the Story of Jephthah's Vow and its consequences, are now on view at 163, New Bond-street; the first showing the daughter with her maidens; the second and largest, Jephthah meeting his daughter on his return; and the last, the body of the daughter laid out on a funeral pile. Almost as a matter of course, all the pictures are up to a certain limit well painted and composed; and there is all that can be said about them. They are what we call "family Bible pictures" on a large scale, and represent the art of respectable common-place.

WE must enter a protest against a new form of exaction practised on architects entering into competitions, which appears to be gaining head, viz., the system of demanding a deposit of money before supplying them with the instructions to competitors. At first it began with a guinea; the Fulham Vestry demanded two guineas, and supplied wretchedly imperfect plan and instructions; and now, in the advertisement for a competition for new Municipal Buildings for Sunderland, published in this and in our last issue, is an obliging offer to communicate to architects the terms on which they may compete, on the deposit of 5*l*. Consider what this means. Not one word is said in the Sunderland advertisement about time, premiums, or any other condition of the competition. Until the architect sees the conditions he cannot possibly tell whether they are such as he would consider fair or just, or whether it is worth while for him to go in for it at all; and to obtain this necessary information he is to deposit 5*l*, which will be forfeited unless he sends in a design. Considering the imperfect and blundering manner in which conditions of competition are frequently drawn up, it is utterly unreasonable to invite architects to spend 5*l*. in discovering whether the competition is on which it is worth their while to go into; and we hope the members of the profession will decline to comply with the ingenious request of the corporation to present them with many five-pound notes on speculation.

#### THE UNEXHIBITED SCULPTURES IN THE BRITISH MUSEUM.

GREEK MONUMENTS, CHIEFLY SEPULCHRAL.

PROFESSOR C. T. NEWTON, C.B., delivered the first of a course of three lectures on the unexhibited sculptures in the British Museum, on Tuesday afternoon last, in the theatre of the Royal Institution, Albemarle-street. Here remarked that comparatively few people were acquainted with the contents of the Blue Books and Annual Reports laid before Parliament concerning the British Museum, but those who were acquainted with them would know that the Trustees of the Museum had been continually clamouring for more space during a period of nearly fifty years. A certain portion of the required space they had at length obtained, but, he grieved to say, it was far from sufficient for the proper exhibition of the treasures of the Museum, and not nearly sufficient for the needs of the Department of Greek and Roman Antiquities, of which, until very recently, he had the honour of presiding. A portion, and a very important portion, of the sculptures of the British Museum was at the present time buried in the basement of the building, which had been called the "sepulchral basement." As soon as his hearers would know, he had, in time past, in other countries and under other conditions, been fortunate enough to be a discoverer, but in those days it never occurred to him that his last task in connexion with the British Museum would be to re-discover many of the sculptures which, purchased with grants of public money during the early part of the present century, had been described and engraved at the expense of the Trustees, and were known and referred to by every school of archaeology in Europe,—and known better, too, he was sorry to say, by foreign publicists than by the people of the



country. It never occurred to him when he was digging up sculptures in Asia Minor that he should afterwards have to reveal their very existence to the British public by delivering these lectures. The screen was covered with a number of drawings of a particular class of sepulchral sculptures, nearly all of which, interesting as they were, were immured in the dark basement of the British Museum, unseen, uncared for, and blackening year by year by dust and the smoke-laden air of London. It was for these unhappy prisoners, waiting for a release which never came, that he confidently invited the sympathy of his audience, for he was convinced that the latter did not include any of the pretentiously ignorant people who scoffed at these remains as being unworthy of notice. It would be very difficult, within the limit of an hour's lecture, to give an adequate idea of the quantities of sculpture which were now buried in the basement of the Museum. There were, however, three main classes, viz., (1) the Greek sepulchral reliefs, mainly from the Elgin collection; (2) the Roman sepulchral reliefs, mainly from the Townley collection; and (3) a number of what might be called stray sculptures of very great interest in their several ways. In addition, the basement contained a large number of stones bearing Latin inscriptions. In the present lecture he would only deal with a comparatively small portion of the great buried collection he had thus briefly described, namely, the Greek sepulchral reliefs, reserving his notice of Roman sepulchral sculptures for his subsequent lectures. With regard, then, to the Greek sepulchral reliefs or monuments, he would say that they consisted, in a large proportion, of stels. It would be asked, "What is a stel?" Students of ancient history who had read their Thucydides or Grote would need to be reminded of the noble passage of the funeral oration of Pericles over the Athenians fallen in war,—"It is not only by the record of the stels in their own country, but by the unwritten record in all countries that their memory is preserved. Of illustrious men all earth is the tomb." Those who did not care to turn to Thucydides might see those noble words, graven in their original Greek, on the base of the monument erected to Lord Falkland near Newbury. Now, the illustrious men whose memories were preserved to us in Greek history had no doubt their monuments, and monuments of the highest interest, at Athens. Those monuments, alas! we do not possess. But the monuments we do possess were the monuments of a number of people less distinguished in history, — of Athenian citizens, who in their several walks of life were supporters of Pericles and other great Athenian generals. Many of these monuments bore representations of the domestic life of the citizens. There were several varieties of the Greek stel. The most common was a long and narrow strip of marble, sometimes simply inscribed, but frequently sculptured. Sometimes the top of the stel was carved with the beautiful floral ornament which the Greeks called the anthemion; immediately below that came the name of the person commemorated, and on many stels the figure of the person was sculptured in relief, sometimes within a sunken panel. A peculiarity of the stel was its extreme narrowness in proportion to its height. Possibly that form of monument was in some degree necessitated by the law of Solon, who regulated the size of the sepulchral monuments in time and the length of the inscriptions upon them. In some instances the stels were crowned by pedimental forms. Sometimes they were sculptured in the form of a vase, called a kythos. Some of these were very elaborately sculptured, but in low relief, so that the subjects might not interfere with the line of the "vase." Some specimens of this kind of stel were in the basement of the British Museum, — some having lost their necks and some their feet. Then there was another variety, namely, that of the heroon type, so called from their resemblance to the façades of a heroon or small temples which abounded on the mountain sides of Lycia. These, then, were the principal varieties of stels. But there was another form of sepulchral monument which he had not yet named, but of which there was a very important class, many examples of which were in the British Museum, viz., the form in which there was a relief set in an oblong frame. It now came to a very important question, viz., what was the meaning of these sculptured reliefs? Did the figures represent the dead as

they were supposed to appear in another world, or as they appeared in life? Or, were some of the figures representative of the living, and others of the dead? These were questions on which a great deal had yet to be written. The Austrian Government, who took an enlightened view of the duty of a Government in the encouragement of archaeology, years ago projected a great scheme for publishing the whole of the Greek sepulchral monuments, with the view of facilitating the interpretation of their meaning. On this head he referred his hearers to two interesting reports, one published in 1874 and the other in 1875, by Professor Conze, now of the Museum at Berlin, but then of the Austrian Academy. At that time the Austrian Government sent commissioners into all the countries where these Greek sepulchral monuments were known to be, as well as to Athens and in the country round about it. The Museums of London, Paris, Leyden, and Berlin, as well as private collections, were visited by the commissioners, who caused the whole of the sepulchral monuments which they found to be photographed. When the Commissioners came to London it was his (the lecturer's) duty to drag the whole of the sepulchral monuments from their hiding-place in the basement of our national museum, in order that they might be photographed. That was a work involving a considerable expenditure of time and labour, and, of course, of money. However, we might hope that the result of all that labour would be that archaeologists, instead of writing papers on the subject based upon imperfect deductions from a limited number of examples, would be able to take the clear and large view of the subject which would result from a true induction from a large number of examples. The lecturer then went on to point out, by reference to the drawings exhibited on the screen, that many of the figures in relief may be assumed to depict some incident in the life of the person commemorated, or some incident typical of his calling or vocation. One of the examples of which a drawing exhibited was a relief, in which a horseman was plunging a spear into his prostrate foe. This relief, as the inscription upon it showed, was to commemorate one of the five horsemen who fell at the battle of Corinth, somewhere about 394 B.C. Another relief exhibited an Athenian youth seated on the back of a horse that was rearing, the rider being represented as gently caressing the animal to keep him quiet. Behind was a figure on foot. The inscription on this monument was metrical, the two first lines reading, —

"I many joys in youth with mates in years  
Once shared. Now earth-born, earth again become."

These examples were amongst those found in the celebrated street of tombs in Athens, — the Agia Triada, discovered in 1868. Other reliefs were of a domestic character, some of them representing apparently such subjects as a lady seated and attended by her handmaiden; figures reclining at a banquet, &c. Some of these reliefs were figured in Mrs. Mitchell's able history of ancient Greek art, in which was a whole chapter devoted to the consideration of these Athenian sculptured monuments. Mrs. Mitchell's remarks on the subject were well worth reading. Many of the family groups depicted on these sculptured monuments were regarded as representing leave-takings between the living and the dead, and that was a theory to which he, the lecturer, was more or less inclined. The latest German light on the subject was contained in the large catalogue of the wonderful collection of casts which had been brought together in the Museum of Casts at Berlin. In the new edition of that catalogue, published last year, the archaeologist Wolters expressed his conviction that these sculptured groups were in no instance meant to represent leave-takings between the living and the dead, but were simply representative of domestic affection among the Athenian families, and related to real life. Wolters was an archaeologist whose opinion was entitled to great respect. These reliefs were of the fifth and fourth centuries B.C., and were a faint echo or reflection of the art of Pheidias and Praxiteles and their immediate followers or contemporaries. It might be asked, "Why are all the faces of these figures so monotonous and so similar in character?" That question was a very interesting one in the study of Greek art. The fact was that the Greeks were opposed to the realistic representation of public men on their monuments. Their whole theory was that

the individual should be merged in the State, and that individual likenesses should be very much discouraged if not absolutely forbidden. It was this which accounted for all the faces of the figures on the frieze of the Parthenon being similar. There were people who believed that the ancient Greeks were all possessed of ideally perfect and regular features, but he (the lecturer) utterly disbelieved such a thing. He believed that there was just as much variety between the faces of man and man, and woman and woman, as there was amongst ourselves. One proof of that was to be seen in their masks, which represented an infinite variety of expression of feature, — a variety which could only have been obtained from the faces of the people. With regard to the oblong reliefs, the lecturer recommended his hearers to peruse an article by Mr. Percy Gardner, in a recent number of the *Journal of the Hellenic Society*. In conclusion, the lecturer referred to the Chersonese Lion, a cast of which, taken at the instance of the British Museum some years ago by a *formatore* sent out for the purpose, at a cost of 70*l.*, was hidden in the Cimmerian darkness of the basement of the British Museum. It was quite possible for this work to be restored, and he was surprised that the Greek nation did not restore so interesting a monument of their ancestors. Finally, the lecturer referred to the destruction, by the agency of the lime-kiln, of the tomb near Bargylia, in Asia Minor, which consisted of a basement crowned, like the lion tomb at Cnidus, by a figure of Scylla, half-woman, half-dog, of which a cast is in the British Museum. The lime-kiln had much to answer for in the destruction of ancient monuments in barbarous countries. Even in this highly-civilised country, General Wade, looking for materials to make a military road from Newcastle to Carlisle in the early part of the last century, could find nothing so convenient for the purpose as the great Roman wall, which was, up to his time, nearly perfect with all its towers and battlements.

#### ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE sixth ordinary meeting of this Institute for the present session was held at Conduit-street on Monday last, Mr. Alfred Waterhouse, R.A. (Vice-President), occupying the chair in the continued indisposition of the President.

##### *Architects' Remuneration.*

Professor Kerr asked whether the attention of the Council had been drawn to the remarks made by Baron Huddleston on the architects' commission of five per cent. His lordship was pleased to say that he considered this mode of payment objectionable, and thought the Institute of Architects should take up the matter. Baron Huddleston's opinion was entitled to peculiar attention, because, when at the Bar, he was a very successful advocate, and no one understood better the way in which a jury would look at any question of a commercial character. It seemed, however, that he had mistaken the principle on which the commission was charged to be that of payment on results. The Council might think it advisable to issue some sort of declaration on the subject, as the same remark was frequently made by persons of less importance. The schedule of charges prepared under the presidency of Sir William Tite was not understood to constitute rules laid down by the Institute. It was rather a declaration of custom arrived at after a careful investigation by persons qualified to enter into the matter. This schedule had been revised from time to time, but never altered in principle, and it still stood as a declaration of the custom of the profession from a somewhat early period. It was also a principle such as was adopted in America, France, and Germany, and no one had since suggested a better system. In some cases it was not remunerative, while in other cases it was more than remunerative, and then special conditions were made in the schedule to reduce the amount. The practical question was, whether architects, as a matter of fact, were found to be inclined in any shape or form to run up their clients' expenses for the sake of their shilling in the pound. As a public officer of twenty-five years' standing, he had come across architects and builders of all kinds and



he had found the former, as a rule, were a great deal too careful, being more troublesome to the District Surveyor than builders upon questions affecting expense. The real grievance was that architects did not stand by the schedule as regards each other, but would sometimes exercise surprising ingenuity in explaining away the schedule to the disparagement of their professional brethren. The Council might take the matter into consideration, and a carefully-prepared declaration might be issued in answer to the challenge from the Bench.

Mr. Charles Barry thought the meeting must appreciate Professor Kerr's object in bringing the matter forward, to clear the profession from anything like false aspersions. But what he had said was the most conclusive series of reasons why the Council should take no notice of the matter. As the old proverb said: "*Qui s'excuse s'accuse.*" It was well known that this pestilent heresy, which at one time was very prevalent, had considerably decreased. That it would entirely disappear was too much to hope, because there were always men who could not believe good of others.

Mr. Henry Dawson agreed that the prejudice was dying away, and the judges had invariably of late years allowed the justice and reasonableness of the five per cent. He remembered two cases before Lord Coleridge, where his lordship distinctly stated that custom was to be respected, and directed the jury to find accordingly. That being so it would be well not to take any notice of Baron Huddleston's expression of opinion.

The Chairman said that the general feeling of the meeting seemed to be that no action should be taken by the Council. The more people knew of architects the more fully would they realise that they were never prompted by a desire to augment their own fee at the expense of their clients. The subject then dropped.

#### The Architectural Examination.

Prof. Kerr next brought forward the matter of which he had given notice at the last meeting.\* Since the system of examination had been established for the admission of Associates, fewer candidates had come forward than had been expected, and on the last occasion none had presented themselves. It was natural in such a state of things that an idea should be prevalent, that the Examination was practically a failure. Candidates who had been rejected complained that the Examination was too severe, eccentric, and complex, while even those who had passed made a similar complaint. A singular thing, which had alarmed a good many, occurred on the last occasion, when the Asphit Prize was refused. When they remembered Mr. Asphit and the object he had in view in establishing that prize, no one could suppose it would have been his wish to reserve it, to the dissatisfaction of the young men rising up in the profession. He (the Professor) was always suspicious on the refusal of any prize of the kind, and he expressed his dissatisfaction at the time. Then it was complained that the Examination papers were not published. It was the universal rule to show examinees what work they had to do, that the Examination papers of the previous year should be published; but in this case not only were the questions not published, but the publication was intentionally withheld. The programme to which the young men were referred was chargeable with great complexity, discursiveness, and exaggeration throughout.

Mr. Charles Barry rose to order. What Professor Kerr was stating was extremely interesting, but he (Mr. Barry) submitted that this was too large a matter to be discussed without notice at a non-business meeting.

Professor Kerr complained that just as he was about to open the question Mr. Barry, as usual, called him to order. (Mr. Barry, "Not as usual.") The examination extended practically over a whole week, and covered the history of architecture, mouldings, sanitary science, plans, &c., besides an oral examination on the last day, and advice to candidates was also given. The list of books was stated to contain what was absolutely to be read more or less by the examinee, and extended to 187 volumes, besides encyclopedias. Of these, forty-four volumes were in the French language, six in the German, and twenty were Italian. Any one who would go into the matter would be astounded at the range of the Examination, and would not be surprised that it should be

considered a failure. The Examination ought to be a contest, not for admitting candidates, but for excluding those who were unfit. They had no right to exclude from this guild any one who was twenty-one years of age, and an architect properly so-called, while the Examination should go no further than to prove that the young man was really an architect, and not one of those youths whom they found practising in surveyors' offices. It was under these circumstances that Mr. Cates had taken a step which he ventured to think was entirely out of order, and at the same time most dangerous. Mr. Cates asked the young men to come to his place of business by appointment, to receive from him assistance and advice. Any one who knew much about it, and who knew that it was contrary to rule to allow the examiners and examinees to confer privately, and no university man would listen to such a proposal for a moment. But the practical objection was this, it brought to bear upon the examination a principle of individualism and a study of the peculiar idiosyncrasy of mind exhibited by the examiner. As an old academic hand, he knew the dodges resorted to by students, and he would formally ask by what authority Mr. Cates had advertised these invitations.

Mr. Robert Walker rose to a point of order. He submitted that although Professor Kerr had a right to put the question, he was hardly in order in raising the whole matter of the Architectural Examination. Referring to the Professor's letter, which appeared in the *Builder* of the 23rd ult. (p. 182), he thought there were one or two expressions in it which might be called in question, and which ought not to have been used. There had been some difficulty in starting the Examination, and the notice was put in the "Kalendar" of the Institute, that Mr. Cates would be ready to see any young men who might be in need of advice in regard to it. Therefore, while Professor Kerr was in perfect order in asking this question, he ought to have done so in a proper manner, and without writing to the *Builder* in the way he had done.

Mr. Macvicar Anderson (hon. secretary) said that so long ago as 1877 By-law 14 was enacted, whereby it was provided that in March, 1882, an Obligatory Examination should take place, the object of which was to supersede the Voluntary Examination held up to that time. In 1879 a special committee was appointed to consider the best means of carrying the by-law into effect. On May 3rd, 1880, that committee's report was adopted by the Institute, and a committee appointed later by the Council to consider the whole subject. This committee held nine meetings, and recommended that Mr. Cates should be requested to act as chairman for 1880 and 1881, which was approved by the Council. Mr. Cates had, therefore, acted as Chairman of the Board of Examiners not only in London, but in Manchester and Glasgow. They would see in the Kalendar of the present year that any student desiring special advice would be received by the Chairman of the Board of Examiners by previous appointment, who would assist him to the best of his power. Professor Kerr had objected to this course, but others were of a different opinion. Besides, Mr. Cates was not, technically speaking, an examiner, as he neither set the papers, nor marked them in London. On the other hand, it was a great advantage that students in difficulty or doubt on many questions, should be able to receive from so experienced a man advice and assistance. So strongly did the Council feel this that they had that afternoon passed the following resolution in reference to Professor Kerr's notice of motion:—

"The Council approve the action of the London Chairman of the Board of Examiners (Mr. Arthur Cates) in having given publicity to the 'advice to architects' already approved by the Council, and published in the Kalendar of 1886-7; and cordially thank him for the action he has taken, also for the zeal, usefulness, and ability with which he has always interested himself in the advancement of architectural education."

That was the answer to Professor Kerr's question, but he would have scantily performed his duty to one who had rendered invaluable service to the Institute, did he not take the opportunity of expressing his individual opinion. Professor Kerr had not been present at any of the examinations held by the Board under the by-law, and was therefore not in a position to speak with authority on the manner in which they were conducted. He (the speaker) had attended several, and had been struck with the wide and extensive range of knowledge displayed

by Mr. Cates, and he would say deliberately that the Institute owed that gentleman a deep debt of gratitude for having conducted the examinations. Professor Kerr had inquired what had become of the Voluntary Examination, but this had been superseded, as could be seen by reference to the minutes. Considering what Mr. Cates had done for the Institute, it was cruel that any action should have been taken by a member such as that taken by Professor Kerr.

Mr. Aston Webb, as one of the recently-appointed examiners, said that in order to put the young men in the way of preparing for the Examination, various means had been proposed by the Board, and it was with that view that the advice to candidates was drawn up.

Mr. Dawson thought that in any future announcements, inserted by Mr. Cates as Chairman of the Board of Examiners, they should be distinctly stated as being "on behalf of the Board of Examiners."

The Chairman considered that the members were indebted to Professor Kerr for having elicited the valuable remarks of the Hon. Secretary. He would not add a word as to the amount of indebtedness they were under to Mr. Cates for what he had done in connexion with the Obligatory Examination. He would, however, carry away the conviction that he should send to Mr. Cates any young men in whom he had an interest, who were preparing for the Examination.

Professor Kerr said his desire was that the Examination should not be a failure.

Mr. Barry added that the figures of the Voluntary Examination in nineteen years were as follows:—Class of Distinction, 3; Class of Proficiency, 43; Preliminary, 52. In the four years from 1882 to the present time 96 had presented themselves, and 64 had passed.

#### Swedish Building Law.

Mr. Alexander Benzley, M.Inst.C.E., then read a paper on "Swedish Building Law," of which the following is an abstract:—

The Building Law of Sweden was defined by a Royal Ordinance (1875), and building regulations were then framed by the municipal authorities of each town. An abstract of the ordinance in the several chapters was as follows:—The first referred to the regulations, building committee for each town, and fines for breaches of the ordinance or regulations. The second contained sixteen sections, dealing with building plots, streets, squares, quays, &c., together with the general laying-out of towns, of which authorised plans are prepared, and no new districts are allowed until the plans of them have been approved of by the Crown. The third, sections 17-28, referred to the subdivision of building plots, the maintenance of boundaries, levels, yard-spaces, building lines, sanitary ordinance, and number of stories permitted to dwelling-houses; sections 29-33 dealt with corner buildings, external painting, cellars, dwelling-rooms, churches and other buildings, intended for the assemblage of large numbers of people; sections 34-36 with fireproof walls, roofing, chimneys, fireplaces, and precautions against fire; sections 37-44 included application for permission to build, duties of the building committee as to building-lines, sanitary arrangements, and surface-drainage, &c., and also referred to Government buildings. The fourth dealt with the responsibility of persons building without leave from the committee, the levying of fines, and various legal proceedings arising upon the regulations; it also related to the employment of architects, their responsibility, that of the building owner, and the duty of the provincial governors to see the ordinance and regulations duly enforced. The building regulations, based upon the ordinance, varied much in different towns, and were therefore dealt with by the speaker in a general way under the principal heads, any great diversity being noticed. The heads were:—Building Plots, Streets, Projections upon or over Streets, Yards, Foundation Walls, Height of Buildings and Thickness of Walls, Fireproof Walls, Chimneys and Fireplaces, Doors and Gates, Ways, Windows, Floors and Ceilings, Entrances and Stairs, Roofs, Gutters, &c., Concrete Buildings, Timber Buildings, Theatres, and the Inspection of Buildings. A building plot with frontage less than 49 ft. and area less than 2,847 sq. ft. 9,489 square feet was not allowed to be rebuilt upon until it had been decided whether it should be purchased by the town for improving the dimensions of other plots; plots of greater

\* See *Builder*, p. 228, ante.



frontage were not so subject to compulsory sale. Side-walks were not to be broken into by carriage-entrances, &c., but the gutter was to be properly bridged where necessary to allow vehicles to cross the side-walk, which was to be from 5 ft. to 7 ft. 9 in. wide in streets, and 9 ft. 9 in. on squares and open public places. The minimum width of roadway must be from 17 ft. 6 in. to 23 ft. 5 in. If ground were not wholly occupied by a building, the yard-space must equal at least from one-fifth to one-third of its area. In new quarters, buildings were not to exceed 66 ft. in height, excepting churches and other public buildings. Openings in fire-proof walls were, in some Regulations, absolutely prohibited, and in all cases subject to stringent conditions. Dwelling-houses were not allowed to have Mansard roofs, roofs were to be covered only with tile, slate, metal, or other approved fire-proof material. Straw bedding to tiles was prohibited. A trap-door, sheathed with metal, must be provided in every roof, and a ladder always under it. Theatres must be situated at least 40 ft. within the boundary of their own ground on all sides; or else 10 ft. within the boundary, with fire-proof walls not less than 1 ft. 5 in. thick, having but one opening, if necessary, at the ground-level for exit. The inspection of new buildings was to be performed by one of the Building Committees and the Town Architect. The drawings of each intended building must be examined, as also the proposed site. Inspection during the progress of building had to be made at eight stages, and notice given to the Building Committee when each stage was reached. Mr. Beazeley concluded by referring to matters pertaining to light and air.

In the discussion which followed, Mr. Edmund Woodthorpe said that in Mr. Beazeley's long paper much useful matter had been described which might with advantage be introduced into the Metropolitan Building Act. There were many difficulties in the way of carrying out in London an Act which was already arbitrary enough. Mr. own Act gave many powers, but the Swedish law seemed to give more, and appeared to be a very wholesome and sensible way of dealing with buildings in a timber country. He proposed a vote of thanks to the reader of the paper.

Mr. Charles Fowler seconded the vote, and added that two of the reservations mentioned might well be adopted in this country. One was that building in a city should be required to satisfy taste, and the other was that chimneys should be reasonably ornamented. The Swedish Regulations also with regard to easements seemed better than our own provisions.

Professor Kerr asked Mr. Beazeley to add to his paper what was the prevailing nature of buildings in Sweden. In that country it appeared that an old building, when excessively out of repair, had to be demolished. In England, on the other hand, property was so sacred that a man had a right to retain what he pleased on his land.

Mr. Robert Walker remarked that the paper showed that in Sweden the owner of the property must employ an architect or be responsible himself. Unfortunately in London the district surveyor could not catch the builder, and the property fell under the mortgagee or the owner, there was no remedy except against the builder.

The vote of thanks having been put and tried,

Mr. Beazeley, in replying to Professor Kerr, said that the materials generally used in Sweden were brick and stone, and for fuller information he would refer to a paper read by him nearly three years ago, on domestic buildings in Southern Sweden.\* In remote districts nothing but timber was used. Repairs which amounted to rebuilding or reconstruction were never done upon old buildings, which were not in accordance with the building regulations, but only such small repairs were done as were necessary to keep them in habitable condition for the time being. In general, the greatest care was exercised in the building regulations, and only those who had studied in well could see how at every turn they guarded against the danger of fire, which seemed to be the great dread of the Swedish people. The convenience of the private owner to give way in Sweden to the general cost and convenience of the whole population.

## NEW HOUSES AND FLATS AT KENSINGTON.

VISIT OF THE ARCHITECTURAL ASSOCIATION.

THE second Saturday afternoon visit for the present session of the Architectural Association to buildings in progress was made last Saturday, by the kind permission of the architects, Messrs. George & Peto, and Messrs. Peto Bros., the builders, to the houses in course of erection in Collingham-gardens. There were four houses visited, each in different stages of progress, from one which was just ready for the roof (one principal being fixed) to the last house which was finished fit for occupation. The houses are being built with thin Acton red bricks, with Doulton white terra-cotta dressings, the roofs being covered with Ashton & Green's green Westmoreland slates, which are graduated in size from the eaves to the ridge. The houses, which are of interesting and quaint design, decidedly Flemish in character, were carefully studied by the members. The plan of each varies, a feature in all the houses being made of the entrance-hall, which is approached by a lobby from the front door, the staircase being placed in an adjoining space slightly screened off the hall; a very picturesque treatment is obtained by this means. The reception-rooms are so arranged as to have inleak nooks or large recesses, with mullioned windows breaking the straight line of the walls. The rich detail of the wooden panelling, staircases, mantelpieces, and ceilings was especially noted. All the reception-rooms have high wooden panels, some in wainscot and some painted. The mantelpieces are principally carved oak; in one of the entrance-halls the mantel-piece is of Ham Hill stone. One of the houses contained a very interesting ceiling executed in selenitic plaster, carved *in situ*, the plaster being put up about a yard at a time, the pattern being transferred to the plaster and carved before the plaster set. Most of the other ceilings are elaborately panelled. Some of the hall ceilings are of wood. All the windows have clear glass lead-light glazing, the casements being hung to wooden frames set inside the terra-cotta mullion. The buildings form a pleasant relief to the regulation pattern stucco fronts which abound in the immediate neighbourhood.

The members passed from Collingham-gardens to the blocks of flats being built from the designs of Messrs. Flockhart & Wallace, in the Earlsfield-road. Mr. Wallace met the party and conducted them over the buildings. The buildings are arranged so that two complete stairs occupy each floor, approached by an ample staircase of Wilkes's Eureka concrete, which is placed in a recess open and carried up to the roofs. The flats consist of two reception-rooms, five bedrooms, kitchen, bath-room, stores, &c., with separate coal and wine cellars in the basement for each flat, and box-rooms in the roofs. The kitchens have communication with a lift for delivery of stores, and a dust-shoot, and are arranged with good entrance-halls and well-lighted passages. The rooms average 16 ft. square; each flat has a fireproof floor. There seems to be a good demand for this class of building in the neighbourhood of Kensington, all the flats in the finished blocks being let and occupied.

## SEWER VENTILATION.

SIR,—In the abstract of the report of the Committee of the Metropolitan Board of Works on sewer ventilation, which appears in your issue of the 13th inst., it is stated, with reference to the use of charcoal in the sewers of Croydon, that it had been tried and finally abandoned in consequence "of the difficulty of keeping the charcoal dry, and therefore inefficient."

I wish to point out that, in the course of my experience, I have largely used charcoal for sewer ventilation, and was the inventor of the spiral arrangement which has been extensively used in the application of charcoal for deodorising the air escaping from sewers. In the case of Croydon, where for ten years I was in charge of the works, and for four years subsequently was a member of the Urban Sanitary Authority, there is not one particle of evidence to show that charcoal ever impeded the ventilation.\*

\* On reference to our article, it will be seen that we expressly stated our own conviction that the spiral tray arrangement would not impede ventilation.—Ed.

The charcoal was removed from the sewers upon the joint recommendation of the Medical Officer of Health and the Surveyor, in a report presented to the Croydon Local Board in February, 1876, on the utility of charcoal in sewer ventilators, when they stated with regard to the ventilators that "the best consist of circular spiral wire trays, on which the charcoal is placed and kept fairly dry at all times. In the others, the charcoal is laid upon flat wire trays, placed zig-zag in the ventilators, and in most of these the charcoal gets saturated with the wet off the roads, and is rendered useless for the purpose for which it is intended. In the parish there are 245 of the spiral ventilators, and 460 of the others." Then they recommend that the charcoal should be removed, as, in their opinion, the ventilation would be improved thereby, and they went on to state that "an offensive ventilator indicates an imperfect sewer, and the true remedy is to alter the condition of the sewer, and not to seek to render its emanations harmless by charcoal." I may mention that at this period, beyond the large number of ventilators upon the public sewers,—the number in the report representing one to every 200 yards of sewers,—every house in the district had one or more ventilating pipes communicating with the house-drain; the latter communicated with the sewer without the intervention of a trap, so that the house-drain ventilators served also the purpose of ventilators for the public sewers, the total number of openings for ventilation by this means being equal to one opening in every 12 yards of sewer.

Since the removal of the charcoal from the ventilators in Croydon, thousands of pounds have been expended in improving the sewers, providing flushing arrangements, and enormous quantities of disinfectants are regularly applied in these open ventilators, so that when there are not stinks arising from decomposing matter, the nose reminds one of their presence by the powerful odour of the disinfectants. Neither has the removal of the charcoal from the ventilators in Croydon been attended with any success from a sanitary point of view. There have been more complaints of the nuisance arising from the unprotected ventilators in any one week since the removal of the charcoal, than there were in the whole of the ten years while the charcoal was in full use in the sewers. The vital statistics of the year 1873, when charcoal was in full use in the sewers of Croydon, are far more favourable than those of the year 1885. It should be observed that in the case of Croydon a great alteration has been made in the system by the interposition of a trap between the sewer and the house-drain, which, when supplied with a proper air-opening, is no doubt an enormous sanitary advantage and security to the inhabitants of the house; but it cannot be overlooked that the trapping of these house-drains, in the case of Croydon, has greatly diminished the amount of previous ventilation, which seems to have been overlooked by the Sanitary Authority, as no adequate provision has been made in substitution of the large amount of ventilation which has been stopped so far as the public sewers are concerned.

I may add that I have no interest whatever in advocating the use of charcoal, as the ventilators which I invented are open to any person to manufacture or use, but I can safely say that I have found charcoal most efficacious in preventing noxious effluvia escaping from open ventilators. It appears, however, that the Local Government Board have set their face against the use of it, and have, in more than one instance which has come under my notice, recommended its removal from the ventilators; but after a trial of the absence of the charcoal the authorities have been only too glad to again revert to its use, without any evil consequences, but with the greatest possible advantage in preventing the escape of noxious air. I do not wish to be understood to say that charcoal will meet all the difficulties of sewer ventilation, or that it is the only mode by which air escaping from sewers can be dealt with, as with the advance of scientific knowledge there cannot be the slightest difficulty in effectually dealing with the question of the ventilation of sewers if the money is forthcoming for the purpose; but in many small districts which cannot afford a large expenditure of money, the use of charcoal is simple and efficacious.

BALDWIN LATHAM,  
M. Inst. C.E., F.G.S., &c.

\* See Builder, April 28, 1883, p. 563.



# "THE PRACTICAL SURVEY OF WORKS IN PROGRESS."

ARCHITECTURAL ASSOCIATION.

THE ninth ordinary meeting of the present session was held at Conduit-street on the 12th instant, Mr. C. R. Pink (President) in the chair.

The following new members were elected:—Messrs. A. B. Clement, Horace L. Field, Edward Boehmer, Arthur E. Bartlett, George Bridge, Charles H. Daniel, T. A. Allen, Alfred A. Webbe, Robert Reid, E. C. Thomas, and Arthur E. Vickers.

A vote of thanks was accorded to Mr. Alfred Newman for kindly permitting the members to visit his forges.

Mr. Herbert D. Appleton then read a paper on "The Practical Survey of Works in Progress." At the outset he spoke of the responsibility which the architect ought to feel in being the sole arbitrator between the builder and employer as to the correct carrying out of the specification and drawings. If he were asked for a motto, he would suggest one based on the well-known advertisement, "If you ask for Somebody's Starch see that you get it," for architects were, perhaps, too often in the habit of asking for "the best" of everything in their specifications; but did they always, when the works were being executed, see that their clients always got it? Although most contracts stipulated that the contractor was to be responsible for the proper setting-out of all work, the architect should take the earliest opportunity of checking the setting-out, as no work which had been pulled about and adapted was so sound as that which had been correctly carried out from the start. After arranging with the builder as to what parts of the site might be used for the storage of materials, and the disposition of any temporary workshops or sheds that might be necessary (taking care, if the ground sloped, to have the water for the builder's use laid on to a point below the building, so that in the not unusual event of waste of water through the tap being left running the water would not soak into the foundations), the next point to be dealt with was the important one of the foundations. Of course, the greatest amount of care should be exercised in settling whether the best foundation possible had been obtained. In judging this, experience was everything, and every opportunity should be taken of gaining this experience by noting every section that was made,—such as when main sewers are laid through towns, for instance, or on the occasion of any other excavation, a careful note being made of the various strata exposed. It would be of great service if it were possible, by paying a small fee, to see a record of the sections made by the various boards of works in forming their sewers. As had often been said, the streets of London formed a most valuable school of practical experience in building if architects only availed themselves of the opportunities which the constant rebuilding and alterations afforded. During the dry weather last summer great damage was done to the houses on the southern side of London built on the clay, owing to the serious settlements caused by shrinkage. The question as to the depth that foundations in the clay should be carried was a very difficult one, and in his (Mr. Appleton's) opinion, in most instances of buildings on the clay the foundations were not carried deep enough. It would be interesting to note the depth to which the surface-cracks that appeared each year penetrated, and whether there was any movement in the clay below those cracks. It had been suggested that when clay overlaid gravel there was a constant washing of the clay into the gravel through such cracks, and that the landslips that could be seen, for instance, in the neighbourhood of One Tree-hill, Sydenham (where tons of clay fell every year), were caused in that way, the accumulation of debris at the foot of the hill not being enough to account for the mass of clay that had fallen. In clay districts it was usual to allow concrete to be made of burned ballast, but the advisability of this was very doubtful, the ballast being so uncertain in character, some of it going back to clay after a few years had passed. The precaution of coating cement before using it should always be adopted. The next step in the building was the brickwork. The selection of the bricks was often a difficult task. Autumn and spring made bricks were said to be better than bricks made in the

summer, as the latter, being dried more quickly before being burned, were liable to flake. If the facing-bricks were of different quality to the other bricks care should be taken to get bricks to match the facing-bricks as nearly as possible in size, so that the work might settle evenly. Care should be taken to see that the heading bricks used for facing were tailed in, and not snapped. In building hollow walling, it was very difficult to make the bricklayers work with a lath, to keep the cavity clean, and the utility of the hollow space was often destroyed by the quantity of mortar that was allowed to drop which, collecting on the iron ties, conducted the wet and thus destroyed the value of the hollow space. In very few cases that he (Mr. Appleton) had noticed was any care taken to preserve the iron ties from rusting. What would be the strength of hollow walls some fifty years old when the ties were rusted through it was difficult to imagine: perhaps the two parts of the wall would continue to hang together for old association's sake even then. As a rule, red bricks were very porous, and in certain parts of the walls it was difficult to keep the damp from spreading. For that reason it was always advisable to put a damp course in the chimney just where the chimney came through the roof. This should always be formed of slate in cement. In all the cases of chimney-stacks blown down by the wind that he (Mr. Appleton) had noticed, the failure had always been where some change in the material occurred, such as a stone band or string-course, and that was a point to be borne in mind in designing chimney-stacks. Parapets to party-walls of red bricks should always have a hard stone coping to prevent wet soaking down. There was another point that should always be looked closely to in brickwork, viz., to see the walling kept well flushed up. Grouting was apt to make the facing in a mess, but it was a capital method for making solid work. It was very essential to keep the work going up equally all round, so as to prevent unequal settlement and cracks. This was difficult to do when there was stonework or other materials to be built in; but these should be ready as wanted. The effect of frost on brickwork in progress should be borne in mind, and the work should be stopped in frosty weather. If the sun was bright during the day and the frost sharp at night more damage was done than when the weather was more uniformly cold. The coke-breeze concrete blocks and lintels, which were much better than the wooden lintels, wood-bricks, &c., should be made under cover during very cold weather, as the frost greatly affected them. In cleaning down the walls when the scaffolds were struck the facing should never be scrubbed with a brick,—a very favourite method with the bricklayer. It would be very useful if a simple formula could be devised for enabling architects to readily test the chemical composition of mortar. In regard to the stonework of a building, the principal points to be looked after were the bedding of the stone on the natural quarry-bed, and the working of the bedding-joints so as to make the stones bed perfectly level. In bedding stones the cement should not be brought to the face, but a thin strip of stone-dust mortar should be put on the edge, to prevent the cement staining the stone with efflorescence. In bedding stone piers the beds should always be worked perfectly level. Some masons, to produce a fine joint, would work the bed slightly hollow, the general result being that the stone flushes,—i.e., it splits off at the edges. For piers Mr. Appleton preferred lead all over. Some architects used strips of lead and fine mortar, but he could not help thinking that a mistake, and he thought a great fault in modern stonework was the attempt to produce a fine joint. In fixing wooden principals on stone corbels or shafts, the wood should not be doweled to the stone, for the constant vibration of the roof had a tendency to crack the stone, and he had known two instances of corbels falling from that cause. The timber in a building was always a difficult thing for a young architect to judge. A very useful manual, called "The Timber-Merchant and Builder's Vade-Mecum" gives the timber marks. The principal source of trouble was, of course, shrinkage. That was a thing which it was almost impossible to guard against, and on that account he (Mr. Appleton) always tried to use as few wooden partitions as possible, and in the construction of these he looked carefully to the way in which they were braced. They should, whenever possible, cross the

joints; if they ran parallel, they should rest on bridges in preference to bearing on a single joint. There was a notion that partitions were well able to carry themselves and a floor or two besides. If that was the intention of the designer of the building the partitions should always be detailed, and not left to the builder to truss. Iron was taking the place of wood for wall-plates, the joints being notched on the iron plate, and, no doubt, forming a capital tie to the walls. As soon as the roofs were covered the drains should be put in. Cement joints should always be made, and the pipes bedded on concrete. The fall should be even throughout, except just in front of the syphon, where the fall should be increased. The architect himself should always check the fall of the drain, and take nothing for granted. The minimum fall for house-drains was 1 in. in 10 ft. The quality of the London-made goods being looked to, in plastering, the best plan was to run all the time. Bad plaster-work was one of the most unfortunate things with which a house could be afflicted, especially for the ceiling-work. There seemed to be an idea amongst some that the sand for plastering need not be so clean as that used for mortar; but that was a great mistake. It was also essential that there should be no salt in the sand. Plastering should be carefully watched, to see that the work was not made too thick; 2 in. was the usual maximum thickness allowed. The plastering should be carried down to the floor behind skirtings, as it would stop vermin. The joinery-work being always prepared at workshops, it was necessary to visit these, to see the work being prepared. When the doors were roughed out they should never be stacked against a wall, as it rendered them liable to wind. In most specifications all the joinery is described as "yellow deal"; but pine panels stood best, and were therefore most to be commended, except where the plumbing and hot-water service should be set out on a detail drawing. This would be a useful drawing for reference if anything went wrong. In sanitary plumbing he always preferred to have a plumber who could be trusted, and he thought that this work should always appear in a separate trade from that of the constructive plumbing. As a general principle it was best for the pipes to be arranged with the idea that it might happen that at some future time they would want looking at. The pipe-casings might appear rather obtrusive, but they saved a great deal of damage if anything had to be got at. Hot-water services required careful arranging. He preferred the circulating cistern fixed below, in preference to placing it in the roof; but it would be as well to see that the cistern was clean before the manhole was fastened down, for he had heard of an instance where a family suffered from lead poisoning through the plumber fastening the manhole down with a quantity of red lead in the cistern; of course it was the last place that was thought of, and it cost 120l. to dislodge. Gas-pipes should never be fixed between stud partitions, as very serious accidents had happened from the space in stud partitions getting full of gas and exploding. In glazing, the quality of the glass should be checked. Plate-glass edges should be blacked and the glass sprigged. Lead light glazing was rarely water-tight, and required well supporting with bars. In making-up the grounds and laying out the garden the architect (if he had the direction of this work) should take care to carry the land drains with a good fall from the house; these drains should not be connected with the rain-water system without passing an inspection-box, as they frequently became choked with roots, and through these pipes the roots got into the glazed drains. Having thus noted a few of the points that occurred in surveying a building in progress, Mr. Appleton said the point he wanted to raise for discussion was:—"What was the best way of obtaining experience in judging materials and workmanship?" That was knowledge which could not be obtained from books or in an office, and could only be picked up on the works. The question of the number of times a building should be visited must, of course, depend on the nature of the work, but, as a rule, the visits ought to be sufficiently numerous that no part of the work was covered up without its having been seen by the architect, and after each visit, a note should be made of the progress of the work up to the date of the



survey, the number of workmen employed, the value of the work done, and of any alteration made. The latter should also be noted on the office drawings if they involved a change of plan or elevation, and on the specification if they involved questions of material. The report should also note any detail drawings that should be prepared to keep the work going in proper sequence, and should include a reference to the time remaining for completion up to the date fixed in the contract. If any allowance should be made on account of the weather, that also should be noted in the report. In some concluding remarks Mr. Appleton referred to the great value of the Saturday afternoon visits of the Association to works in progress, and urged the value of the practice of committing to writing a description of what was seen, and gave some useful hints for the keeping of a "common-place book," and for the writing of specifications. As to the latter he urged exactness and fulness. "Do not," he said, "be afraid of making the specification too detailed; a little trouble at the beginning saves a world of anxiety at the end. Mean what you say, and know what you mean and want."

The Chairman, in opening the discussion, referred to Mr. Appleton's paper as one of the many valuable benefits the members had received from him, and when he remembered their hon. secretary's multifarious duties, he could scarcely conceive how the time could be spared for the preparation of such a paper. Dealing with visits to buildings in progress, there were, of course, the students' visit and the architects' business visit. For the student he would emphasise the advice that he should observe everything, noting or sketching every detail possible, and conferring with the master workman on all occasions. There were many phrases in specifications which were not clearly understood by young architects, and he would, therefore, advise the student to take the first opportunity of finding out what they really meant. Turning to the architects' business visit, it was essentially necessary that sometimes no notice should be given of the time. Then, as soon as he got on the works, he should mount the scaffolding; and, thirdly, when he had made up his mind on any point on which a difference of opinion existed, he should not then further argue the matter. The number of visits must vary with the class of work, but they should certainly be made at the commencement of each important stage of the building operations; while it was important that each class of material should be examined before being used. Dealing with the materials, the testing of cement and lime was a difficult matter, but it was an important point that they should be as fine as possible. To avoid mortar blowing it should be seen that the lime had been slaked a day before use, and that the labourer did not leave unslaked lime scattered about. As to timber, his experience was that what was imported got worse and worse every year. Timber with dart shakes should be rejected, but sometimes a mistake might be made about timber being sappy by looking only at the dark colour of the outside wood. It was important to keep the deals and timber out of the sun. Spotty timber was early always bad, and might produce dry-rot. He knew an instance where within four months of the erection of a building, the whole joinery was destroyed to a height of 4 ft. from the ground-floor. Not all knots were bad; but bad knots were very bad indeed. In putting timbers into a building, hardly one would be found without a camber, and in putting the joints or beams it was important that the timber should camber upwards. Protecting work should be protected; this was often disregarded, the labourer coming afterwards, scraping plinths and strings, and tearing and destroying the surfaces. With regard to bedding stone columns, he knew an architect who had iron rings made the exact diameter of the column. A soft mortar bed as spread within the ring, which was 1½ in. wide by 4 in. thick; the ring was then taken off, the stone laid, and the joints afterwards bed in.

Mr. S. F. Clarkson proposed a vote of thanks to Mr. Appleton. There was a stage, he considered, in setting out work where checking was injurious. As to the foundations, trial-piles seemed a most rational arrangement, because sites were sometimes hollow, and walls had to be carried down to a great depth. The

question of intercepting land-water was a difficult one, and occasionally required some ingenuity. As to hollow walls, he agreed with what had been said about iron ties; there was no reason why a piece of wrought iron galvanised should not last a couple of generations. The best way to clean out the core was boldly to leave openings about 18 in. wide, at intervals.

Mr. J. A. Gotch seconded the vote of thanks, adding that the paper was of so encyclopaedic a character that, by the time it had reached the plumber, he had forgotten what had been said about the builder. Hollow walls, he agreed, conveyed sound, and that sometimes of an unpleasant description, and if Mr. Appleton had told them of some cure, he would have merited their deepest gratitude. At the same time they should avoid putting a hollow wall between two adjacent houses, and if they had done so the best course to pursue was to fill up the hollow with dry sand. As to joints, he knew many stone-built houses in Northamptonshire where one had to look closely to see the joints. Returning to the question of hollow walls, he was somewhat sceptical as to the amount of moisture which went down.

Mr. Cole A. Adams said that the paper reminded him of the charming book entitled "Round the World in Sixty Days," covering as it did so much ground in so short a time. In regard to hollow walls, in the South of England he had found the 9 in. part put inside instead of outside. He did not believe there was that great objection with regard to transmission of sound which had been referred to; though hollow partitions between the rooms were sometimes disastrous. To prevent the sound coming through, the plaster should be carried down to the floor, thus preventing sound, draughts, and vermin, and also the spread of fire. Partitions to be sound-proof should on the quartering have a fillet nailed, and on this should be rendered a coat of plaster.

Mr. C. H. Brodie could not agree that the thin part of the wall should be outside, especially in such a climate as ours, where heavy rains were followed by severe frosts.

The Chairman here remarked that the Ecclesiastical Commissioners would not allow the 4½ in. part of the wall to be put outside.

Mr. Brodie thought that tie-bricks were better than iron-ties, but it was important to see that the workmen put them in properly. As to flues, he believed a 9 in. by 9 in. was quite big enough. Every pupil, before finishing his time, should serve a certain period on a building, and he knew an office where this was done, with the happiest results.

Mr. Clark thought Mr. Appleton had not touched sufficiently on the importance of seeing that the damp-course was effective. Two courses of asphalt should be laid on as the walls were being built. For window-sills he had used a large quantity of teak, which cost about the same as oak.

The vote of thanks was then passed by acclamation.

Mr. Appleton replied, and added that he was rather in favour of a 14 in. by 9 in. flue, corresponding as it did with the flue linings.

#### COMPETITIONS.

**Birmingham Law Courts.**—According to the *Birmingham Gazette*, at a meeting of the General Purposes Committee of the Town Council, held on Monday last, a report was presented from the Assize Courts Sub-Committee, embodying a report from Mr. Waterhouse, R.A., the consulting architect, with reference to the above competition. The following are the numbers and mottoes of the sketch-plans selected by Mr. Waterhouse, and approved by the sub-committee for the second competition:—14, "Two Judges of Assize," 86, "Law and Order" (Design A), 88, "Via Una," 103, "Terra-cotta," 121, "Sincerity" (Elevation No. 2). The report of the sub-committee was approved, and the authors of the selected plans—whose incognita will be preserved—will be requested to send in finished drawings on or before the 1st of June next. The sketch-plans of the unsuccessful competitors will be immediately returned to them.—At the meeting of the Birmingham Town Council on Tuesday, Mr. Brinsley asked the Mayor if it was possible that all the plans for the proposed new Assize Courts sent in for competition could be exhibited. He thought if such a course could be adopted it would please the townsfolk. The Mayor said

it had been found inconsistent with that fairness which they wished to show towards all the competitors to exhibit the plans because the competition was not a final one; it was only an interim competition, and it would not be fair to give the competitors an opportunity of inspecting each other's work.

**Birmingham Workhouse Infirmary Competition.**—Mr. Victor Scruton, secretary of the Birmingham Architectural Association, writes, in reference to this competition,—"The following notes may be of interest to intending competitors:—1. No professional adjudicator or referee has been appointed. 2. A local architect, who has already done a great deal of work for the Guardians, was appointed to prepare block plans for the proposed buildings, and to arrange other preliminaries in connexion with the competition for which he has been paid the sum of 300l. 3. The gentleman referred to in Clause 2 would have been appointed architect for the buildings, but for the casting vote of the chairman, and it may be presumed he will be a competitor."

**Fulham Vestry-hall.**—Mr. Henry Currey, the advising architect in this matter, some time ago made his award, after examination of the sixty-four designs sent in. His award was:—First, "Light and Air"; second, "Beta"; third, "Montgomery." As we have already stated, the committee having charge of the matter disagreed with this award, and at length, after much delay, last week submitted a report recommending that the premiums should be allotted to the authors of the following plans:—First premium, "Clavius"; second premium, "Truth"; third premium, "Beta." On the matter coming up for discussion Mr. Davey moved a reference back to the Committee, and that Mr. Currey be asked for an explanation as to the inclusion, in his selection of plans, of one which could not be erected on the site. Mr. Dyer, in seconding the motion, mentioned that he had been at variance with the Committee, and, together with Mr. McLlroy, had declined to vote. Mr. Currey had stated that none of the plans could be carried out for the sum stipulated, 20,000l. If modifications were to be made, it ought to be done all round. While they were quarrelling Mr. Currey should have been called in to advise the committee. Other plans were not considered because the authors had no friends. Ultimately the matter was referred back to the committee, and Mr. Currey was requested to attend the meeting and give an explanation.

**Reform Club, Heaton Chapel.**—Twelve sets of designs have been received in a limited competition for a Reform Club at Heaton Chapel, near Manchester. The selected design is the work of Messrs. Darbyshire & Smith, architects, Manchester. The cost is estimated at 2,725l.

**Croydon Street Improvements.**—In reference to a paragraph under this heading in our last (p. 289), we have to mention that the first prize was awarded to Mr. J. M. Brydon, F.R.I.B.A., of Cambridge-place, Regent's Park, N.W., and not to Mr. J. M. Beydon, as was stated, owing to a misprint.

**St. Clare Estate, Walmer.**—A scheme for the laying out of this estate, by Mr. W. Pope, of London, has been selected in public competition out of fifty-three competitors. The estate is now being developed for residential purposes. Its situation is said to be a very good one, being elevated, well timbered, and picturesque in character, and commanding uninterrupted views of the Downs, the Glen, Walmer Castle, and neighbourhood, and within a few minutes' walk of the sea. It is to the enterprise of Messrs. W. & T. Denne, the owners, of Walmer, that the first portion is now under development.

#### OBITUARY.

**Mr. James Green.**—The *Manchester Courier* reports the death of Mr. James Green, architect, Todmorden, which took place on the 10th inst. Mr. Green was sixty-four years of age. He was the architect of the Accrington Town-hall and other public buildings.

**Mr. Shakspeare Wood,** an English sculptor long resident in Rome, died a few days ago.

**Mr. William Lee.**—The death is announced of Mr. Wm. Lee, who a few years ago carried on an extensive business as a builder in Bristol, and who leaves behind him in various parts of the city many evidences of his skill and enterprise. He was fifty-nine years of age.



## DRAWINGS FOR THE ROYAL ACADEMY.

As before, we shall be glad to photograph in advance architectural drawings which are intended for the Royal Academy Exhibition of this year, with a view to their being illustrated in our pages during the continuance of the Exhibition; and we will, if desired, forward such drawings direct to the Academy from the office of this journal, but we cannot be responsible for procuring them and returning them at the close of the exhibition.

It must be understood that we can only accept for this purpose drawings of a high class, and such as have a reasonable prospect of acceptance at the Academy.

## Illustrations.

## LIVERPOOL CATHEDRAL COMPETITION.

DESIGN BY MR. W. EMERSON.

**WE** give this week the west elevation of Mr. Emerson's design for the Liverpool Cathedral, on the fine and original quality of which we have already commented in previous numbers.

## DECORATIVE DESIGN: "PEACE AND PLENTY."

This illustration is reproduced from the drawing by Mr. R. A. Bell, which obtained for its author the prize for decorative design at the last Royal Academy students' competition. The original drawing, which was one of the most attractive things in the last exhibition of students' work at the Academy, was purchased by Mr. E. Pfeiffer, of Mayfield, Putney.

## WAREHOUSE, MANCHESTER.

This illustration, from the architects' drawing, represents a warehouse which was built not long since in Manchester, from the designs of Mr. Muirhead and Mr. Wallis Baldwin. The materials are brick and terra-cotta.

## SCHOOLS AT CLAYGATE FOR THE THAMES DITTON SCHOOL BOARD.

These schools, which were won in open competition, give accommodation for 300 children,—110 boys, 110 girls, and 80 infants. They are built in local red bricks and covered with "permanent green slates," the two residences in the centre having half-timbered gables. The boys' and girls' school-rooms are each 45 ft. by 20 ft., and each has a class-room of 34 ft. by 20 ft. The rooms are plastered to the collar, and are 12 ft. 6 in. high to the plate, and 18 ft. 6 in. in centre of room. Each school has separate entrance, with hat and cloak lobby, and lavatory with Stidder's tip-up basins. There is a covered playground in the rear and offices fitted with Moule's earth-closets, with passage at back and dry earth store. The whole of the school-rooms, class-rooms, and lavatories have a dado of white glazed bricks, 4 ft. high, and are paved with Parmenter's patent pitch-pine blocks, laid herring-bone-wise on a bed of concrete. The playgrounds are an acre in extent, and have been levelled and gravelled on burned ballast and clinkers. The schools are enclosed on two sides by a 6 ft. cleft-oak pale fence, and on the front and side by dwarf walls and iron railing.

The whole of the works have been most satisfactorily carried out by Mr. Pillar, of Teddington, under the superintendence of the architect, Mr. Richard J. Lovell.

## DETAILS FROM STAPLES INN.

These details, which have been measured expressly for us, form an interesting example of the elegant and piquant variations on Classic types to be found in English Renaissance work.

**Liverpool Cathedral Illustrations.**—Just before the rising of the Court, on the 18th inst., Mr. Hadley, Counsel on behalf of the proprietors of this journal, applied *ex parte* for an interim injunction to restrain the printers and publishers of the *Building News* from publishing copies of these designs taken from plates published by us. Mr. Justice Kay gave leave to serve notice of motion for injunction with copy of the writ in the action.

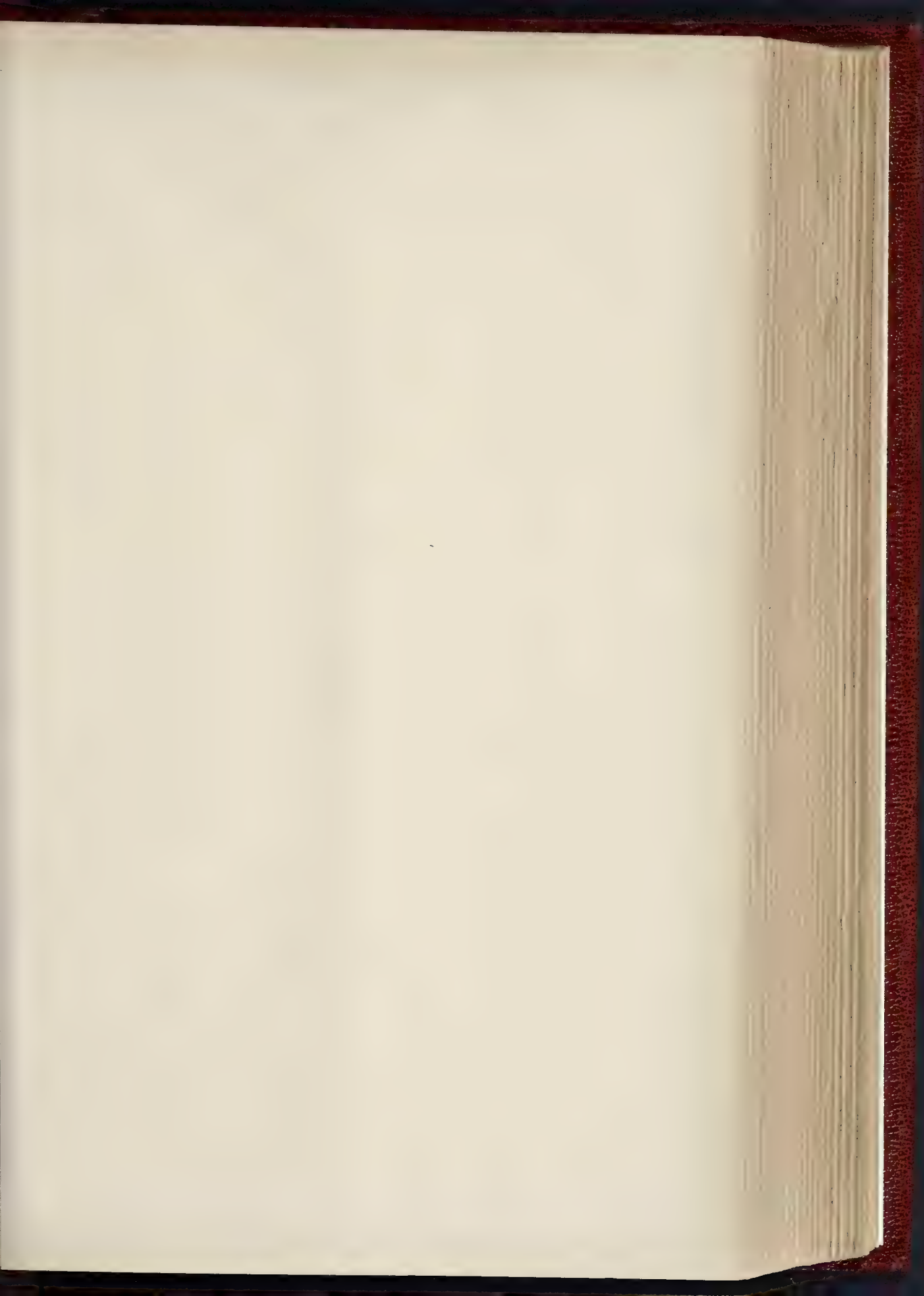
## FREE LECTURES TO ARTISANS AT CARPENTERS' HALL.

TIMBER: ITS GROWTH, SEASONING, AND PREPARATION FOR USE.

The first of the present series of free lectures was delivered on Wednesday evening, by Mr. Thomas Blashill, F.R.I.B.A., who chose as his subject, "Timber: its Growth, Seasoning, and Preparation for use." Mr. John Foot, a member of the Court of the Company, occupied the chair, and the attendance was very large.

The lecturer commenced by describing the growth of endogenous and exogenous trees, their bark, wood, and pith. For work of importance, timber should be taken from the heart-wood of a sound tree. The grain should be close and straight, and it should be free from large or dead knots or blemishes. Some of the chief defects found in logs were cup-shakes, star-shakes, and heart-shakes. If the latter were merely found straight across the butt, and running up the log in a perfectly straight direction, they did no great harm. The tendency of the trunks to twist was very curious, and most trees were subject to it more or less. The Spanish chestnut twisted so violently that by the time it was seventy years old it was badly torn by shakes, and decayed at the heart. The best ages at which trees could be felled were, for oak, 100 to 200 years; Scotch pine and Norway spruce, 70 to 100; larch, ash, and elm, 50 to 100; and poplar, 30 to 50. Winter was the most favourable season for felling, as the tree was then most free from sap. Oak was usually felled in the early spring,—the worst season, because the bark, which was valuable, was then full of sap. Teak was barked three years before being felled, and it shrunk less than any wood in ordinary use, though it was said that this method rendered the wood of teak more brittle. Seasoning was the gradual drying of the whole log, so that the shrinkage of the outer part should not be so rapid as to cause it to split and tear open before the interior had time to part with its moisture. If timber had to be seasoned without artificial help it should be stored over a dry surface, free from vegetation, well-packed off the ground, with free access of air, but not exposed to much wind. When squared it should be stood under cover to give shelter from rain, sun, and wind. So seasoned, oak would require as many months as the side of the log measured in inches, while fir would take half that time. The timber should then be cut into plank or large scantlings, and be still further exposed to the air, being so stacked that it could not warp or twist. When cut to the sizes in which it was required to be used it was again stacked till fully seasoned. Finally it should be brought into a dry, warm room or shop till fit for joiner's work. After being wrought it must stand in the shop for a few weeks, until it assumed the average condition of dryness permanently maintained by wood in our moist climate, and might then be finished off. If a round or square piece of wood had to be thoroughly dried it was best to bore a hole through the heart that the air might have access to the interior and make it keep pace with the outside, so that the shrinkage should be nearly equal all through. The length of time occupied by this natural process of drying, with the consequent expense, has induced many inventors to propose drying by artificial means. The most ancient method was that of drying in the smoke of wood fires. Besides drying it more rapidly than by the gentle warmth of a room, the bitter deposit from the smoke was supposed to protect wood from insects. There was an old patent,—that of Langton,—by which the sap was extracted from the green timber in a vacuum cylinder under heat, but the length of time and cost prevented its use. Other systems of the application of considerable heat, with the condensation of the extracted moisture, were subject to the grave defect of causing irregular shrinkage, with splitting of the wood; and though the cracks thus made closed again to a great extent, the mischief done to wood intended for many important uses was incurable. For the use of the carpenter, it was unfortunate that balk timber and deals seldom got any seasoning beyond the time requisite to convey them from the forest to the building, and during their stay in the docks. Such timber, if closed up from the air, near to moist walls or new pugging, would quickly develop dry rot even in the upper

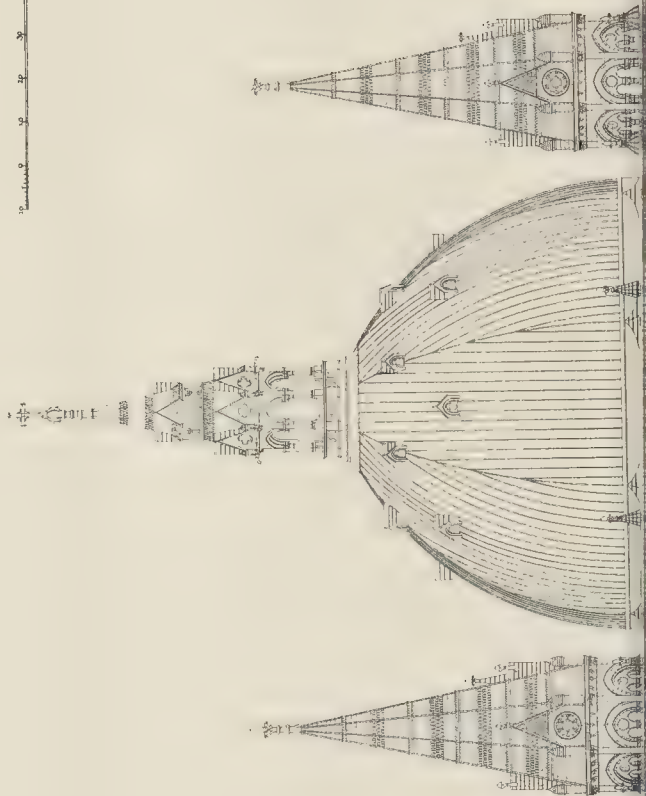
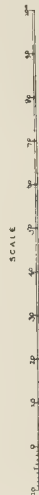
floors of a house. Deals should have a year or two of open-air seasoning, being stacked with spaces between them, and afterwards gradually dried as required for use in the joiner's shop. Dry wainscot from Riga and Odessa was cut into thicknesses and stocked for three, four, or five years, being placed on end, as the sap was supposed to run down more easily. Planks were stacked horizontally with space between them. Such woods as mahogany, black walnut, ash, birch, and maple were treated similarly, but for a shorter time. In all cases the ends of timber required protection from sun and wind, as they dried more rapidly than the other parts. The old method was to keep timber in water for a fortnight after being felled. A good deal of the sap was thus dried, and it became more durable, but not so strong. Steeping it for a longer time injured it, particularly if floating, and only partly covered by water. Boiling and steaming timber was almost abandoned, the effect being to wash out the sap, as in steeping. A fresh plan of steaming had lately been introduced, and was considered by some to be efficient. There were many purposes for which the strength of wood was of less consequence than dryness, or at least permanence of the same degree of dryness. The sap had also been extracted by the air-pump, but this plan did not seem to have been much practised. The ordinary means of drying were by keeping up heat in a drying room, and generally by the use of waste steam from machinery. When wood was cut up into small scantlings, the drying could be hastened in this way, but the further the heat was raised beyond that of an ordinary room, the greater was the risk of irregular drying and over-drying. There was a new process for seasoning boards by means of dry cold air, which was passed through a furnace, cooled, and then made to circulate through the piles of wood, so that in a few hours the boards were dry. One or other of these processes would probably be found to be far satisfactory as to be useful for a great variety of purposes. The best makers of cabinet work and musical instruments were exceedingly shy of artificial seasoning. The woods used by organ builders, such as mahogany, black walnut, birch, red, yellow, or white deals, were stacked under cover, and carefully packed for the free access of air. Hard woods required from two to four years, and soft woods from one to two years of seasoning, after being cut to sizes. Even the workshop must not be too warm, for as organs were generally placed in buildings not uniformly warmed, there was more danger that the wood would swell than shrink after the work was done. The common sense of the question of seasoning was sufficiently obvious. Wood must not be dried so quickly that it would be made unsound by cracks; and it must not be dried much as to absorb fresh moisture and swell when exposed to the atmosphere in which it was permanently to remain. It was not merely a question of time, but rather of judgment, the object being to see that the timber was gradually reduced in scantling as it dried, and so treated as to temperature and stacking as neither to expand nor get out of shape. Two important points should here be considered. Except Holland, the European country was so subject to damp, these islands, while even in Holland the weather was not so changeable. In no count too, was timber used with such needless regard of the ordinary precautions for seasoning. One might travel over the Continent without seeing a door divided vertically by a muntin which was an English peculiarity. The panes of Continental doors were, therefore, more than twice the width of ours, yet he had hardly seen one that had shrunk in the least degree, which he attributed to careful selection and seasoning, more than to loss from something less than one-fifth to more than one-fourth its weight, while other woods varied more. Teak and pitch-pine lost very little. Paints or other appliances that would clog up the pores must on no account be put on wood insufficiently seasoned, though when they might be serviceable by preventing absorption of moisture. If the wood was of sap decay would take place much quicker when painted than if left uncovered. One of the most important questions, especially with regard to the soft woods, was the prevention of decay. It was desirable, if possible, to give the sap wood of all trees the durability native to the heart wood. In elm and a few other

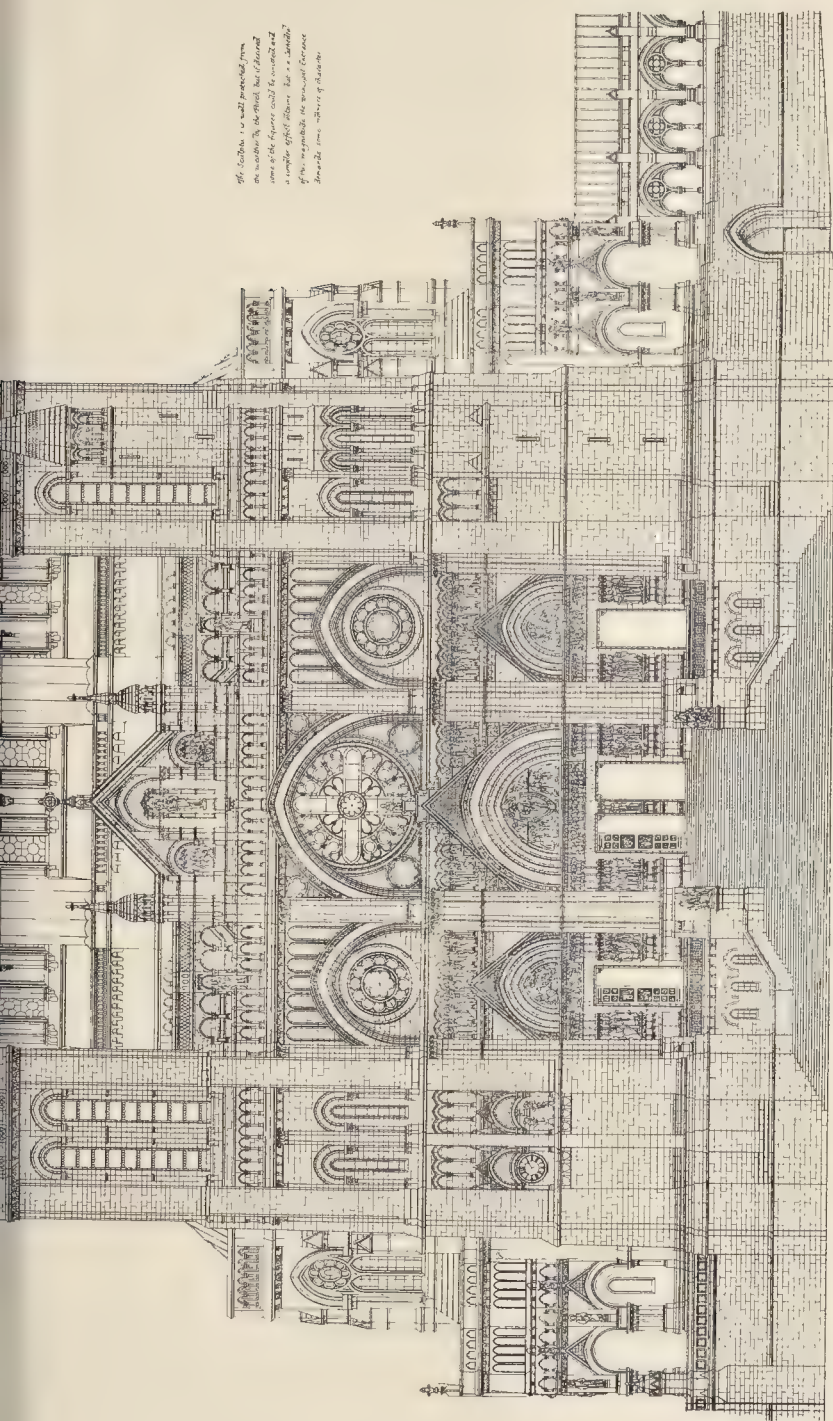




THE BUILDER, FEBRUARY 20, 1886

## DESIGN FOR PROPOSED CATHEDRAL, LIVERPOOL.





The Cathedral is a well-proportioned form  
 and, notwithstanding the small size of the  
 site, the design could be carried out  
 in a complete and effective manner. It is a building  
 of the magnitude of the great cathedrals  
 designed from the centre of the city.

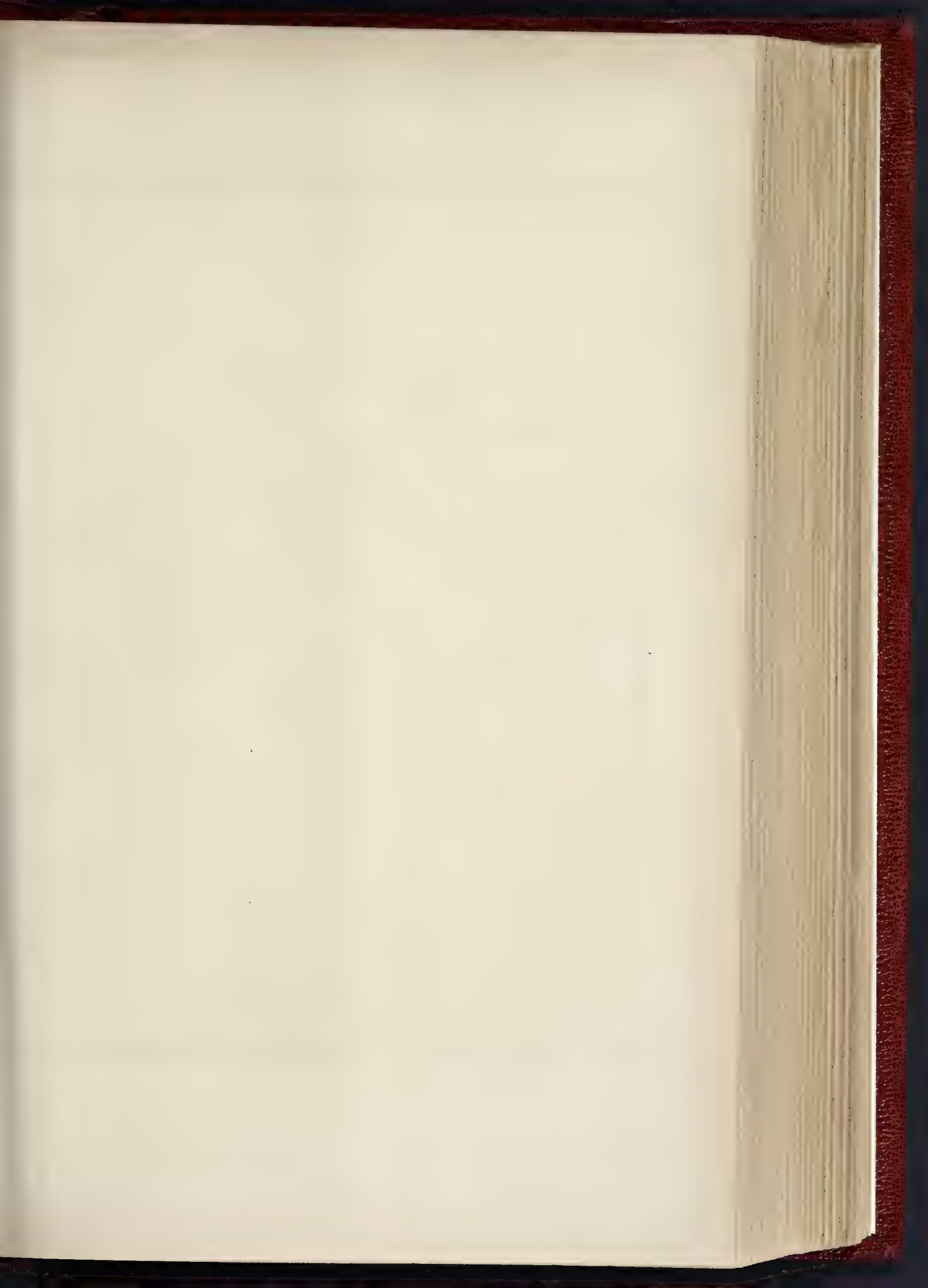
PAUL ALTHO SPRAGUE & CO LONDON

LIVERPOOL CATHEDRAL COMPETITION.—DESIGN BY MR. WM. EMERSON, F.R.I.B.A.

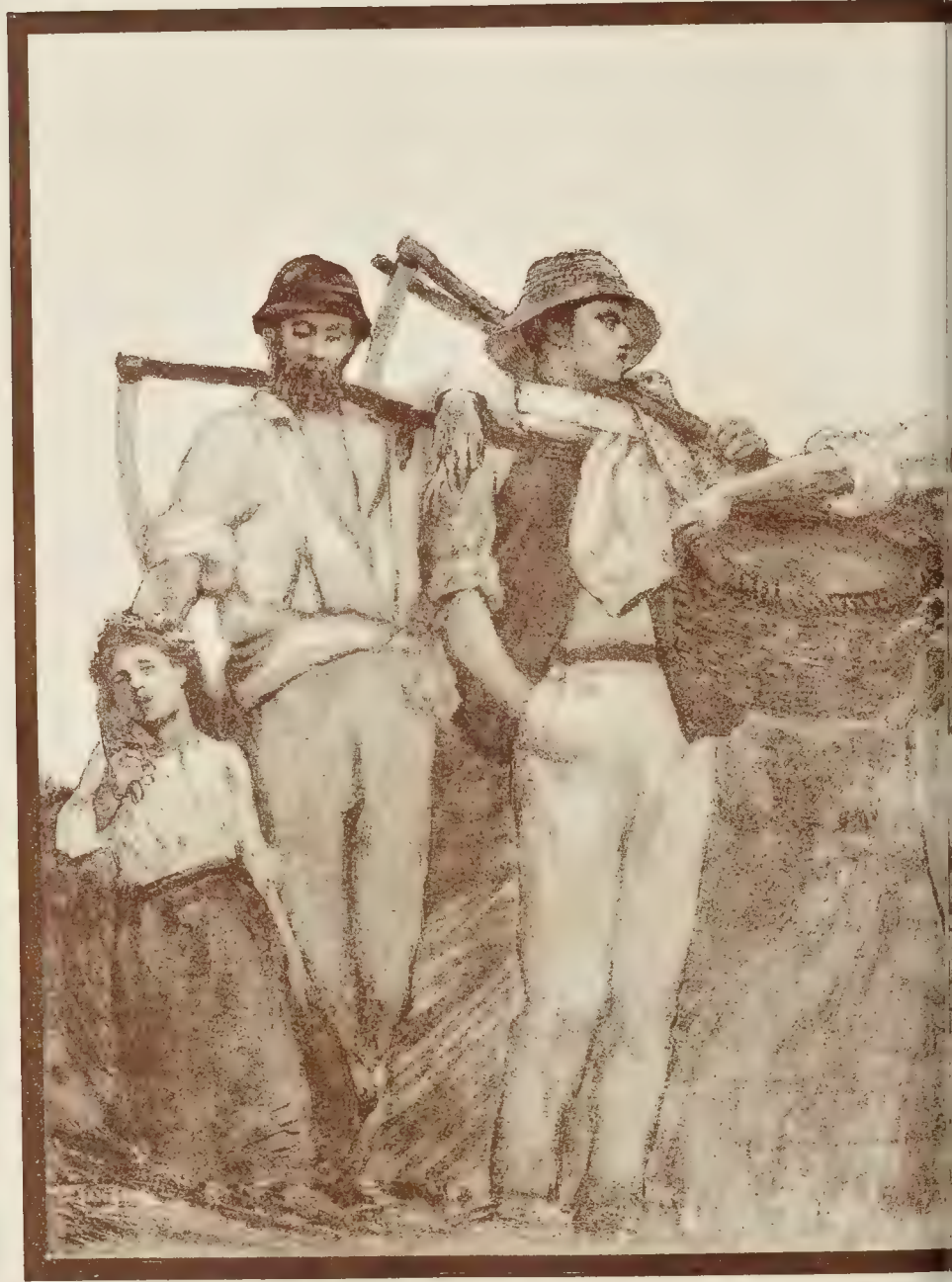
WEST ELEVATION.









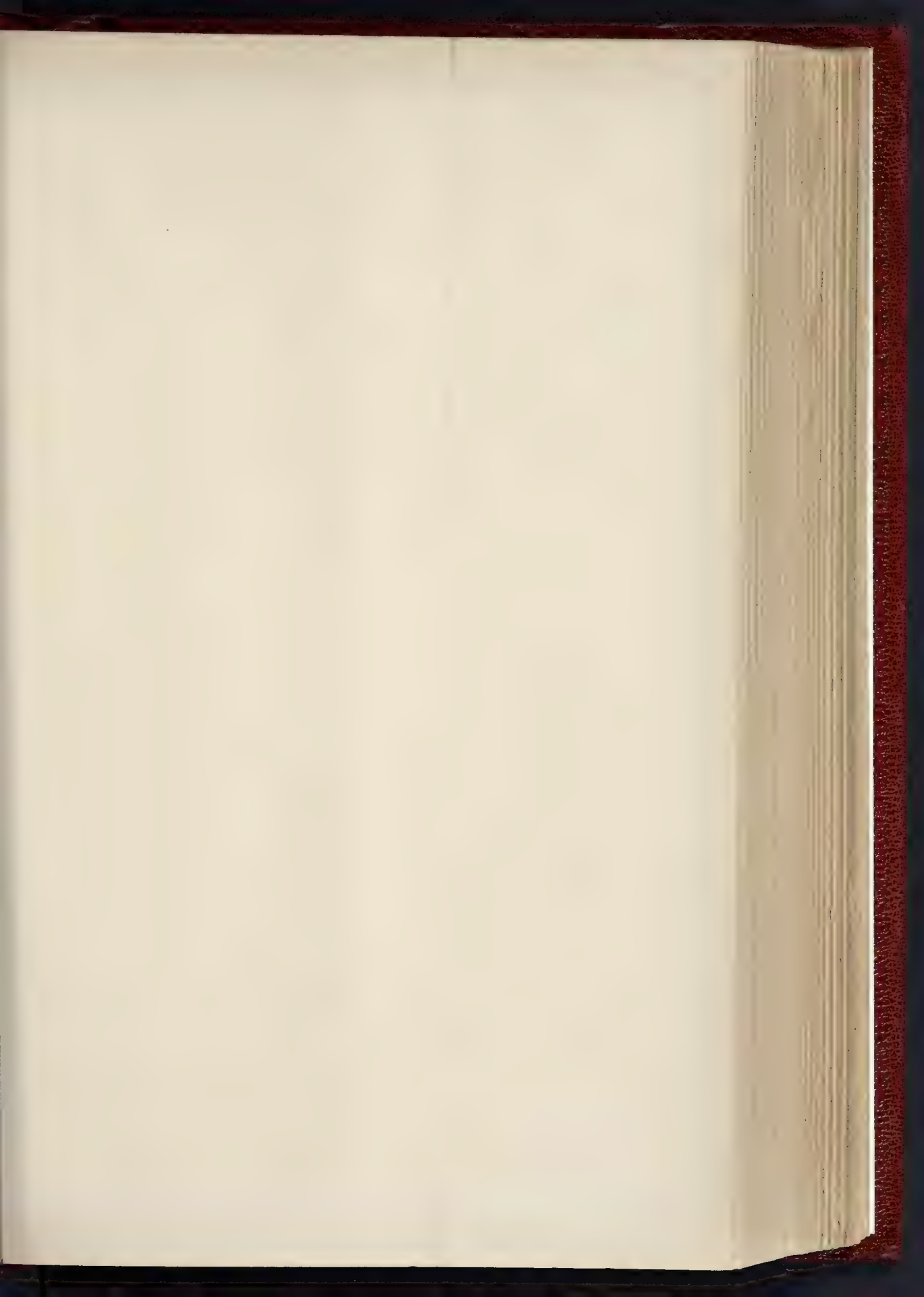




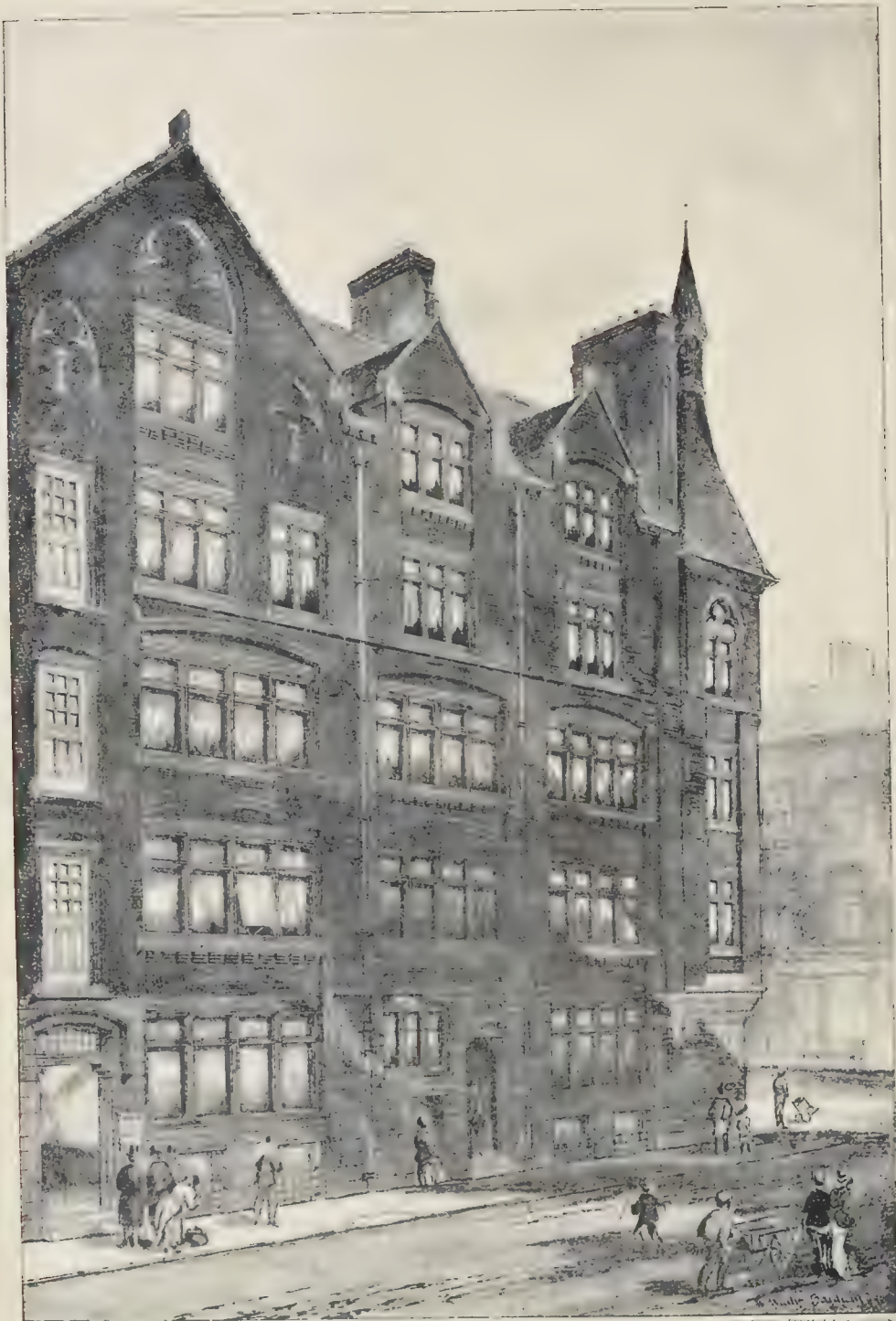
E AND PLENTY." — DECORATIVE DESIGN BY MR. R. A. BELL.—AWARDED THE PRIZE, ROYAL ACADEMY STUDENTS' COMPETITION, 1885.







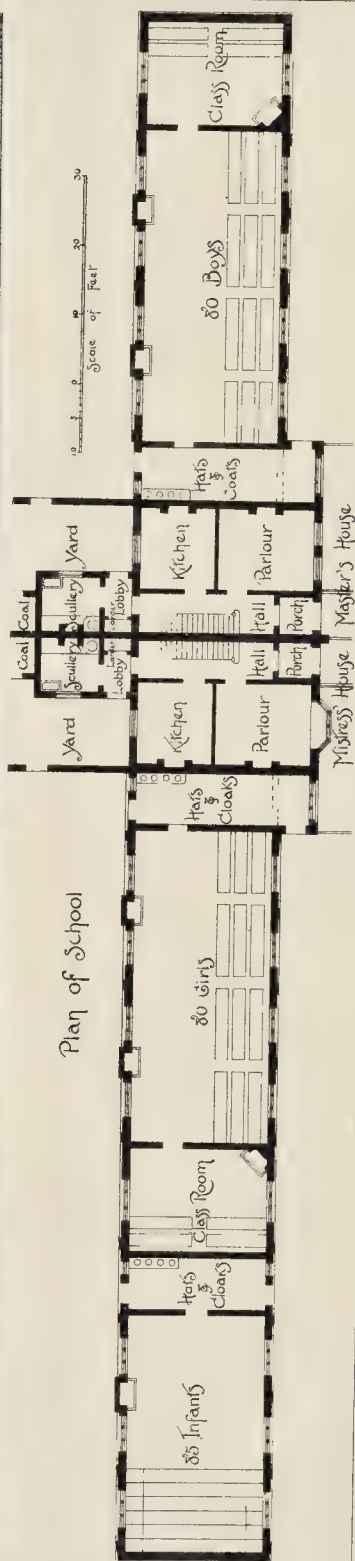




A WAREHOUSE IN CANNON STREET, MANCHESTER — MESSRS. MUIRHEAD AND BALDWIN, ARCHITECTS.



Plan of School

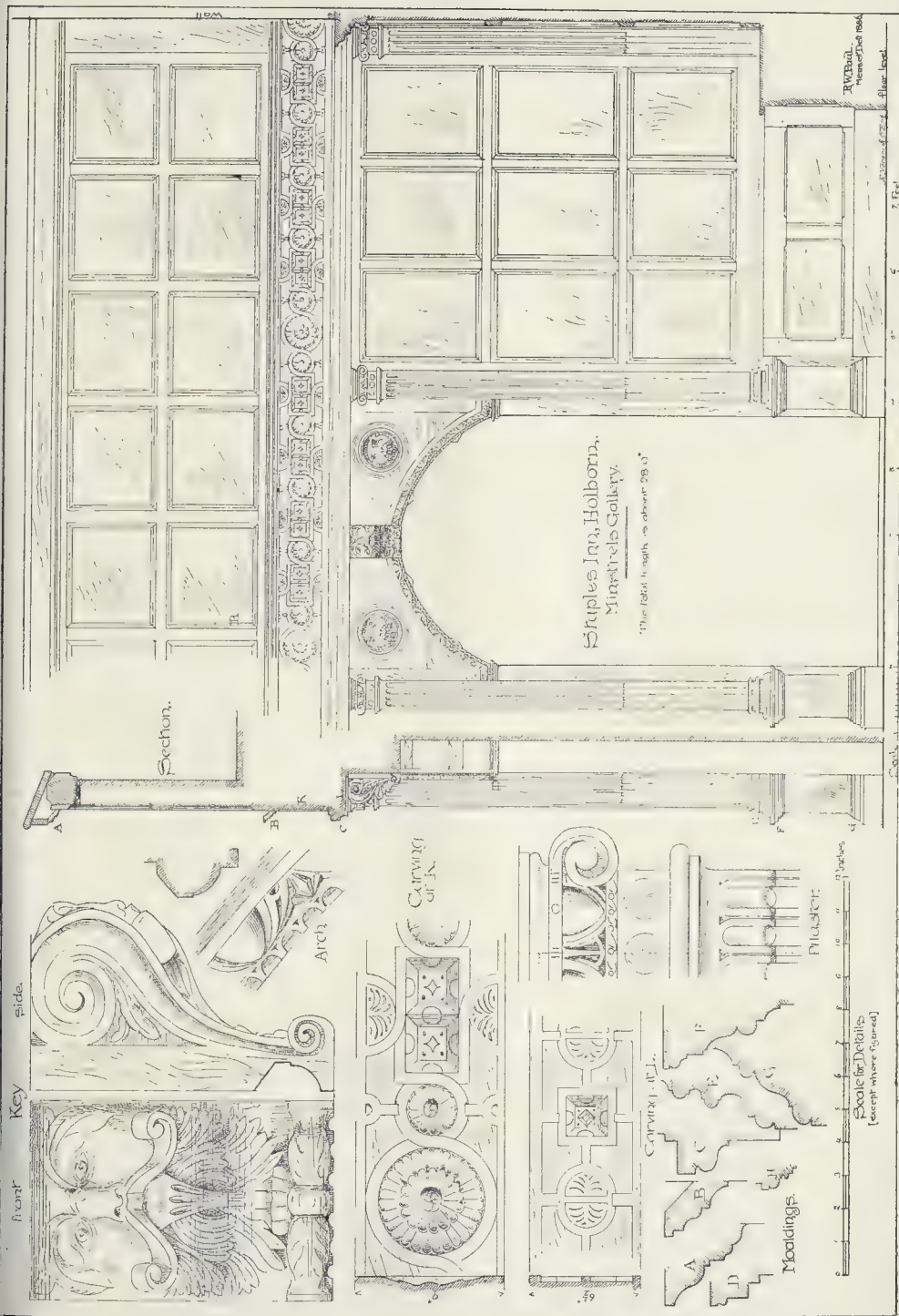


INK PHOTO SPRAGUE & CO. LONDON

SCHOOLS AT CLAYGATE, NEAR ESHER.—MR. RICHARD J. LOVELL, ARCHITECT.







DETAILS FROM STAPLES INN, LONDON.



woods the sap was equal in durability to the heart. In an old tree natural decay began at the heart. When in use in a building, timber generally decayed, either by rotting, through becoming sodden with wet, or by dry-rot, caused by slight moisture, warmth, and want of ventilation. For the prevention of decay the Kyanising process, consisting of the application of corrosive sublimate by soaking, was effectual. Burnett's process consisted in enclosing timber in a large iron vessel, from which the air was extracted, so as to empty the pores of the wood. A solution was then admitted, and a very heavy pressure applied by means of air pumps, so as to drive the liquid into the substance of the wood, which was thus rendered proof against the effects of moisture. Doubtless by the use of such machinery ordinary timber might be made useful for purposes for which it was not now considered fit on account of its perishable nature. It did not seem that much was required to make our resinous woods durable when exposed to the atmosphere. In Switzerland and other countries where fire wood was plentiful, houses that had stood at least 400 years showed hardly any signs of decay. Complete exposure to the air, combined with the dryness of the ordinary atmosphere, was in itself a great preservative. Beech timber was useless in construction, as a building in which it was employed would be destroyed, chiefly through the attacks of insects, in a few years. But beech would last many years as a weather-boarding for such a building. In the Indies such insects as the white ant destroyed all woods that were not bitter, especially soft woods. When furniture was sent from England it might be partially protected by a coating of red lead, but if the insects got into the substance they honeycombed it before any-one knew that they were there. It was therefore advisable to impregnate the wood with some protective solution by means of such machinery as had been mentioned. The essential oils, such as turpentine, had been recommended, but they were inflammable. Corrosive sublimate, arsenic, and other poisonous solutions of that class seemed most suitable. Creosoting was effectual both as against decay and against insects, but it spoiled timber for all the best and finest purposes. The protection of wood from fire was a most important question, particularly as recent experience seemed to show that iron or stone could not be depended upon. A heavy wooden beam would resist fire longer than any other beam or girder, and the same applied to staircases. Such liquids as tungstate of soda could be forced into the substance of all wood where fire was to be guarded against. Outward applications seemed to be effectual in experiments tried on a small scale. To sum up the whole class of questions connected with seasoning,—timber was wanted that would not shrink after being brought into use; that would not warp or twist out of shape; would not decay through damp, or be destroyed by insects. Wood might also be indurated, that being the result of polishing and varnishing to some extent. Upon the whole it was desirable to encourage all means of treating wood so that it might possess some of the advantages commonly attributed to iron and stone. In cutting up timber for use the question of its grain as developed by the annular rays was of very great importance. The shrinkage being greater in the newer layers of wood it must be cut so that this irregular shrinkage may be of no disadvantage in use. A plank taken out of the middle of a log would shrink at its sides more than in the middle. The boards cut out to right and left of this plank would curl outward from the centre of the log. If a log was cut into four quarters the part of each quarter furthest from the centre would shrink the most. Nothing required so much care in converting as oak timber in which the medullary rays had so much influence. In order to show the beauty of the grain as well as to provide wainscot boards true in shape it was necessary to get the boards as far as possible to radiate from the centre to the outside of the log. If this was done, the medullary rays were cut through in many places so as to show the silver grain. One method for doing this perfectly was shown in books, though he had never heard of its being done in practice, the great expense and waste in sawing being an effectual obstacle. He had always had English oak "quartered," and then the boards had been sawn from alternate sides of each quarter,—a method which

insured at least eight perfect boards, and twice as many very good ones in regard to beauty of grain. Wainscot oak from Riga and Odessa came to this country with two slabs taken off the opposite sides, and a cut clean through the centre; or else it had the slabs taken off and a plank taken out of the middle. When partly seasoned the plank had the centre part taken out, as the part around the pith was likely to be unsound. Then each of the sides was likely to cut up into boards, several of which would go pretty nearly along the line of the medullary rays and show the silver grain. Oak timber, as used in the beautiful Gothic timber roofs of the Middle Ages, and as still used in important parts of wooden ships, required to be not straight, but bent. This bent timber was known as "compass" timber when it was 5 in. and upwards out of the straight in a length of 12 ft., and was more valued on that account. Ash timber did not appear to have any sapwood, all the wood being of the same colour, and there were foreign timbers with the same peculiarity. It appeared, however, that the worms found out the sapwood, so that it had the usual defect. In elm timber the sapwood was reckoned as good as the heart. The timber did not improve by seasoning, but should be used green, and even kept wet until wanted for use. When used in flooring, he had known the oldest elm boards shrink considerably if merely taken up and placed. The important uses of the finer kinds of wood when cut up for veneers must not be overlooked. The fact that veneer was much abused was no argument against its legitimate use. It should only be used in panels, so that the framing would be of solid wood, of good plain colour, to set off the beauty of the panelling. The most beautiful veneers were still cut with the saw from 10 to 16 to the inch; and knife-cut veneers were also very largely used. By steaming large logs of timber, and putting them in a lathe, the knife would pare off a continuous sheet from the thirtieth to the one-hundredth part of an inch. In concluding his remarks the lecturer insisted on the importance of the subject he had brought forward. Other gentlemen would follow him, who, happier than he, would be privileged to discourse upon the great subjects of beauty and fitness in the use of timber. That evening, however, they had been nearer to the beginning of the subject, and unless that was properly stated, no act of man could entirely remedy the mischief, or give to the world the benefits art was able to confer.

The following are the remaining lectures of the course:—Feb. 24th, Prof. Corfield, M.A., on "Water Traps"; March 3rd, Prof. Kerr, F.R.I.B.A., "A Gossip on the Philosophy of Building Materials"; March 10th, Mr. T. Chatfield Clarke, F.R.I.B.A., on "The Architecture of City Buildings"; March 17th, Mr. John Slater, B.A., on "Concrete"; March 24th, Mr. H. H. Statham, on "The Fine Art Aspect of Woodwork"; March 31st, Mr. James Doulton, on "Terra-cotta"; and April 7th, Mr. Banister Fletcher, M.P., F.R.I.B.A., on "The Influence of Architecture on Carpentry."

#### LIVERPOOL CATHEDRAL DESIGNS.

SIR,—Referring to the remarks by a correspondent, given in your last issue, concerning the construction of the dome in Mr. Emerson's design for the Liverpool Cathedral, if the writer had looked at the plan and sections in the copy of the report on the design, which is also in the Library of the R.I.B.A., he would have seen that the walling above the intersection of the pendentive arches is octagonal on plan, while the balustrading is circular, and the triangular soffits he refers to filled by niches, figures, and columns.

M. N.

#### The Proposed Birmingham Ship Canal.

At an influential meeting of traders held on Wednesday, at the Council House, under the presidency of the Mayor (Alderman T. Marneau), Mr. Keeling's project for improving the canal communication between Birmingham and the Western ports was further considered. The scheme, which was referred to in a "Note" in our last, was explained at some length by Mr. Frank Impey, received a considerable amount of support, and ultimately, on the motion of Mr. A. Hickman, M.P., a committee was appointed to investigate it in detail, and to report it to another meeting.

#### ST. PAUL'S CATHEDRAL APPROACHES.

SIR,—There is great danger of this important question being decided on a false issue.

We have appeals to sentiment and a claim for public convenience; if the sentiment were sound and the convenience a reality, the proposal could not be opposed, but both are factitious.

A great point is sought to be made of the narrowness of the roadway east of St. Paul's Cathedral; true, it is narrow, and I am informed that the Mercers' Company effected a successful encroachment at their last rebuilding by throwing an arch over the pathway. This can be withdrawn, but is the roadway needed at all?

If public convenience be really consulted, if the sentiment of throwing open the cathedral to spectacular view be really desired, the proper course is to begin on the north side. It affords a direct passage from Cheapside to Ludgate Hill, and should be open to vehicular traffic. What, in the name of common sense, is the rationale of the present line of traffic, needlessly forced all round St. Paul's, wholly folly, because it is perpetrated, affords a ground of argument for the still grater folly now in contemplation.

If money is to be spent, let the outlay be effected for a solid advantage and *bona fide* necessity, viz., to save a quarter of a mile or so, in travelling south by west from the City, which is lost in time to passengers and sunk in labour of cattle and for no good at all. But need money be sunk in this beneficial plan? I say, no! For, if the cathedral railings be set back a sufficiency, as it is possible, a carriageway would be opened without trespassing on the house frontages at all; the present steps to the north gate entrance are very awkward, but might very easily be adjusted with a view to the proposed plan under consideration. There remains the question of traffic east of the cathedral. I assume that it is infinitesimally small. At present vehicles from St. Martin's-le-Grand circumnavigate St. Paul's *via* the east passage, because they cannot get north, and such traffic would gain most of all by the course suggested; what remains after this limitation would be undistinguishable. The Royal Exchange is centre of an enormous traffic and open on three sides only; it is, therefore, open to consideration whether a footway for traffic east of St. Paul's would not suffice, and the remaining traffic from Cannon street to the Post Office, go by Old Change. One of the objections to my plan is that the shopkeepers north of St. Paul's would consider themselves injured by the intrusion of a general traffic. On this point I take leave to note that steps are in progress to widen the Sessions House; before it is too late I would plead for a footway from Angel Corner straight into the Old Bailey. From Angel Corner ground in America, a strip of which, alongside of Stationers' Hall, would take up the unoccupied wagon-yard of Messrs. Lavington; if the City authorities mean to build over it, they might leave us a covered way. This would carry off all business traffic of pedestrians, and leave the St. Paul's pavement much relieved, so affording the lecturer full leisure to contemplate the beauty of silks and satins.

A CRY FROM PATERNOSTER-ROW.  
Feb. 12, 1886.

#### ARCHITECTS' POWER TO EMPLOY SURVEYOR.

SIR,—It may interest your readers to know that the view you favour in last Saturday's "Notes" was also affirmed in the Court of Session in Scotland, in the action "Black v. Cornelius," 1879, in which it was held that an architect is a general agent of his employer for all purposes necessary for the carrying out of the works, and that, consequently, he is authority to employ a surveyor to take out quantities without any special consent from his client. Baron Huddleston is, therefore, in opposition not only to the English, but also to the Scotch precedents.

A. R. PRENTICE.

#### HELP FOR THE UNEMPLOYED.

SIR,—The distress now prevailing among the unemployed must be my excuse for asking you to insert this letter. Some of the workmen in my employ having expressed a wish to assist their out-of-work brethren, and knowing from experience that they always are to help each other in case of necessity, I formed a committee at my head office here, and the following arrangements were made.

Posters were distributed to my various works, &c., stating that a weekly collection would be made to the payable by each of the foremen, assisted by a representative chosen by the men. The first of these was made last Saturday, and I am glad to say realised a very satisfactory amount. It is proposed to continue this for five weeks, by which time, with better weather, the distress will, we hope, be lessened. The men are invited to report to the committee through their own representative a list of want which come under their personal notice. These, after examination, will be forwarded with the amounts collected, to the London Bible and Domestic Female Mission, 2, Adelphi-terrace, Strand.



the honorary secretary of which most excellent institution has kindly consented to distribute in money or otherwise, as most applicable, to deserving cases, those above referred to taking precedence. This society has a large number of workers distributed over the whole metropolitan area, and their constant contact with the working classes gives them every opportunity of judging as to the necessities of those for whom the fund is intended.

My object in entering into these details is that the employers of other firms (where they have not already done so) may be induced to do likewise.

JOHN T. CHAPPELL.

149, Lupus-street, Finsbury.

#### THE "ECONOMISER."

SIR,—Mr. Priggin Toale may feel interested in knowing that the "Economiser" which he advocates so strongly, and which is the "central principle" of his treatment of fireplaces, has been in use for many years in the South of England, and with good results.

The idea of this movable shield, closing in the space under the fire front, occurred to me nine or ten years ago, when I had two of them made, and applied them to existing stoves in the Isle of Wight; so I am five years ahead of Mr. Toale in his discovery; but shall not be surprised to hear that I have been anticipated by others in so obvious an improvement of the old-fashioned grate.

L. C. RIDDETT.

### The Student's Column.

#### FOUNDATIONS.—VIII. PILE FOUNDATIONS.

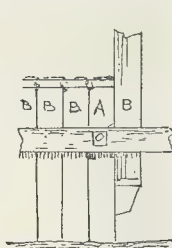
**P**ILES, though of very common use in engineering works, are seldom employed in the foundations of ordinary buildings. They are, however, amongst the oldest building appliances known, and their durability is very far beyond what might be supposed.

They are found under the pre-historic lake dwellings that have been dug up chiefly in Switzerland. They were used by the Phœnicians in harbour works in North Africa, as may still be seen. Oak piles in very good preservation are found in waterside works of Roman date, and Medieval specimens taken up from under the piers of Old London Bridge seem as hard as horn. In Venice such works as the walls of the Arsenal and the Tower of St. Mark's stand on close piling. In the sixteenth century the Dutch were quaintly described by Erasmus as a people living on the tops of trees like crows. If the mud and bog and sand that form the ostensible support of the Dutch town could be quickly withdrawn, the full significance of this description would become apparent. At Rotterdam, the Palace,—a seventeenth-century building of the largest class,—stands on more than thirteen thousand piles driven 70 ft. into the earth. Whether from some degree of decay in the fir timber, of which piles are usually made, or, more probably, from overloading, large buildings have at times sunk down very considerably into the mud. At Dordrecht the tall stables of seventeenth-century houses incline outward over the footway to an alarming extent, and are evidently prevented from falling only by iron ties. It is, indeed, the invariable custom of those who build in the treacherous soil of the Low Countries to use such ties, and they form a very conspicuous and ornamental feature in Dutch architecture. We may hesitate to assume that the subsidence which is often very evident in the decay in the piles; for, unless they have reached a firm foundation, they are likely to sink little by little as long as the building stands. Decay, indeed, is often observed in one part which are above the permanent level of the water in the soil, but it is seldom possible to examine the condition of piling below that level. Some of the fir piles taken up from the foundations of old Westminster Bridge were as sound as when driven 120 years before. Upon the whole, we may consider that oak and elm have, when submerged, a durability that is equal to any requirement, and that fir timber, similarly placed, has also very great durability, the extent of which is not so well known.

The simplest way of using piles is to drive into the ground stakes of as large size as can be forced down by the blows of a heavy mallet. These stakes should not reach down to the earth they will consolidate the surface soil as to give a better support to a light structure than it would have without them. The simplest method in use for driving piles of the

dimensions of trees is that known as a "ringing engine," from some likeness to the mode of ringing bells. A rope is carried through a pulley that is fixed above the pile, and a heavy weight is suspended by it. When the weight has been raised some three or four feet by the united efforts of about a score of men, who pull at the rope by means of separate cords that are attached to it, they let it drop suddenly upon the head of the pile. In this way two rows of common round fir piles may be driven closely along the line of a wall so that stout planking may be fixed upon them to receive the brickwork.

The "monkey-engine," which is in common use for driving piles made of squared timber of full dimensions, is arranged to drive with a much lighter ram falling from a greater height. Thus, a ram or monkey will be made to fall 10 ft. or 15 ft. It is raised by a small windlass turned by two men, and when it has reached the required height it is released by self-acting gear, slides down the upright guides in which it works, and falls on the head of the pile. Rams arranged in a somewhat similar way, but raised by steam power, are made of a ton weight, and capable of working with a fall of more than 30 ft.



BEARING PILE

A GUIDE PILE  
B SHEETING PILES.

In the "steam ram," which is an adaptation of Nasmyth's steam hammer, there is a return to the principle of a heavy weight falling through a small space. The weight in this case is from one ton to one and a half, and the ram will deliver sixty blows per minute, this being by far the most rapid and efficient means by which piles in large numbers can be driven, though other systems have their advantages in special cases. A heavy ram falling through a short distance is better than a light ram with a long drop, as the shock is not so great, and there is less danger of injury to the head of the pile. The reason of this is evident if we consider that the light ram, in order to produce a given result, must cause the pile to assume a quick motion instantaneously, while the heavy ram, falling much more slowly, will press the pile down comparatively gently. In the latter case there is some approach to the effect of the actual load that the pile will have to bear. Piles may be driven into soft mud, in which they will stand and carry a load, chiefly by virtue of the resistance caused by the friction between them and the semi-fluid mass in which they stand. But this can never be considered a satisfactory result, for when the permanent load comes on such a pile it will in time, by steady, persistent pressure, gradually overcome the resistance of the soft earth, and this will then yield, although it would not yield to the momentary shock of the pile-driver.

### Books.

*The Arts in the Middle Ages and the Renaissance.* By PAUL LACROIX. English Edition, revised and re-arranged by W. ARMSTRONG, B.A. London: J. S. Virtue & Co.

The first English edition of this work appeared sixteen years ago, and was reviewed by us at considerable length,\* and its various merits fully admitted. But a great deal has happened since then, and it can scarcely be said that the present edition stands in the same relation that its predecessor did to our knowledge of the arts whereof it treats. It is nevertheless an interesting, and in many respects a useful work. It professes to embrace "all the arts from the

fourth to the latter half of the sixteenth century," and to be in fact not only a history of the arts themselves but of the epochs in which they were developed. It is obviously impossible to bring an adequate treatment of so vast and complicated a subject within the compass of less than 500 large-print pages. Architecture is disposed of in thirty-five pages, sculpture in thirty-one, painting in twenty-six, which is sufficient evidence that only a very cursory glance is given to those important arts and the epochs which they adorned. Architecture is the greatest sufferer; and the author is sensible of the fact. Its history demands, he says, either a short epitome or a thorough investigation. He has given us neither, and it is to his treatment of the minor arts that the real interest of his work attaches. The chapters on Gold and Silver Work, on Playing-cards, on Music and Musical Instruments, show great research, and are both instructive and entertaining, and the same may be said of the chapters on Bookbinding, Printing, and Manuscripts. Heraldry, which played so important a part in the arts of the Middle Ages, is unaccountably omitted. The book is an assemblage of odds and ends of information on a great variety of subjects connected with the arts, great and small, and it is little more; but it has its place and use, and will, no doubt, continue to find a wide circle of readers. The illustrations, over 400 in number, show little or no deterioration, and the paper, type, and general get-up of the work leave nothing to be desired.

*Spon's Architects', Builders', and Contractors' Pocket-Book of Prices and Memoranda.* 1886. Edited by W. YOUNG, Architect. Thirteenth edition. London and New York: E. & F. N. Spon.

A BOOK which has reached its thirteenth edition scarcely needs commendation. This one is surprisingly full of useful information, which is no less remarkable for its general accuracy than for its amount and variety. The author asks for suggestions calculated to improve it. Here are a few. The table of cost per cubic foot of public buildings should state whether the measurements are all on an identical basis, and how the buildings have been measured, and give dates of erection. Without this the value of the information is much reduced. The table of comparative prices of builders' work in 1703 and 1876 might be usefully extended to include a column for 1886; and if other dates could be interpolated the interest in the progressive growth of prices would be greater, and the statistics of more practical value. The section on valuation of leasehold property is incomplete because it does not specify what it is that is to be multiplied by the given number of years' purchase, viz., the net profit rental, nor how that net rental is to be arrived at. The subject should be omitted altogether or treated in reasonable detail. We have no fault to find with the prices generally, which are fair. The schedules of manufacturers' goods might in some cases be amended, e.g., the list of water-closet apparatus is confined to valve and pan closets, and omits all reference to the various forms of wash-out closets, which are every day becoming more generally used.

The Acts of Parliament do not comprise the Metropolitan Building Act as such, although all that need be known on the subject is given under "Thickness of Walls." The alphabetical arrangement of the contents is a convenient one. There is a good index, and (rare virtue in a book of this kind) the handiness of the little volume has not been impaired by advertising sheets. It is a book for which every architect should thank the author.

*Lockwood's Builders' and Contractors' Price-Book.* 1886. Edited by FRANCIS T. W. MILLER, Architect. London: Crosby Lockwood & Co. 1886.

ALTHOUGH merely entitled a "Price-Book," this work comprises short introductory essays on the several building trades and the measurement of builders' work, and includes a form of building contract, the Metropolitan Building Act, and numerous tables. This is a doubtful form of composition, and one not to be indiscriminately commended; for the qualifications necessary for the essays do not necessarily extend to the prices, and the knowledge of the prices of builders' work does not necessarily warrant its possessor in dealing with the theory and practice of construction.

\* See the *Builder* for March 26, 1876.



As a rule, a price-book had better be a schedule of prices merely, and a work on the building trades be unhampered by questions of cost. In the present work the section on concrete construction contains statements which passed unchallenged twenty years ago, but which now require some modification. Concrete roofs are not water-tight unless protected by cement or asphalt. Concrete walls are not good non-conductors of sound, and so on. Moreover, the cons should be given with the pros, and the unfortunate property which a concrete wall has of cracking from top to bottom, like a china plate, on the least inequality of bearing, being without the elasticity of a jointed construction, should be touched upon if the subject is to be treated at all.

The prices strike one as high, and as based upon a contractor's standard, rather than upon one which an architect would adopt. But the book contains a vast amount of information of a miscellaneous kind, and is well indexed.

*James Nasmyth, Engineer. An Autobiography.* Edited by SAMUEL SMILES, LL.D. A new edition. London: John Murray. 1885.

We reviewed this book at considerable length on its first appearance, and its republishing, now that a new edition has become necessary, has given us fresh pleasure. The subject of it came of a remarkable and variously-gifted family, and his plain, unvarnished account of his forebears and their lives has all the charm of a work of fiction with the added interest of being true. A little comfort at the present juncture may be sucked from his graphic account of the attempted building of the Fort at Inverness by his great-grandfather, whose work was brought to an abrupt close by Rob Roy and his wild companions in a way which resulted in the death of the courageous builder. The state of Scotland in 1703 was not unlike the state of Ireland now. It is, therefore, not beyond hope that Ireland may hereafter be as peaceful and happy as Scotland now is. The many beautiful drawings and designs embellishing the work show James Nasmyth to have been no less gifted as an artist than he proved to be eminent as a man of science and an engineer.

*The Combined Number and Weight Calculator.*

By WILLIAM CHADWICK, Public Accountant. London: Crosby Lockwood & Co. 1886.

THIS bulky volume, the result of an immense amount of patient labour, gives upwards of 250,000 separate calculations "showing at a glance" (we quote from the title-page) "the value, at 421 different rates, ranging from one-sixty-fourth of a penny to 1l. each, or per cwt., and 20l. per ton, of any number of articles consecutively from 1 to 470." Thus, has a builder to use 23 tons 7 cwt. of any material at 3l. 16s. 6d. per ton, he has only to turn to Mr. Chadwick's page, headed with that price (and which also gives prices per lb. and per cwt.), and run his eye down the column till he gets his amount, 89l. 10s. 2d. The use of such a work is not to be reckoned in regard to occasional and isolated calculations, but to cases in which a large number of varying amounts of materials, some at fractional prices, have to be priced with as little delay as possible. Each page also, besides giving prices per a given weight, gives them per so much an article. Thus, if instead of calculating so much per ton, our contractor or manufacturer has to price 467 articles at 3s. 9d. each, he will run his eye down the numbers column instead of the tons and cwt. column, and will find his 89l. 10s. 2d. opposite No. 467. The same column of numbers is made also applicable to prices per cwt. The prices for single articles or cwt. increase by a d. each page, and those of tons of course, by 10d., in the bulk of the work; the earlier pages, however, advance by smaller fractions, commencing at  $\frac{1}{4}$  of a penny per article. The volume is likely, we should imagine, to be very useful to contractors and estimators, not only in the saving of time but of brain work in repeated calculations. It is one of those books in the production of which virtue may be said to be its own reward, for they seldom bring fame or pecuniary return to their authors, who have to be content with the consciousness of having done something practical for the convenience of others. Mr. Chadwick concludes his preface by saying that he will be very thankful for any suggestions that may lead to the improvement of the work in future editions.

*The Strength and Proportions of Riveted Joints.* By BINDON B. STONEY, LL.D. London: E. & F. N. Spon.

THE author of this work has done excellent service in collecting together and presenting in a portable form a good deal of that vast amount of information on various questions of riveting that lie scattered so widely in the Transactions of the many scientific and technical societies and institutions. The problem of joining iron or steel plates by means of rivets involves so many different considerations of varying complexity that the amount of experiment and research necessary to establish a sound theory of riveting must be enormous. Although much yet remains to be done, much has already been accomplished in this direction. Dr. Stoney casts a wide net, and the copious references he gives to the sources from which he quotes add particularly to the value of his book.

*Some Particulars of the Municipal and Sanitary Works of Blackburn.* By J. B. McALLUM, Borough and Water Engineer. Blackburn: Printed by J. Janson.

THE author has put together a few disjointed notes on the Sewage Water and Gas-works of Blackburn. These are bound up with various plans and "ink-photo" illustrations, and form the volume indicated above. The Blackburn corporation, under pressure exerted by the Rivers Pollution Commissioners, have established sewage farms some distance outside the town. The yearly loss on one of these farms is about 600l., but on another there is an annual profit of 900l., which is a little over 14 per cent. on the first cost of 70,000l. The total expense of these irrigation works has been 129,328l. The particulars given are far too meagre to enable the book to be of much practical value to any but those who have a previous knowledge of the district and the work done.

#### RECENT PATENTS.

##### ABSTRACTS OF SPECIFICATIONS.

15,266, Casement Stay. A. B. Milne.

A rod is pivoted to the casement, a thumb-screw passes through a clip into a plate on the window-sill. The clip can turn on the thumb-screw when the window is opened, but grips the stay when the screw is turned.

15,355, Wall Ventilator. T. S. Ellis.

The ventilator consists of an L-shaped box, which gives the incoming air an upward direction. In a portion of the box may be placed any suitable device for filtering, perfuming, heating, disinfecting, or cooling the air as it enters the room. The ventilator may be opened, partially opened, or closed by a shutter or valve, which is also arranged to slide upwards clear of this portion of the box when access to the latter is desired.

9,357, Kilns. L. Williams.

In the body of the kiln is constructed one or more fire-clay columns, with apertures. These apertures are fitted with iron or fire-clay boxes, in which are fixed bars or bricks. Combustible gas is led into a tube within the column, thence into the column through openings, where it mixes with air which is forced into the annular space between the columns and the tube. The mixed gases pass through the apertures, and are ignited, thus burning the lime, bricks, &c.

16,709, Chimney Cowl or Ventilator. J. White.

On a central shaft or tube are fitted a number of radial webs or ribs. The lower ends of these webs are closed by a conical case or plate, and the upper ends are partly covered by another conical case, between which and the tube an air-space is left. The wind passing through induces an up-draught in the shaft. In some cases a curved or conical web or plate is provided, fixed between the plates, so as to form a double set of passages for the wind.

#### NEW APPLICATIONS FOR PATENTS.

Feb. 5.—1,691, J. W. Helliwell, Zinc or Metal Roofing.—1,706, J. & A. Cooke, Syphon Cisterns for Flushing Water-closets.—1,742, J. Bauer, Pipe Cutter.—1,744, T. Hux, Floorings.

Feb. 6.—1,762, J. Wilson and Others, Breakwaters.—1,765, J. Chapman, Weatherproof Tiles.—1,787, W. Lake, Screw-threaded Nails.

Feb. 8.—1,804, W. Howie and R. Henderson, Windows.—1,816, W. Joy, Charging Cement Kilns.—1,819, A. Gates, Bakers' Ovens.—1,836, J. White, Portland Cement.

Feb. 9.—1,852, H. Owens, Casement Stay.—1,862, R. Hunter and J. Turnbull, Kitchen Ranges.—1,894, J. Brewster, Heating or Cooling Buildings, &c.

Feb. 10.—1,912, G. Wooliscroft and T. Freeman, Tiles.—1,917, R. Quinn, Saw Guide.—1,936, W. Scarlett, Pipe Tongue and Cutters.—1,945, W. Thompson, Improving Chimney Draught.

Feb. 11.—1,938, J. Shanks, Connections for Baths-Sinks, &c.—1,947, W. Haigh, Ornamentation of Mouldings.—1,996, W. Haigh, Wood-cutting Machine.—2,014, J. Armstrong, Locks and Latches.—2,017, J. & J. Mason, Frames for Window-sashes.

#### PROVISIONAL SPECIFICATIONS ACCEPTED.

14,184, W. Wood, Apparatus for Soldering and Brazing.—14,977, C. Henderson, Ventilating.—15,133, L. Scott, Glass Levels.—15,506, G. Whitehead, Chimney Cows, &c.—15, M. Goughly, Door or Window Fastener.—26, A. Barker, Urinals.—78, C. Watkins, Graining Tools.—179, R. Evered, Connecting Door Knobs to Ropes of same.—215, C. Homer, Window Sash-Fastener.—255, W. Gallon, Stone or Concrete Piers, &c.—654, G. Nolton, Cowl and Ventilator.—657, W. Wade, Preventing Down-draughts and Smoky Chimneys.—891, C. Hodger, Pipe Joint.—16,517, A. Mumford, Brick-Crushing Machine.—19, W. Carr, Preventing Concussion in Water Pipes.—299, C. Revell, Electric Indicators for House Bells.—307, A. White, Lavatories.—364, J. Hyde, Sash-Fasteners.—407, J. Jennings and Others, Flushing Cisterns.—411, B. Sutcliffe, Hand-Planing and Thickening Machine.—488, W. Youlton, Butts of Hinges.—547, W. Green, Door Bolt.—567, T. Bratton, Hanger Attachment for Sliding Doors.—838, B. Ramsden, Ladders.—977, J. Nichols, Nails.—1,171, F. Balbi, Sharpening Edged Tools.

#### COMPLETE SPECIFICATIONS ACCEPTED.

##### Open to opposition for two months.

2,788, E. Prince, Adjusting and Fastening Windows.—3,232, A. Maher, Door Checks.—3,897, J. Johnson, Artificial Stone.—4,169, J. Holloway and H. Stanning, Window Fasteners.—4,613, R. M'Queen, Stoves for heating Buildings.—9,211, H. Gibbs, Flushing Water-closets.—12,706, J. Green and Others, Fire Grates.—13,173, W. Brower, Fastening Windows, &c.—1,998, T. Roberts, Gill Stoves, 7,738, G. Pfeiffer and M. Schütz, Apparatus for Heating Soldering Tools.—20, W. Kellett, Plane Bits.—441, J. Pullar, Opening and Closing Windows, Ventilators, &c.

#### RECENT SALES OF PROPERTY.

##### ESTATE EXCHANGE REPORT.

###### FEB. 8.

###### By COLLIER & COLLETT.

Westbourne Park—21, Acklam-road, 50 years, ground-rent 8l. .... £365

###### FEB. 9.

###### By C. & H. WHITE.

Pimlico—25, Ranelagh-grove, 11 years, ground-rent 3l. .... 205

28, 29, and 30, West-street, 37 years, ground-rent 14l. .... 700

###### By A. RICHARDS.

Dalston—113, Haggerston-road, 33 years, ground-rent 3l. .... 370

Lower Tottenham—Two freehold houses with shops Tottenham, High-road—Two freehold houses and plot of land. .... 530

16, 17, and 18, Church-road, 66 years, ground-rent 4l. .... 610

1 to 4, Orchard-place, 56 years, ground-rent 3l. .... 1,020

1 to 6, Church-street, freehold .... 295

3, Chestnut-road, freehold .... 1,200

1 to 10, Pearl's-cottages, freehold .... 309

1 and 2, Hope-cottages, 70 years, ground-rent 4l. .... 785

6, 8, and 12, Western-terrace, freehold .... 975

Stoke Newington—96 and 98, High-street, 26 years, ground-rent 31l. 11s. .... 560

Tottenham—Ground, reversion in 45 years. .... 360

Ground-rent of 11l. 3s., reversion in 45 years. .... 340

Ground-rent of 11l. 11s., reversion in 37 years .... 340

###### By T. W. WATSON.

Camden-town—18, Camden-road, 56 years, ground-rent 2l. .... 565

Kenish Town—Ground-rent, 100l. a year, reversion in 47 years .... 2,320

Ground-rent, 4l. a year, reversion in 62 years .... 1,015

21, Prince of Wales-terrace, freehold .... 700

7, Castle-road, 48 years, ground-rent 6l. 10s. .... 456

69, Wille-road, 35 years, ground-rent 14l. .... 340

King's-croft—34, Argyle-square, 18 years, ground-rent 7l. .... 715

###### By HUMBERT, ROSE, & FLINT.

Watford—2 and 4, St. Alban's-road, freehold .... 1,230

###### FEB. 11.

###### By NEWBOLD & HARDING.

Canonbury—Improved ground-rent, 41l., term 32 years. .... 620

Holloway-road—No. 70, freehold .... 620

Old Ford—172, Rouse-road, freehold .... 855

Hermesbury—135 to 115 odd, St. James's-road, 47 years, ground-rent 21l. .... 1,415

147 to 157 odd, St. James's-road, 47 years, ground-rent 21l. 7s. .... 1,425

###### By CRAWFORD, HARRIS, & CO.

New Cross-road—Nos. 44 to 50 even, freehold .... 1,775

Acton, Gunnersbury-lane—"Bromley Cottage," freehold .... 600

###### By WALTON & LAY.

Wimbledon—Ground-rents of 41l. 15s. reversion in 94 years .... 1,275

Ground-rents of 67l. a year, reversion in 67 years .... 1,765

Ground-rents of 41l. 2s. a year, reversion in 66 years .... 655

Ground-rents of 130l. a year, covering 10s. 3s. 27p., reversion in 71 years .... 5,000

###### FEB. 15.

###### By BAKER & SONS.

Crouch-hill—"Womercley House," and 2s. 6d. 15p., freehold .... 3,850

Poplar—11 to 16, Latham-street, 81 years, ground-rent 18l. .... 1,610

3, 4, and 5, Sussex-street, 67 years, ground-rent 3l. .... 400



By NORTON, TRIST, WATNEY, & Co.

City—83 and 84, Queen-street, freehold, area 18,500 feet	£16,000
Creed-lane—a plot of freehold land, 620 feet	5,625
Auxhall—1, Auckland-street, freehold	730

MEETINGS.

MONDAY, FEBRUARY 22.  
Royal Academy of Arts.—Lectures on Architecture, Mr. G. Aitchison, A.R.A., on "Architectural Education," 8 p.m.  
Surveyors' Institution.—Mr. Wm. Woodward on "London remodelled," 8 p.m.  
Inventors' Institute.—8 p.m.  
Liverpool Architectural Society.—Mr. A. G. White on "A Few Points in Practical Plumbing," 7 p.m.

TUESDAY, FEBRUARY 23.  
Royal Institution.—Professor C. T. Newton, C.B., on "The Unexplored Portions of the Greek and Roman Sculptures in the British Museum," 11. 8 p.m.  
Institution of Civil Engineers.—Discussion of Mr. L. F. Vernon-Harcourt's paper on "The River Seine," 8 p.m.  
Builders' Clerks' Benevolent Institution.—Annual meeting, 8 p.m.

WEDNESDAY, FEBRUARY 24.  
Carpenters' Hall, London Wall.—Professor Corfield on "Water Traps," 8 p.m.  
Society of Arts.—Prof. W. C. Unwin on "The Employment of Autographic Records in Testing Materials," 8 p.m.  
Civil and Mechanical Engineers' Society.—Mr. B. Houghton on "Wave Motion," 7 p.m.  
Liverpool Engineering Society.—Mr. A. Wharton on "The Bricks and Masonry Arches," 8 p.m.

THURSDAY, FEBRUARY 25.  
Royal Academy of Arts.—Lectures in Architecture: Mr. G. Aitchison, A.R.A., on "Mouldings," 8 p.m.  
St. Paul's Ecclesiastical Society.—Mr. J. P. Seddon on "A Series of Architectural Monuments," 7.30 p.m.  
Society of Antiquaries.—8.3 p.m.  
Society of Telegraph-Engineers and Electricians.—Prof. E. Hughes, F.R.S., on "The Self-Induction of an Electric Current in Relation to the Nature and Form of Conductor," 8 p.m.

FRIDAY, FEBRUARY 26.  
Architectural Association.—Mr. William White, F.S.A., on "Brickwork and the Tower of Bologna," 7.30 p.m.  
Institution of Civil Engineers (Students' Meeting).—Mr. Henry A. Cutler on the "Stability of Vessels," 7.30 p.m.

SATURDAY, FEBRUARY 27.  
Architectural Association.—Visit to the New Buildings, St. John College and the Offices of the London School Board. Members to meet at the College, Victoria Embankment, at 2.30 p.m.  
Royal Institution.—Rev. C. Taylor, D.D., on "The History of Geometry," 3 p.m.  
St. Paul's Ecclesiastical Society.—Visit to St. Paul's Cathedral, 2.15 p.m.  
Edinburgh Architectural Association.—Visit to Museum of Science and Art.

Miscellaneous.

**Fatal Accident at the Proposed Shippers' Exhibition, Liverpool.**—A disaster occurred on Tuesday afternoon at the Exhibition Building. The erection of a iron framework of the building is being pushed forward as speedily as possible, with a large number of men are employed upon the site. The northern transept was in a tolerably advanced condition, a number of pillars having been erected and a good deal of the framework of the roof fixed. From some cause not examined, this portion of the building collapsed. A number of men were working upon it, and fourteen men were so much injured that they had to be removed to the Royal Infirmary. One of them has since died.

**English v. American Locks.**—American lock-makers will have to look out, for, according to invention, thanks to the introduction of machinery in the English lock trade, and to other methods of improvement, American competition is rapidly becoming of less account, and now it has been determined by English makers to turn the tables upon the Americans by commencing a vigorous competition with them in the Australian colonies, India, and China. It appears that the Americans have gained a stronghold in those markets with a (door) lock, which has a cast-iron casing and ornamental designs, and which has the advantage of possessing a reversible bolt. The internal parts of this lock are made to template. It is now stated that a firm of Willenhall lock manufacturers have resolved to make locks of exactly similar class, and to offer them in the quantities in the markets referred to.

**The Health Exhibition, 1884.**—Although the Health Exhibition has been closed for some months, the Diplomas of Honour and other Certificates have not yet reached the exhibitors to whom they were awarded.—Continued.

**Lincoln.**—Mr. J. Wm. Tronson of Penryn has been appointed the architect for the new hill Wesleyan chapel and new school houses, and has received instructions to proceed with the necessary plans forthwith.

**The Grant Monument.**—In the American Congress, the Committee on Military Affairs has reported favourably regarding the proposed vote of 500,000 dollars for the erection of a monument in New York to commemorate the achievements of the late General Grant. The appropriation will remain unavailable until the voluntary subscriptions to the Monument Fund have reached the sum of 250,000 dollars. The Bill received the unanimous support of the Military Committee, and it is anticipated that the House will very shortly take further proceedings in the matter. The question of the locality will in all probability provoke considerable debate, in consequence of many of the members considering that the monument ought to be erected at Washington.

**New South Wales Timbers.**—Probably no country in the world possesses finer or more durable hardwoods than New South Wales. According to the Immigration Agent for the Colony, her pines and cedars, valuable though some of them may be, yield the palm to those of other lands; but her ironbark and blackbutts rank, for durability and strength, second to none on the globe. Singularly enough, all the principal hardwoods used in the Colony are myrtaceous trees, that is, members of the great Myrtle family, which, according to Professor Balfour, is divided into five tribes, containing seventy-five known genera, and upward of 1,800 species. Members of this great family are natives chiefly of warm countries, as South America and the East Indies, although many are found in more temperate regions. Some of the genera, such as the eucalypts, are peculiar to Australia, although they have been successfully transplanted in Europe and the East, and in the Campagna at Rome, on the borders of Portugal, where they have been planted by the vigneroni for the making of casks, and even on many of the hill stations of the Panjab and Madras the wandering Australian may recognise the tall, rough stem, leek-green leaves, and strong perfume of the sylvan denizens of the sunny south. Eucalypts, which constitute at least three-fourths of New South Wales timber-producing trees, furnish us with the bulk of colonial hardwoods. Ironbark, blackbutt, blue-gum, stringybark, swamp mahogany, tallow-wood, and yarrab, all belong to the same remarkable genus, although they differ from one another in many ways, and in none more so than in their rate of growth, the blue-gums and blackbutts being very rapid growers; while the ironbark and box take a very much longer time to mature. The remainder of hardwoods are principally angophoras, or "apple-trees," most of which are subject to "gum-veins"; tee-trees, tristanias, and syncarpas, better known as turpentine trees, but all members of the myrtle family, and all growing in the open forest, and very rarely in the bush or the scrub.

**Sewer Ventilation.**—A patent has recently been taken out by Mr. Malvin, of Harrogate, for a method for exhausting gas from sewers, and for consuming or deodorising and dispersing of such gas. The plan provides for the diversion of a town's sewers into sections by the fixing of automatic doors. The sections are to be isolated, and each furnished at a suitable spot, with a chimney or shaft and a furnace, which shall be as nearly as possible smokeless. An upcast shaft from the sewer is to be connected with the ashpit under the furnace. After passing through the fire, the gas is conducted to a reservoir, where it encounters a spray of water designed to lay any solid particles which may have been produced by the action of the fire, so as to prevent their emission into the atmospheric air. The sewer gas, after passing through the fire, is taken by the current up the chimney, and delivered at a considerable altitude above the street.—*Lancet.*

**The Durability of Sandstone.**—An interesting discussion lately took place in connexion with the use of sandstone from local quarries in the restoration of the Kilian tower at Heilbronn. The municipal architectural officials, acting upon the advice of Professor Beyer, of Ulm, had decided upon employing Oberrkirchen sandstone, the cost of which (including transport from the North of Germany) would be double that of the Heilbronn quality. The matter was brought before the municipal council; the opinions of Herr Von Egler, of Stuttgart, and Professor Beyer being officially given in presence of that body regard-

ing the properties of the two descriptions of sandstone. From a statement in the *Deutsche Bauzeitung* it would seem that the Heilbronn stone was considered suitable for internal work, but not for positions exposed to the influence of the weather; while the Oberrkirchen stone (chosen after much deliberation for the cathedral at Cologne) justified its higher cost by its tenfold durability as compared with the other variety. The Berlin testing-station had certified that the Heilbronn stone offered a thorough resistance to the weather, but this fact, as well as the assertion that its quality was better than formerly, did not alter the views expressed by the experts; the discussion resulting in a resolution being passed which gave Professor Beyer freedom to act according to his judgment. This was, however, coupled with a recommendation that Heilbronn stone should be used in those portions of the building for which it might be considered suitable.

**Work for the Unemployed.**—Very extensive tracts of country belong to the Government, and produce very large returns under the name of "Woods, Forests, and Land Revenues," which are managed by a department of the Government known as the "Woods and Forests" at a cost of somewhere about 22,000*l.* a year. There are several commissioners, who receive 1,200*l.* a year; a solicitor, 1,500*l.* a year; clerks and other officers, 900*l.* a year. Such salaries should represent service on very large monetary returns, and so it will be found to be. At the end of one financial year there was a cash and stock balance amounting to more than 600,000*l.* at the disposal of this department for permanent improvements. The extensive tract of Government property, stretching from Windsor Park to Aldershot, admits of very great permanent improvement. The larger portion of it is un reclaimed. To trench some portions and plant with Scotch fir and larch would bring some return for expenditure. To drain the low-lying marsh districts around Bagehot Park, Wellington College, the Royal Military College, and the Camp at Aldershot, would effect a great sanitary improvement, even if confined to those portions of these districts which actually belong to the Government. Here, then, is abundance of work for the unemployed, and 600,000*l.* available in one department of the Government to pay for it, with the prospect of a real permanent improvement to Government property and increased sanitation where it is much needed.—*Lancet.*

**The Iron, Hardware, and Metal Trades' Pension Society.**—The Thirtieth Annual Ball in aid of the funds of this charity took place on Thursday, last week, at Willis's Rooms. Mr. Jonathan Pearson, of the firm of R. H. & J. Pearson, President, assisted by a numerous staff of stewards, representing every branch of the metal trades. Thirty years ago the ball was inaugurated by Col. Stedall, J.F., the present President of the Society, with the view to afford not only an additional source of income, but as a means also of bringing together under the most pleasing auspices the numerous friends of the Institution. Through this channel an aggregate of 1,895*l.* has accrued to the general funds.

**Durability of Larch.**—According to a writer in the *Gardeners' Chronicle*, the wood of the Swiss larch tree, which often attains colossal dimensions, it being by no means rare to meet with trees 80 ft. in height, with a trunk 6 ft. in diameter,—withstands the influences of air and water equally well. In the Canton of Valais there are many chalets, constructed of larch, dating from the fourteenth century; the wood is entirely blackened by the sun, but it is as firm and sound as recent timber.

**Science and Art Department.**—The Archbishop of Canterbury has promised to deliver to the students of the Metropolitan Drawing Classes, the "Queen's Prizes," awarded by the Science and Art Department, South Kensington. The meeting will take place on Friday, March 5th, at eight o'clock, in the Memorial Hall, Farringdon-street. These classes, which are held in twenty-four centres, consist of about 800 working men, who are taught, in evening classes, the principles of drawing and construction, as applied to the building and engineering trades. Each class is under the management of a Local Science Committee. Mr. W. Busbridge is the superintendent of the classes.



**Architectural Examinations at the Institute.**—The following, extracted from the "Journal" of the Proceedings of the Institute, may be of interest at the present moment:—"A Register is kept at the Institute, containing the names of all those who have passed the Voluntary and Obligatory Examinations. During twenty years (1861-1881), from the commencement to the end of the Voluntary Examination, when twelve examinations were held, forty-three candidates passed, and of these twenty-nine are now Members. During four years (1882-85), since the present Obligatory Examination came into existence, sixty-eight candidates have passed, out of ninety-six persons who have applied to be examined, and, of the sixty-eight, sixty-four are now Associates, one has not offered himself for membership, and three are deceased after having been admitted Associates. In the Voluntary Examination, a certificate was granted, but passing the Obligatory Examination simply entitles a man to become a candidate for the Associateship. In the Voluntary Examination, a candidate had to pay a fee of four guineas to be examined, and, if, having passed, he afterwards wished to become an Associate, he had to pay a further (entrance) fee of three guineas; a young man who enters for the Obligatory Examination pays a fee of three guineas, which, if he passes, is placed to his account as his entrance-fee should he be elected an Associate within eighteen months from the date of his passing."

**Sir Richard Mansel's Estates at Wimbledon.**—Amongst the properties offered for sale at the Auction Mart last week were the estates of Sir Richard Mansel, at Wimbledon, the estimated value of which is stated at 80,000. The estates consist of freehold ground-roads and building land, the ground-rents amounting to about 862. per annum, and the rack-rents producing upwards of 5,200. per annum. Messrs. Walton & Lee conducted the sale, the property being offered in forty-four lots. The first nineteen lots offered consisted of freehold ground-rents and building-land in Wimbledon Hill and Worple-road, together with the sites of a church and school shortly to be erected in Mansel-road. The ground-rents were on leases for terms expiring in from eighty to ninety years. The competition was active, the prices offered for the several lots representing not more than from three to four per cent. return on the same bid, but all the lots were withdrawn as being below the reserve. Five ground-rents, amounting together to 571. per annum, were sold for 1,740. 1. a ground-rent of 11. per annum, with reversion in sixty-six years, realised 551., whilst another ground-rent of 12s. per annum for a similar term, secured upon five houses, the annual rental of which now amounts to 370s. per annum, was sold for 500. A ground-rent of 130l. per annum, secured upon the Wimbledon Collegiate School, with reversion in seventy-one years, the total area, including the garden and grounds, being nearly 11 acres, was sold for 5,000. As indicating the value of building land in some parts of Wimbledon, a building site near Wimbledon Hill, containing four acres, was bid up to 2,800., whilst for another site known as The Grange, at the south end of Wimbledon Common, containing nearly 7 acres, 8,000. was offered. The aggregate sum bid for the forty-four lots submitted was upwards of 53,000.

**A Safety Benzoline Lamp.**—Mr. William Hardy, jun., of Thistleton, Oakham, has invented and patented a new benzoline lamp which possesses several merits. It is globular in form, weighted at the lower part so as to be self-righting. It is also claimed for it that it is unspillable and self-extinguishing. It is manufactured by Messrs. Snell & Brown, of Birmingham, and only costs a shilling. If the use of this lamp by those who burn benzoline becomes general, the fatalities which so often result from the use of that illuminant are likely to be very materially diminished in number.

**The New Home and Infirmary for Sick Children, Lower Sydenham.**—was opened on Saturday last by Viscount Lewisham. The Home provides cots for fifty children. Special votes of thanks were passed to Mr. Tolley, the Honorary Architect; to the Medical Officers, and to Mr. Aste, the Honorary Secretary.

**Appointment.**—We are informed that H.R.H. the Prince of Wales, Executive President of the Colonial and Indian Exhibition, has appointed Messrs. Chubb & Son as makers of strong-dress, safes, and locks to the Royal Commission.

**The Registration of Plumbers.**—At a meeting at the Guildhall last week, under the presidency of the Master, of the joint committee of the representatives of the Plumbers (masters and journeymen) of London, the decision of the Conference of Metropolitan and Provincial Plumbers, held at the City and Guilds of London Central Institute, in October, 1884; of the general council subsequently formed to give practical effect to the resolutions of that conference; and of a meeting of the plumbing trade of London assembling at Guildhall on the 25th January last, that the registration of plumbers (masters and journeymen) is essential to the due protection of the plumbing trade and the public against the serious injuries which are caused to the public health and to the true interests of the plumbing trade by plumbers' work being carried out by dishonest and unqualified persons, was approved. The registration of the plumbers of the London district is adopted as a preliminary step to the extension of the system of registration throughout the kingdom by means of local organisations. Pending the establishment of local registers, provincial plumbers may register their names in London, if desired, on the same conditions as the plumbers of the London district. The register will be opened by the Plumbers' Company on the 1st March. The fees payable on admission to the register are 2l. 2s. for master plumbers, and 10s. 6d. for journeymen.

**Royal School of Mines.**—Prof. Warrington Smyth, F.R.S., in continuing his lectures on "Mining," in the Theatre of the Geological Museum, Jermyn-street, considered the question of dry rot as affecting timber in underground situations. He said that the matter of prime cost of timbering, and particularly of its maintenance, often becomes serious, and various devices have been put forward with the object of obviating the difficulty. The effect of the atmosphere may be very considerable in some situations, heaviness and a great degree of warmth being exceedingly prejudicial to the preservation of timber. Dry rot cannot always be detected on the surface. The timber, therefore, requires to be scooped or tested by a hammer, and it is very important that this test should be occasionally employed, and any affected part removed at once. When decomposition of mineral substances is going on in the neighbourhood, the timber should be protected by much greater exposure to air currents than would be necessary in ordinary circumstances. A constant supply of fresh air and water, the latter being allowed to trickle down the timber, will preserve its full strength for a long time. In some situations, pipes with small holes, or rose jets, are arranged so as to discharge a stream of water upon the timber, and this has been found to answer well. Anything is better than allowing the timber to become alternately wet and dry, or cold and hot. Considerable attempts have been made to preserve timber by chemical means, but, where timbering was of a temporary character, the advantages derived would not counter-balance the expenses.

**The Surveyors' and Auctioneers' Clerks' Provident Association.**—The annual general meeting of the members of this Association was held on Saturday last, at the Auction Mart, Tokenhouse-yard, Mr. D. Watney, the President, being in the chair. The report and statement of accounts for the past year were received and adopted, and the officers re-elected for the current year. In order to extend the usefulness of the benevolent fund, an addition was made to the rules so as to enable relief being granted, under exceptional circumstances, to clerks in distress, not being members, and to their widows and orphans. The accounts show that the Association is in a good financial position, there being a fund of 1,500l. invested in Consols. It is earnestly hoped that the assistants in the joint professions will show a much greater interest than heretofore in the success of the Association by becoming members, and thus avail themselves of the benefits provided solely for them. The secretary is Mr. L. Edmondson, 10, Waterloo-place, Pall-mall, S.W.

**Perry & Co., Limited, Birmingham.**—The dividend recommended by the directors in their report, to be presented at the annual meeting on Tuesday next, is 10 per cent. for the year, the same as that paid for the last two years. £3,000 is placed to reserve fund, being the same amount as for the preceding year.

**The Sanitation of Dwellings.**—This subject was considered, in connection with the fifth annual report of the Sanitary Assurance Association, at a meeting of the members at No. 9, Conduit-street, on Tuesday evening. The chair was occupied by Captain Douglas Galtoun. Mr. Brudenell Carter, F.R.C.S., moved a resolution declaring that measures for improving the sanitary condition of dwellings should receive continued support. Dr. Farquharson, in seconding the motion, alluded to legislation on this subject, and expressed the opinion that compulsion should not be lost sight of in any future steps that might be taken. It would be far better, he thought, if instead of having, as under the present Act, to go to a court of law, which was a very expensive process, and in which one might not be successful, there was a clear-cut, drastic provision introduced, by which those who sold or let houses should have them in a proper sanitary condition, or if they were in default, that a cheap and efficient remedy should be open to the victim for any danger on expense he might thereby have been put to.

## PRICES CURRENT OF MATERIALS.

		£.	s.	d.	£.	s.	d.
TIMBER.							
Greenheart, B.G.	.....ton	6	10	0	7	10	0
Teak, E.I.	.....load	12	10	0	15	10	0
Sequoia, U.S.	.....ft. cube	0	4	0	3	0	0
Ash, Canada	.....load	3	0	0	4	10	0
Birch	.....load	3	0	0	4	10	0
Elm	.....load	3	0	0	4	15	0
Pir, Dantisc, &c.	.....load	1	10	0	4	10	0
Oak	.....load	3	0	0	5	0	0
Canada	.....load	5	10	0	6	10	0
Pine, Canada red	.....load	3	0	0	4	0	0
.....yellow	.....load	3	0	0	5	0	0
Lath, Dantisc	.....fathom	3	10	0	5	0	0
St. Petersburg	.....load	4	0	0	6	0	0
Wainscot, Kige	.....log	15	0	0	3	0	0
Deal, Finland, 2nd and 1st	.....std. 100	7	10	0	8	10	0
.....4th and 3rd	.....std.	6	0	0	7	10	0
Riga	.....std. 100	7	0	0	8	10	0
St. Petersburg, 1st	.....std. ycl.	9	0	0	14	0	0
.....2nd	.....std.	7	0	0	8	15	0
Sweden	.....white	6	0	0	15	0	0
White Sea	.....std.	7	0	0	17	0	0
Canada, Pine 1st	.....std.	17	0	0	30	0	0
.....3rd	.....std.	8	0	0	10	0	0
.....Spruce 1st	.....std.	8	0	0	11	0	0
.....3rd and 2nd	.....std.	8	0	0	7	10	0
New Brunswick, &c.	.....std.	7	0	0	7	10	0
Battens, all kinds	.....std.	4	0	0	12	0	0
Flooring Boards, sq. 1 in.—Pine	.....std.	0	9	0	0	13	0
Second	.....std.	0	7	6	0	8	6
Other qualities	.....std.	0	5	0	0	7	0
Cedar, Cuba	.....foot	0	0	34	0	0	0
Honduras, &c.	.....foot	0	0	34	0	0	0
Australian	.....foot	0	0	24	0	0	0
Malagasy, Cuba	.....foot	0	0	5	0	0	7
St. Domingo, cargo av.	.....foot	0	0	5	0	0	7
Metuan	.....foot	0	0	34	0	0	4
Tolaco cargo av.	.....foot	0	0	4	0	0	0
Honduras cargo av.	.....foot	0	0	44	0	0	0
Maple, Birdseye	.....foot	0	0	7	0	0	0
Bath	.....foot	7	0	0	15	0	0
Bath	.....foot	6	0	0	14	0	0
Bor, Turkey	.....foot	5	0	0	18	0	0
Satin St. Domingo	.....foot	9	0	0	10	0	0
P. Rio Rico	.....foot	0	0	0	0	0	0
Walnut, Italian	.....foot	1	19	7	0	0	0

METALS.							
Iron—Pig in Scotland	.....ton	1	19	7	0	0	0
Bar, Welsh, in London	.....ton	1	15	0	0	0	0
.....in Wales	.....ton	4	7	6	4	10	0
Staffordshire, London	.....ton	5	15	0	7	0	0
Sheets, single, in London	.....ton	6	0	0	7	0	0
Hoops	.....ton	6	0	0	7	0	0
Nail-roads	.....ton	5	15	0	7	0	0

COPPER.							
British, cks. and ingots	.....ton	42	0	0	44	0	0
Best selected	.....ton	43	0	0	45	0	0
Sheets, strong	.....ton	60	0	0	0	0	0
India	.....ton	48	0	0	46	10	0
Australian, fine cast	.....ton	9	0	0	10	0	0
Chili, bars	.....ton	39	15	0	40	5	0
Yellow Metal	.....lb.	0	0	44	0	0	0
Lead, Pig, Spanish	.....ton	12	15	0	0	0	0
English, com. brands	.....ton	13	0	0	0	0	0
Sheet, English	.....ton	14	0	0	14	2	0
Sprinkler	.....ton	15	2	6	15	5	0
.....special	.....ton	14	17	6	15	5	0
Ordinary brands	.....ton	14	17	6	15	5	0

TIN.							
Banks	.....ton	0	0	0	0	0	0
Bullet	.....ton	0	0	0	0	0	0
Strait	.....ton	82	5	0	82	15	0
Australian	.....ton	82	7	8	82	12	0
English ingots	.....ton	97	0	0	0	0	0
Zinc	.....ton	17	0	0	17	15	0

OILS.							
Linseed	.....ton	20	0	0	20	7	0
Cocanut, Cochila	.....ton	28	0	0	30	0	0
Copra	.....ton	13	5	0	15	0	0
Palm, Lagos	.....ton	23	0	0	28	0	0
Palm, Kera	.....ton	24	0	0	0	0	0
Rapeseed, English pale	.....ton	23	0	0	23	10	0
.....brown	.....ton	21	5	0	21	10	0
Cottonseed, refined	.....ton	22	0	0	40	0	0
Tallow and Oleum	.....ton	22	0	0	40	0	0
Lubricating, U.S.	.....ton	6	0	0	10	0	0
Refined	.....ton	10	0	0	13	0	0

TUNING.							
American, in cks.	.....cwt.	1	8	3	1	8	3
Tar—Stockholm	.....bbl.	0	19	0	0	19	0
Archangel	.....bbl.	0	12	0	0	12	0



# COMPETITIONS, CONTRACTS, & PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

## COMPETITIONS.

Nature of Work.	By whom required.	Premium.	Designs to be delivered.	Page.
Own Hall, &c.	Merrith Tydd Ltd. Bd.	521. 10s.	April 20th	i.
Municipal Buildings.	Sunderland Corporation	Not stated	Not stated	i.

## CONTRACTS.

Nature of Work, or Materials.	By whom required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Ints.	West Ham Local Bd.	Lewis Angell	Feb. 23rd	ii.
Living Works	do.	do.	do.	ii.
Repairing Road	Met. Board of Works	Official	do.	ii.
Drainage of Highbury Fields, &c.	do.	do.	do.	ii.
Materials and Works	Willenden Local Board	O. Claude Robson	Feb. 24th	ii.
Street Watering	Strand Board of Works	Official	do.	ii.
Additional Buildings to Workhouse	West Ham Union	do.	do.	ii.
Land-making, Tar-paving, &c.	Kensington and Chelsea School District	A. & C. Harston	Feb. 25th	xiii.
Works and Materials	Surbition Imp. Com.	Official	Feb. 27th	xvii.
Car Paving	W. Worthing Imp. Com.	do.	Feb. 28th	xvii.
Rection of Six Houses, Harrow	do.	do.	do.	xvii.
Good Pavement	Vestry of St. George's, Hanover-square.	G. Livingstone	March 1st	xiii.
Verage Works	Chalmers' Rd. S.A.	Baldwin Latham	do.	xiii.
Car Paving	East Grinstead Lcl. Bd.	Official	March 2nd	xvii.
Low Streets Works	G. R. Strachan	Official	do.	xiii.
Additions to Public Baths	Croydon Town Council	do.	do.	xiii.
Car-paving Street	New Windsor U. S. A.	do.	do.	xiii.
Verage Works	Chislewick Local Board	A. Ramsden	March 3rd	xiii.
Works and Materials	Westminster Bd. of Wks	G. R. W. Wheeler	do.	xiii.
Verage Works, Street Cleaning, &c.	do.	do.	do.	xiii.
Car Paving	Lambeth Vestry	H. McIntosh	March 4th	xiii.
Works and Materials	Dartford Local Board	Official	March 5th	xiii.
Drainage of Roads	St. Yarnmouth U. S. A.	J. W. Cockrell	March 6th	ii.
Concrete Footways	Met. Police District	Official	March 8th	ii.
Works, Repairs, and Supply of Materials	War Department	C. R. Fortune	do.	ii.
Oversewer Sewer-Pipes and Gully Traps	Bath U. S. A.	Official	do.	ii.
Works and Materials	Hendon Local Board	Official	March 9th	ii.
Drainage of House Refuse	West Ham Local Bd.	Official	do.	ii.
Works and Materials	Lewisham Board of Wks	Official	March 10th	ii.
Drainage of House Refuse	War Department	Official	do.	ii.
Water Supply Works	Atherstone R. S. A.	Baldwin Latham	do.	ii.
Works, Materials, &c.	Vestry of St. Mary	Official	March 15th	xiii.
Drainage of House Refuse	Abbotts, Kensington	R. Stubbs	do.	xiii.
Drainage of House Refuse	Holme Cultram L. Bd.	Jas. Mauvergh	March 24th	xiii.
Drainage of House Refuse	Rotherham Corporation	do.	do.	xiii.

## PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page.
Drainage of House Refuse	Liverpool Corporation	100l.	Feb. 24th	xvi.
Drainage of House Refuse	Fulham Vestry	3.00l. and 100l.	Feb. 28th	xvi.
Drainage of House Refuse	Croydon Union	2l. 10s. per week	March 1st	xvi.
Drainage of House Refuse	Shepton Mallet Lcl. Bd.	100l.	do.	xvi.

## TENDERS.

BETHNAL-GREEN.—For sanitary works at Bethnal Green Lunatic Asylum. Messrs. Tolley & Son, architects:— Walker..... £1,062 0 0 Marriage (accepted)..... 786 0 0	CROYDON.—For alterations to house, "Clydesdale," Park-hill-road, Croydon, Surrey, for Mr. R. Haddock. Mr. R. W. Price, architect:— Smith & Sons..... £287 0 0 Taylor..... 220 0 0 Marriage (accepted)..... 218 0 0	DAREMTH (Kent).—For the extension of the School and Asylum for Imbeciles at Daremth, near Dartford, Kent, for the Managers of the Metropolitan Asylum District. Messrs. A. & C. Harston, architects, Lendenhall-street. Quantities supplied:— Wall Bros..... £78,342 0 0 Horsman & Co..... 71,919 15 6 Balam Bros..... 70,700 0 0 Martin, Wells, & Co..... 67,000 0 0 Paramor & Son..... 64,900 0 0 Thos. Turner..... 65,000 0 0 W. E. Kelleway..... 63,980 0 0 Bell & Son..... 62,900 0 0 M. Gentry..... 62,600 0 0 Wallis & Clomville..... 62,454 0 0 Kilby & Gayford..... 62,327 0 0 S. J. Gerrard..... 62,300 0 0 Wm. Johnson..... 62,000 0 0 Wm. Shurmer, Lower Clapton..... 61,390 0 0 J. H. Johnson (withdrawn)..... 60,768 0 0 * Accepted.	DORKING.—For construction of outfall and sewage disposal works, for the Local Board. Messrs. Smith & Austin, engineers, Hertford and Westminster:— Contract No. 2.—Drainage and Westminster Works. J. W. & J. Neave..... £2,325 0 0 L. Bottoms..... 2,988 0 0 J. Harrison..... 2,606 5 0 Wm. Nicholls..... 2,618 18 6 Peill & Sons..... 2,633 17 6 Mark Putney..... 2,610 0 0 John Mackey..... 2,423 8 0 J. Edwison..... 2,398 14 6 O. Killingback..... 2,383 6 8 Wm. Cunliffe, Barking (accepted)..... 1,910 10 0 Contract No. 3.—Dunks and Buildings. Peill & Sons..... £4,254 12 6 J. W. & J. Neave..... 4,113 0 0 J. Harrison..... 3,915 9 10 J. Mackey..... 3,833 10 0 Mark Putney..... 3,794 18 6 L. Bottoms..... 3,769 0 0 O. Killingback..... 3,431 16 6 Wm. Nicholls..... 3,310 6 8 J. Edwison..... 3,268 3 0 Wm. Cunliffe (acceptance)..... 3,261 0 0	OLCHESTER.—For building house, conservatory, ous, and boundary-wall, for Mr. H. Leaning, Colchester. J. Leaning, Poultry, architect:— D. Dupont..... £4,950 0 0 Bowling..... 4,671 0 0 Good..... 4,667 0 0 Eade..... 4,678 0 0 Eick..... 4,645 0 0 A. Diss..... 4,631 0 0 Dobson..... 4,189 0 0 Everett & Son..... 4,175 0 0 A. Chambers..... 4,087 0 0 C. H. Oldridge..... 3,941 0 0 All of Colchester except those marked, * who are of London.	OLCHESTER.—For alterations and fitting up of new at the High-street Wine and Spirit Vaults. Mr. J. W. t, architect:— Samuel Start..... £163 16 0 A. Chambers..... 160 10 0 F. Dupont (accepted)..... 147 0 0 Painter's and Plumber's Work. W. Rogers..... £41 13 0 C. Mills & Son (accepted)..... 40 1 0
---	---	--	---	--	--

DUNSTABLE.—For the erection of the Dunstable Grammar School, for the Trustees of Ashton's Charity. Mr. E. R. Robson, F.S.A., architect:—  
Xirrell & Edwards, Leighton Buzzard..... £13,930 0 0  
Smart Bros, Luton..... 12,889 7 0  
Paramor & Son, Margate..... 12,810 0 0  
Higgs & Hill, South Lambeth-road..... 12,766 0 0  
Wall Bros., Carlton-road..... 12,717 0 0  
P. F. White, Dunstable..... 12,700 0 0  
S. Foster, Bedford..... 12,673 0 0  
A. Bunting, St. Ives..... 12,308 0 0  
D. Dunham & Son, Luton..... 12,290 0 0  
P. & J. Wood, Mile End-road..... 12,232 0 0  
F. H. Kingerlee, Oxford..... 11,883 0 0  
W. Tongue, Plumstead..... 11,800 0 0  
J. Smith & Son, South Norwood..... 11,897 0 0  
Stimpson, Brompton-road..... 11,860 0 0  
Oldrey, Westbourne Park..... 11,850 0 0  
O. Miskin, St. Albans..... 11,468 0 0  
S. J. Gerrard, Lewisham..... 10,940 0 0

HORNSEY.—For new mortuary buildings at Hornsey, for the Hornsey Local Board. Mr. T. de Courcy Meade, engineer and surveyor:—  
Brown & Sweetland, New Southgate..... £2,300 0 0  
Dixon, Highgate..... 2,164 0 0  
Paine, Bros., Stamford-hill..... 2,141 0 0  
Hicks, Peterborough..... 2,091 0 0  
Tozer, Notting-hill..... 2,036 0 0  
Kerry & Son, Highgate..... 1,997 0 0  
Dummore, Crouch-end..... 1,997 0 0  
Hack, Poplar..... 1,991 0 0  
Moreland & Co., Hornsey..... 1,977 0 0  
Norris & Luke, Holloway..... 1,926 0 0  
Roberts, South Norwood..... 1,900 0 0  
Hart, Tottenham..... 1,895 0 0  
Stimpson, Brompton..... 1,873 0 0  
Howell & Son, Lambeth..... 1,840 0 0  
Nightingale, Lambeth..... 1,830 0 0  
Tongue, Plumstead..... 1,800 0 0  
Balam Bros., Old Kent-road..... 1,800 0 0  
Crosker, Great Dover-street..... 1,776 0 0  
Toms, Camden-town..... 1,743 0 0  
Martin, Willenden-green..... 1,685 0 0  
Stephenson, Bishopsgate..... 1,661 0 0  
Pack Bros., Britton..... 1,633 0 0  
J. O. Richardson, Albert Works, Peckham (accepted conditionally)..... 1,628 0 0

HORNSEY.—For new shop-front and repairs at 48, Stroud Green-road, for Mr. Wm. Earl. Mr. Wm. Smith, architect:—  
Larke..... £194 0 0  
Mattock..... 189 0 0  
Ward & Lambie..... 183 0 0  
Clarke Bros..... 164 0 0  
Langham (accepted)..... 149 0 0

HULL.—For converting the central portion of Hall Royal Infirmary into an administration department, altering and enlarging the south-west wing for medical wards, erecting tanks and mains for Porter-Clark's water-softening apparatus, and reconstructing the drainage of the establishment. Messrs. H. Saxon Snell & Son, architects, London:—  
Mark Harper..... £6,310 0 0  
Thos. Southern's Executors..... 6,235 0 0  
Jackson & Son (accepted)..... 6,040 0 0

ISLINGTON.—For alterations and repairs at 103, Upper-street, Islington, for Mr. S. Wood. Mr. William Smith, architect:—  
Larke & Son..... £218 0 0  
Mattock Bros..... 203 0 0  
Valter..... 267 0 0  
Clarke Bros..... 260 0 0  
Castle Bros..... 277 0 0  
Ward & Lambie..... 270 0 0  
Langham (accepted)..... 265 0 0

KENLEY (Surrey).—For additions to house, new billiard-room, &c., for Mr. C. J. S. Joyce. Messrs. C. & F. Ratley, architects:—  
Rowley Bros..... £1,696 0 0  
Hunter & Bryant..... 968 0 0  
Ward..... 961 0 0  
Marriage (accepted)..... 898 0 0  
[Architect's estimate, 907.]

LAMBETH.—For alterations to the Crown public-house, High-street, Lambeth, for Mr. A. White. Mr. H. I. Newton, architect, Queen Anne's-gate:—  
Laphorne, Lambeth..... £568 0 0  
Beasley, Westminster..... 590 0 0  
Rutter, Camberwell..... 575 0 0  
Cook, Kennington..... 647 0 0  
Lambie, Kentish Town..... 539 0 0  
Spencer & Co., Berners-street..... 465 0 0  
Burnan & Foss, Kennington..... 475 0 0  
Beal, Westminster (accepted)..... 450 0 0


LONDON.—For the erection of residences, Cork-street, Piccadilly. Mr. Geo. Wyatt, architect:—  
Perry & Co. (accepted)..... £14,500 0 0

LONDON.—For the erection of a block of offices adjoining the New Synagogue, Lendenhall-street. Messrs. N. S. Joseph & Smith, architects:—  
Ashby Bros..... £1,967 0 0  
Kilby & Gayford..... 1,890 0 0  
G. S. Williams & Son..... 1,616 0 0  
J. T. Chappell..... 1,539 0 0

LONDON.—For alterations, &c., at the Marquis of Anglesea public-house, Lisson-grove. Mr. H. A. Lewcock, architect:—  
Walker..... £430 0 0  
Rooms..... 383 0 0  
J. Anley..... 362 0 0  
S. Pringle..... 370 0 0  
W. Shurmer..... 368 0 0  
R. Marr..... 339 0 0  
Jackson & Todd..... 347 0 0

LONDON.—For alterations to the premises, 114 (formerly 100), Stoke Newington. Mr. H. A. Lewcock, architect, Bishopsgate-street Within:—  
Pringle..... £451 0 0  
Shurmer..... 439 0 0  
Battley..... 437 0 0  
Goodall..... 415 0 0  
Jackson & Todd..... 410 0 0





**COLLINGS'S PATENT HINGE**  
**LEVER, SCREW, & BARREL BO**  
 Self-Acting "FALL DOWN" GATE STOPS,  
 and IMPROVED GATE FITTINGS of every Description.  
**36A, BOROUGH ROAD**  
**LONDON, S.E.**  
**DISCOUNT TO BUILDERS.**

*Particulars on Application. Chief Offices:—352 to 364, EUSTON ROAD, LONDON, N.W.*



# The Builder.

VOL. L. No. 2247.

SATURDAY, FEBRUARY 17 1895.

## ILLUSTRATIONS.

Window, Elstow Church: Subject from Bunyan's "Holy War."—Designed by Mr. T. W. Camm; Executed by Messrs. R. W. Winfield & Co.	336-337
Design for a Town Mansion.—By Mr. H. O. Cresswell	340
Liverpool Cathedral Competition: North Elevation, without Central Spire.—Design by Messrs. G. F. Bodley & T. Garner, Architects	341
Church of St. Michael and All Angels, Walthamstow: Interior and Exterior Views.—Mr. J. Bignell, Architect	344-349

## CONTENTS.

Indian Famines and Preventive Remedies	328	The Slatted Exhibition of the Royal Scottish Academy	392	The International Health Exhibition, 1884	356
Law of Rating	327	The Unpublished Sculptures in the British Museum.—II.	392	Provincial News	356
Notes	327	Roman Sepulchral Monuments	392	Church Building News	356
Street Chapel	328	The Art Exhibition at Berlin	393	The Student's Column: Foundations.—IX.	356
Book-Making: Artificial and Real	330	Free Lectures to Artisans at Carpenters' Hall.—Professor	393	Books: Miller's Wood-Carving (Wymann); Wagon's Le Sculpture Antique (Rothschild); Practical Problems and Lines for Working Drawings (Raywood); Courtney's Builders' Ready Reckoner (Crosby Lockwood); Tompkins's Engineer's, Millwright's, and Machinist's Practical Assistant (Crosby Lockwood)	357
Window, Elstow Church	331	Corridor on "Water-Trap"	394	Recent Patents	357
Liverpool Cathedral Competition.—Design by Messrs. Bodley & Garner	331	Prison Construction in Germany	395	Recent Sales of Property	357
Design for a Town Mansion	331	Builders' Clerks' Benevolent Institution	394	Meetings	357
St. Michael and All Angels' Church, Walthamstow, Essex	331	Provident Institution of Builders' Foremen and Clerks of Works: Annual Dinner	394	British Archaeological Association	358
Liverpool Cathedral Design: Cox and Another v. Bradley and Another	331	Colonial and Indian Exhibition	394	Miscellaneous	358
Architectural Societies	331	Competitions: Money Deposits	395	Prices Current of Building Materials	359
Competition	331	Thames River Nuisance	395		
Preservation of Timber	331	Signals of Distress in Professional Circles	395		
		Domestic Propriety	395		
		Surveyors in New Zealand	395		

### Indian Famines and Preventive Remedies.

Two important papers have lately been brought before the public on the above subjects. The lecture under the title "Historical and Recent Famines in India," was delivered at the Society of Arts, last week, while that on "Preventive Remedies" was read some few weeks previously at the East India Association. In reviewing them together it will be more convenient to transpose the order in which they were delivered, and consider first the paper on Famines, of which Mr. Danvers says there have been fifty-two, extending over a period of from 2,300 to 2,400 years, and of which, at least, as far as any records can be traced, thirty had occurred in the historic period, and twenty-two within the last 100 years. The accounts of the early famines are but meagre; but the effect of that which occurred in 1396 is said to have spread over twelve years, and the sufferings of the people seemed to have obliterated from their minds every idea of government and subjection to authority. The famine of 1629-31 is conspicuous as the first regarding which any really definite information has been handed down. During it money could not purchase bread, and a prodigious mortality ensued; disease followed famine, and death ravaged every corner of India. Destitution reached such a pitch that men began to devour one another. There was large emigration, and once fertile lands retained no trace of productiveness. Taxes of every description were remitted for 10 years, and revenue to the extent of three-quarters of a million sterling had to be remitted. In 1768-70 a very extensive famine raged throughout Bengal. The whole country became so parched up that no food could be produced, the highways and fields are said to have been strewed, while in the cities the streets and passages were choked with the lying and the dead, about one-third of the inhabitants having perished in this calamity. During the present century the years 1806, 1833, 1837, 1854, 1865, and 1876-78, were rendered mournfully memorable in various provinces in India by very extraordinary visitations of drought; the two latter, known respectively as the Orissa and Madras famines, being especially calamitous, and involving great loss of life and revenue. The Famine Commissioners calculated that at least ten millions of human beings, besides innumerable cattle, have been sacrificed during the famines of the

current century, and twenty-three millions sterling lost to the Government revenues.

Mr. Danvers's paper bears evidence of careful and painstaking research, and deals with the subject in plain words, free from any sensational gloss, and, indeed, were it not for the few gleams of light introduced at the end of his lecture, it might really be a question whether India, after all, is the brightest jewel in England's crown, and whether this country has faithfully discharged its duty to its great dependency. It is with a sense of relief, then, that one turns from what Mr. Danvers truly calls "this record of drought, dearth, destitution, disease, and death," to Mr. Stanley Newman's paper, entitled "Water Storage and Canals in India: How far are they Preventive of Famines?" This portion of the question has for many years offered a fruitful theme for discussion, the interest in which, renewed after each successive calamitous visitation, has, when the disasters connected with it have passed away, gradually subsided again, while the good intentions then aroused have well nigh disappeared on the road where such intentions are said to go. Famines in India are calamitous not only to itself, but, more or less, affect all those countries which trade with it, especially Great Britain. Stagnation or dislocation of trade inevitably follows them, in some directions possibly more than in others, but all the great famines in India have in a greater or less degree prejudicially affected its commerce with this country, owing to the impoverishment of the people diminishing their ability to purchase our manufactures, while the enhanced prices of their own products extinguish the small margin of profit obtainable by our own merchants; and hence, for a time, commercial relations become so disorganised as to lead, in some instances, to financial disaster. Hence, the prevention of famines in India is a problem possessing vital interest for England, and it is a source of wonderment, not only that statesmen responsible for the well-being of our great dependency are not more keenly alive to the necessity of pushing on measures to mitigate, if not to avert, the consequences of such dire visitations, but that the commercial community most nearly affected by them ever relaxes its efforts to urge on both the Home and Indian Governments the paramount duty of substituting a steady and comprehensive series of works for the spasmodic and isolated proceedings which have hitherto characterised their policy.

Judging from the reports cited by Mr. Newman, there has been no failure on the part of the responsible advisers of the Government of India in devising schemes,—both engineering and financial,—to meet the wants of that country; neither has there been failure

on the part of the Government as far as recognising the soundness of that policy; but their action seems unquestionably to have fallen short of their professions, certainly as regards the construction of works of irrigation, and still more of lines of cheap communication. When challenged on the subject in Parliament or elsewhere, reference is invariably made, as was done by Mr. Danvers, to the 15,000 miles of railway now open. Of course, as far as they go, the railways have unquestionably afforded a sensible degree of relief from the burden of costly transport; for, on the whole, they have been economically constructed, and still more economically worked; but then it is an incontrovertible fact that even the comparatively low prices at which the railways carry, are still too high for the great mass of bulky goods of small value, which has to be moved, but which cannot and never will be moved until a far cheaper rate of carriage than is possible on railways is provided for the country. Hence the opinions of laymen, especially when they are accompanied by such intelligent discrimination as is exhibited in Mr. Newman's paper, are always welcome, and the more valuable when they are the expressions, not of Government officials or zealous partisans, but of a purely disinterested observer.

The information supplied in the paper has been compiled from various sources; amongst others are several extracts from the valuable Reports of the Indian Famine Commissioners, who state that "the Government of India must be prepared for the occurrence of scarcity in some degree of severity, and in some part of the country as often as two years out of every nine, and that great famines may be anticipated at average intervals of twelve years," and "as Indian famines are necessarily recurring calamities, against which such precautions as are possible must be taken *beforehand*, it is the duty of the Government to do its utmost in devising some means of protecting the country." It is well that these words of warning are brought into prominent notice, now that the cycle has nearly run its course, and a visitation of scarcity may not be far off. After paying a tribute to the railway system of India, which consists of nearly 15,000 miles in operation, Mr. Newman truly observes, that though in many cases railways are the only means by which grain can be quickly poured into a district where dearth prevails, yet that "railways cannot create crops," and that "just as railways have their service and limitation so irrigation works have their limits of service"; meaning thereby that there are localities where their usefulness is unavoidably limited owing to their entire dependence on a local rainfall subject to fail.



One of the principal excuses usually urged against a vigorous prosecution of irrigation works is that in several instances they have failed to afford a direct return to Government on the capital invested. The Famine Commissioners meet that by the following obvious and sensible rejoinder:—"The true value of irrigation works is to be judged very differently. First must be reckoned the direct protection afforded by them in years of drought by the saving of human life, by the avoidance of loss of revenue remitted and of the outlay incurred in costly measures of relief; but it is not only in years of drought that they are of value. In seasons of average rainfall they are of great service and a great source of wealth, giving certainty to all agricultural operations, increasing the outcome per acre of crops and enabling the more valuable description of crops to be grown." The truth of these remarks was admitted by the chairman, Lord Harris, when he observed that it had been found in several instances that works which had been undertaken as protective works only had, in course of time, to be removed from the category of protective into that of productive works. The Government, the chairman also observed, had not failed to recognise the truth and force of the Famine Commissioners' remarks, but were hampered by the difficulty of meeting the interest of the borrowed money with which the non-paying works had to be constructed, owing to the impossibility of raising further revenue by taxation; but he at the same time indicated that that difficulty would probably be met to a certain extent by the decentralisation policy which had been lately inaugurated, and which would, by the help of the Municipal Committees, admit of funds, hitherto provided entirely from the Imperial revenues, being raised locally for local necessities. This may possibly prove one solution of the difficulty, but still it cannot but strike disinterested outsiders that if money can be and is raised for the prosecution of expensive wars, which are destructive of human life and are worse than unproductive, surely there must be some available method by which money for works necessary for the saving of human life can be procured. It is not only human life, however, that has to be thought of, but there is the preservation of the cattle, which in every famine, as stated by Mr. Danvers, perish in countless numbers. It is but to a limited extent that lands in India are set aside for pasture, and cattle have therefore to be fed with the straw of rice, maize, or other similar crops, and, in some cases, with special fodder crops. In such localities as are accessible to the jungle the cattle are driven to the latter to pick up a subsistence; but elsewhere, if the ordinary food crops perish, the cattle must perish too, and so agricultural operations are seriously crippled for a long time after the scarcity has passed away.

It was asserted by some witnesses examined before the last Indian Public Works Committee, that it was not works for increasing the quantity of food that were required, but merely additional facilities for its diffusion, inasmuch as India grows already more than enough food for its population. This may or may not be the case; but admitting that it is so, and that means for the diffusion of food to human beings can be perfectly secured, it is manifestly impossible for any means yet devised to carry the quantity of food necessary to keep alive the tens of thousands of cattle in the purely agricultural tracts of the extent affected by an Indian famine. English legislators accustomed to the small dimensions of their own country cannot, and do not, fully realise the enormous areas which have to be dealt with in India, and still less the very great distances which have to be traversed, and the consequent serious enhancement in the price of food when it has to be procured from a distant province. Hence it seems clear that increased facility for transport never can by itself meet the difficulty or prevent that impoverishment of the people caused by famine, which lies at the root of the financial embarrassments of India. Moreover, by abnormally stimulating prices, an artificial scarcity is created, which presses severely on

the inhabitants of the province whence the food is drawn; and then, as has been experienced in most famines, while barely sufficient relief is afforded to the famine-stricken tracts, not only at a great cost, but with a disastrous dislocation of the ordinary carrying trade, hardship is inflicted on another large portion of the community without any commensurate advantage.

An additional serious objection to making one province dependent on another was brought out in the discussion on Mr. Newman's paper, viz., the diversion which it occasioned of the surplus produced from those foreign markets to which in the ordinary course of trade it would be exported. By compelling one part of India to feed another in time of dearth, neither the State nor the people are benefited, for besides being a simple transfer of money from one part of the empire to another, its effect is to raise the price of food all over the country to its own people, and is, as far as the Government is concerned, but taking money out of one pocket to put it into the other. All that can be said for it is that it is better than paying other countries for food. But it is obvious that every ton of produce which is exported and paid for by the foreigner is so much gain to India, whereas the same food paid for by its own inhabitants merely means a transfer of coin from South to North, or from East to West, as the case may be, a proceeding which cannot possibly add to the general wealth of the community. On the other hand, it seems clear that if every part of the empire can be relieved from the spasmodic if not chronic uncertainty with which its agricultural operations are at present carried on, and if every province can be furnished with the means both of growing sufficient food for its own consumption, and of conveying its surplus at the cheapest possible rates to the ports for shipment to foreign markets, the value received for that surplus will be a positive increase to the resources of its inhabitants.

It is the poverty of the masses in India, and their utter inability to cope with such calamities as periodically devastate that country, that has not only led to heavy financial demands on the Government, but it is also the great obstacle to their devising means to meet those demands. As long as they remain in that state of poverty, it is in vain for England to send its wares to a population destitute of purchasing power. If a portion of the labouring community could be diverted to channels of industry other than agricultural, then the policy of providing increased facilities of communication rather than works for securing and increasing the production of food might have more in its favour; but, as yet, there is apparently but little hope of seeing such a conversion in India; and, whether it may ever eventually become a great manufacturing country or not, the Government has to deal with the present, and its choice lies between an impoverishing and demoralising procedure in attempting to keep alive its subjects by eleemosynary grants, and the more wholesome policy of helping the population to help themselves by placing agricultural operations beyond the caprice of the seasons. It is the question of the possibility of doing this over the great tract in the southern presidency, which suffered so severely in the last famine, within any reasonable cost, that has occasioned so much controversy, and proved a stumbling-block to the Government. As regards the physical difficulties, they must be left to the engineers, who, according to Mr. Newman, are prepared to undertake their solution; but, as regards the financial problem, the following questions may fairly be asked, What sum is to be considered as the prohibitory limit? By what standard of comparison is the expenditure for the purpose of securing a sufficient portion of the food crops over a whole province from perishing to be measured? Is it to be gauged by the outlay which the State has found it expedient to make on the means of conveying a small portion of the existing produce of the country? Or, may it be measured by the sums which have been disbursed by the Treasury, without the

slightest hope of any reimbursement, in endeavouring to save the lives of the State's subjects? Does the aggregate sum lost to the revenue by the famines during the present century indicate a more appropriate standard? Or, lastly, does the waste of capital involved in such calamities offer a more accurate measure of the limit within which the State shall confine its endeavours to find a guarantee for itself and its people against a recurrence of those disasters which have added not only so largely to its own financial embarrassments, but have intensified the poverty of the people?

Whichever of these standards may be accepted, it is certain that if the great mass of the population is to be lifted out of a state of poverty (on the necessity for which there is no division of opinion), that end will certainly not be gained by a restriction of expenditure on the class of works necessary to remove the primary cause of that poverty. As long as 80 per cent. of the population is agricultural, and is obliged to be engaged in the great struggle of raising a sufficiency of food under a constant apprehension of failure from uncertainty of the seasons, so long must it be hopeless to look for any amelioration in their condition; for they cannot spare time to engage in other industries, and consequently will be unable to meet from their pauper incomes the extra high prices of food caused by scarcity, and further aggravated by the cost of long land transport.

Which, then, is the preferable alternative for the Indian Government? To take the chance of seasons, as has been suggested, and encounter periodically such outlay as has been incurred in late famines, amounting to several millions sterling, content with the outlook of a hopeless future; or to grapple with the difficulty by accepting the necessity of a considerable outlay, which, though entailing, perhaps, a serious but yet ascertainable temporary addition to the burdens of the exchequer, will save it from unknown and immeasurable calls in the future?

Mr. Newman states that by comparing the Report of Material Progress, published last September, with the Report of the Famine Commissioners in 1880, it appears that 4,365,516 $\frac{1}{2}$  have been spent on irrigation works since the Commissioners' Report; and that there are now 8,376 miles of main canals in operation with 16,342 miles of distributing channels, irrigating, in aggregate, 29,200,000 acres. The actual expenditure in one year (1882-83) was 2,324,000 of capital outlay from borrowed money, and 1,463,700 $\frac{1}{2}$  from current revenues, making 3,787,000 $\frac{1}{2}$ , as the total investment in that year. During the ten years from 1873 to 1883, the expenditure was 11,330,700 $\frac{1}{2}$ , and, comparing the cost of those ten years with the first, it appears that the outlay on irrigation has just doubled, while a steady increase is shown in the last five years. The average gross annual receipts to the Government on the irrigated area amount to 5s. per acre, the gross expenditure to a little over 2s., leaving a profit to the Government of 2s. 11d. per acre on the whole area. The same Report likewise shows that the Orissa and Sone delta works afford protection to 2,000,000 acres which previously had been the scene of grievous famines, and that the tract between the Rivers Jumna and Ganges is better protected than any similar tract of the same size in India, while in the north-west provinces nearly 2,000,000 acres are actually under irrigation.

These facts, so far as they go, are matter for congratulation. That the further extension of irrigation works would be likely to add permanently to the taxes of the people of India, Mr. Newman considers disproved by the fact that, according to the above-named Report, the gross amount of capital invested in such works over the whole of India is twenty-four millions and three-quarters sterling nearly; and that the revenue receipts on the same for the year, reckoning productive and non-productive works together, were nearly 1,532,000. The profits on the total outlay on productive works are over 4 $\frac{1}{2}$  per cent., so that there is sufficient encouragement, on financial grounds



alone, to continue a prosecution of irrigation works.

Mr. Newman has certainly done excellent service in rousing attention to the all-important question of how to combat famines in India, and it is to be hoped that his admonitions will not only be laid to heart, but lead to a revival of the vigorous policy which was inaugurated some years ago, but which has since been contracted with doubtful expediency. The saying of Solomon seems to be as applicable to States as to individuals, "There is that scattereth and yet increaseth: there is that withholdeth more than is meet, and it tendeth to poverty."

#### THE LAW OF RATING.\*

HERE is no better example of the way in which the jurisdiction of our law courts is affected in the present day by the increased complexity of modern life than the law of rating. The popular idea of a law court is that it is a place where personal disputes are settled, but a study of Mr. Castle's work will show how numberless are the problems, partly economical and partly legal, which have of late years come before the courts in regard to rating. Not that this is the only subject which the tendencies of modern life have brought into legal prominence, but it is one, and not the least important. Nor can any one study this work without perceiving the quiet, unostentatious, but very effective way in which judge-made law becomes part of the law of the land, and grows almost imperceptibly till, in fact, it overwhelms both in size and in importance the original groundwork of statute law upon which it is based.

We have mentioned Mr. Castle's work on the law of rating, the second edition of which now lies before us. We do not, however, propose to make any minute criticism upon it. It is already well known, and it has secured position as a standard work on the subject of which it treats. But for the information of those who are not acquainted with it, it may be useful to state that the law is stated in it with precision, yet with reasonable fulness, and the book is written in an easier and more literary style than are the generality of law books. We can scarcely point to any work, indeed, which seems to us to unite better the qualities which both the lawyer and the layman desire. The only fault which it occurs to us to notice, and which we hope may be prevented in the future editions, is the author's habit of using "that" or "which," as at p. 367, line 4, and p. 368, line 8. We have said that the law of rating simplifies with extraordinary vividness the size and the importance of our judge-made law as compared with our statute law. The judge-made law largely fills this substantial volume. The statute law upon which it is based is to be found in an Act passed in the thirty-third year of the reign of Elizabeth, the substantial part of which is that the parochial authorities, with the consent of justices, "shall raise weekly or otherwise, by taxation of every inhabitant, parson, vicar, and other, and of every occupier of lands, houses, tithes impropriate, appropriations of tithes, coal-mines, or leaseable underwood in the said parish, in such competent sum or sums of money as they shall think fit, a convenient stock of flax, hemp, wool, thread, iron, and other necessary ware and stuff, and to set the poor on work. And so competent sums of money for and towards the necessary relief of the lame, impotent, old, blind, &c., . . . to be gathered out of the said parish according to the ability of the said parish." This Act refers to the taxation of personal as well as real property, but the former species of property has by statute been declared not to be rateable. "With this exception," says Mr. Castle, "the Act of Elizabeth remains untouched in principle at the present time." It would be impossible to show how in every branch of this subject judge-made law has grown into the great structure of the present day, for our space would not suffice.

It will be enough to take note of one portion of the subject, which also shows the complexities of the modern law of rating, and the difficulties which the courts have had to face in creating our present law.

We take, for example, the parochial principle in its application to modern undertakings, such as waterworks and railways. It is this kind of enterprises, entirely the creation of modern times, which have added so much to the difficulties of formulating the law of rating. There may be difficulties in regard to the assessment of other property, even of a dwelling-house, but they are trifling compared to those in regard to commercial undertakings.

The so-called parochial principle dates from the year 1633, when it was enunciated by the judges of England in what has since been known as Sir Anthony Eaby's case, "that assessments are to be according to the estate of the occupier within the parish, and not having regard to any estate which he has in any other place or town." This is a plain and commonsense proposition, but its application is by no means in all cases easy. It is, furthermore, of interest to note that this clear enunciation, and, indeed, creation of this point of law emanates not from the Legislature, but from the judges, exemplifying what has been already alluded to, namely, the great importance, in regard to the law of rating, of judicial decisions. One of the earliest and most interesting cases in regard to the application of the principle occurred in the year 1813, in regard to the rating of the spring of water at Amwell which supplied the New River. The way in which this principle was to be applied appears from Lord Ellenborough's judgment:—"Here, then," he says, "is land and water enclosed in the basin in the land, which falls into the legal description of land, and although a considerable portion of the profits of such water is derived from pipes, through which it is distributed to other places, yet it is found that the water has a certain ascertained value at the fountain-head; and in cases of this kind it is enough to ascertain the total value of the property, without inquiring whether it yields a return on the spot. The property is locally valuable in the parish where it is rated, although that value is derived from extrinsic circumstances, and although the profits are actually received elsewhere." Here, as Mr. Castle points out, "the spring was declared locally rateable, not because it produced profits outside the parish, but because these profits, though received outside, constituted part of the local value of the spring."

Again, as to railways, the Court, in the Brighton, South-Eastern, and Midland Railway Companies' case, laid it down that "the value which the land occupied in each parish produces, after the due allowances, is that upon which the occupier is to be rated in each." Here there is an important principle of the modern law of rating stated, not by the Legislature, but by the judges. The question was worked out still more elaborately in what is known as the Great Western case, where the difficulty arose in regard to the expenses which were to be allocated to two miles and a half of a branch line belonging to the Great Western Railway Company. The pith of the judgment lay in the words, "We are to ascertain what expenses are incurred in earning the gross receipts on the two miles and a half, what charges, parochial or otherwise, they are liable to, what is fairly to be deducted, tenants' profits," and so on. In other words, the judgment was to the effect that local and general expenses were all to be taken into account, and that the general expenses are not to be divided equally according to mileage, but according to the manner in which, so far as can be ascertained, they affect the particular portion of the line under consideration.

There is but one more point on which we have space to touch, that is, in regard to what is of special interest at the present day, the rating of country-houses. Mr. Castle thus sums up the results of the law on the subject: "The assessing tribunal 'have to ascertain the value of the occupation to the existing occupier, and they must find this value from all the

circumstances of the case; in some cases looking to the cost of construction; in others, to the accommodation or to the amount of use made of the premises." It would seem to result from this statement of the law that many country mansions are rated too low. It may be all very well to say that unless Lord A or B lived in a particular house, it would not suit any one else, and that it possesses its value from Lord A's position and his wealth, and that the hypothetical tenant would only pay a comparatively small sum for it; but the mansion is, for Lord A's purposes, of very considerable value. As Mr. Castle very truly says, "the premises should not be rated upon an inadequate assessment, upon the ground that the property is not ordinarily in the market, and would not readily be occupied by a tenant from year to year." The premises have a large value to the existing occupier, having regard to his station and position, and upon such value the assessment should be based.

#### NOTES.

THE agitation for a new or an enlarged House of Commons appears to be taking, among members of the House, a very decisive form. A memorial on the subject is, we understand, being got up for signature by members; and though Mr. Gladstone returned a doubtful or rather a procrastinating answer to Mr. Mitchell Henry's question on the subject on Monday last, it seems likely that pressure will be brought to bear upon the Government to give practical consideration to the subject without delay. In the meantime, we may repeat our caution that too much is being made by Mr. Mitchell Henry and others of the value of the Report of 1868. There seems to be a vague idea that if only we had this report reprinted it would be all plain-sailing. Now, the fact is that the said Report is by no means conclusive, a great deal of the evidence being very contradictory and devoted to the promulgation of this or that witness's special views. We concur in it so far as this, that if one of the courts adjoining the present House be selected as the site for a new House, it must be the Commons Court on the east of the present House, and not the Star Court on the west, the selection of which would bring the new House too near to the exterior confines of the building, and would necessitate the spoliation of some of the best architectural portions of the internal design of the court. We believe Mr. Chas. Barry, who is in possession of both his father's and his late brother's ideas on the subject, has a scheme sketched out which, utilising part of the space from both courts, would destroy neither, and would give the required accommodation, while leaving the Speaker's chair, and the semi-private entrance behind it which the *Saturday Review* claims as an inalienable right of Government and leading opposition members, just where they are: and in spite of what has been rather too hastily assumed to the contrary, it may be found quite possible to carry on the greater part of the work outside the walls of the present House without interfering with its sittings, leaving the concluding portion, the connexion with the present House, to be carried out during recess. On sanitary grounds it is desirable not to fill up either of the before-named open areas entirely with building, if it can be helped. Of course members must not expect that any House that will seat all the members will be as easy to speak in as the present House. That is not in the nature of things.

MR. MUNDELLA, in his new capacity as President of the Board of Trade, received on Friday last a deputation from the Railway Rates Committee, which included several members of both Houses of Parliament, and was introduced by Lord Henniker. The now familiar grievances of terminal charges and preferential rates were brought forward, and the necessity for immediate legislation urged. This has, of course, been retarded by ministerial changes, but the late Government had fully

\* A Practical Treatise on the Law of Rating. Second Edition. By R. J. Castle, Barrister-at-Law. London: Stevens & Sons, 1886.



intended to deal with the question, and Mr. Mundella promises that it shall receive speedy and careful attention at his hands. The right hon. gentleman displayed a pardonable hesitation to credit some of the statements made as to the extent of the preference given to foreign produce as compared with English, and expressed his regret that Lord Henniker was not prepared with proofs. There can be no doubt that exaggerated statements were current during the elections, and that even Mr. Stanhope, the President of the Board of Trade under the Conservative administration, was misled in this respect. He repeated at Horncastle a very improbable story about an Essex farmer finding it cheaper to send his sheep to Rotterdam, and thence to London by sea, than to forward them by rail to the metropolis direct; and the Great Eastern Railway Company drew public attention to the absurdity of this statement in a letter to the daily press on Saturday last. At the same time, it may be noted as a striking proof of the reality of this class of grievance, that at the half-yearly meeting of the London and North-Western Railway last week, one of the shareholders stated that he thought the earning powers of the company were crippled by prejudicing the home producer in the matter of rates, and that this mistaken policy might partly account for the falling off in receipts.

IN the midst of a world-wide commercial depression it is comforting to find that one country shows some sign of improvement. According to the official returns of French imports and exports we find that during last month the exports of manufacturers were 99 millions of francs against 78½ millions of francs for January of last year. On the other hand, taking similar periods, imports of manufactures have diminished 2 millions of francs. Whether the latter is a reassuring sign or not may be a moot point. Statists tell us that the prosperity of a country should be judged by the amount of its imports rather than its exports, but whatever theory may say, probably the French manufacturers will be thankful for the extra 20 millions odd of sales. Comparing the two Januaries again, we find that the imports of raw material have diminished 7 millions, which is undoubtedly not a sign of strength, but the exports have increased 9½ millions. There has been a diminution in both imports and exports of food materials to the extent of eight and six millions respectively. This probably does not indicate that the civilised world is eating less, but that the good harvest general last year has enabled each country more nearly to supply its own wants and not have to look abroad for its food.

A CORRESPONDENT writes:—"Some interesting archaeological remains have been discovered at Athens during the recent explorations carried on in the Acropolis by M. Kabbadias, the Inspector-General of Greek Antiquities. Excavations had been made some eight years ago in the northern portion of the Acropolis for a depth of 6 ft., which had brought to light the foundations of a large building quite unexpectedly; but, from want of funds, no further effort was made until the Archaeological Society of Athens instructed M. Kabbadias to undertake new inquiries. On the 5th of February last, while the King was watching the proceedings, a beautiful female head was unearthed, which he took in his hands and began to clean. Subsequently four more were found, one with an archaic inscription, and all with the hair and robes showing more or less traces of colour. On the next day the torso of a large statue was dug out, of beautiful proportions and workmanship, and this was followed by the discovery of a perfect shoal of statuary, three fluted columns, and a votive altar with inscription. At present there seems to be no solution of the question as to the origin and uses of this building, or why such a storehouse of antiquities existed there; but it is most probable that the date of the statues is about the sixth century before the Christian era, or, in other words, the best period of

archaic art. All the heads had attached to them a little ring, as though some ornament had been fastened on, while, rather singularly, in every case the arm was missing that was most prominent, and probably the one that had held up some portion of the robe."

MR. UNWIN'S paper at the Society of Arts on Wednesday night, "On the Employment of Autographic Records in Testing Materials," was a highly interesting and valuable one, but hardly possible to render intelligible apart from diagrams. Mr. Unwin passed in review the principal autographic recording apparatus in existence, noting the merits and defects of each, and described his own apparatus, worked in connexion with the Wicksteed type of testing-machine, in which the stress is weighed by a steelyard with a travelling jockey weight of one ton driven by a large screw. From this screw a vertical paper cylinder is driven by a belt, with a pencil sliding on guides and connected to the specimen by a very fine wire. Mr. Unwin added the following description of a semi-automatic apparatus for registering the smaller strains of metal within the elastic limit:—

"A large paper cylinder is connected with the jockey weight, so as to turn accurately a circumferential distance proportional to the load on the specimen. A pencil moves along a slide parallel to the axis. To give motion to the pencil there is an electro-magnet and ratchet-wheel, so arranged that, on sending a current, the pencil moves one stop along the slide. If now a scratch on the test-bar is observed through a micrometer, the moment when each extension of 1-1000th in., or, if necessary, of 1-10000th in., can be observed,—if, then, from each such extension a current is sent by the observer, the pencil will mark a step on the paper cylinder. For the paper cylinder is turning proportionately to the increase of stress. Hence we get on the paper cylinder a stepped figure, the angles of which are points on the stress and strain curve. The use of such an arrangement is that a series of readings are taken and registered rapidly, without needing to stop and read the load, and write down the results."

A bar of cast-iron under tension shows on this record a curve nearly straight for some distance from the origin, but curving away rather rapidly on approaching the elastic limit; brass gives a curve much flatter in the later portion; wrought-iron an almost straight line to the elastic limit; steel nearly similar.

IN another part of this week's paper we report meetings of two excellent Institutions connected with the building trade, viz., the Provident Institution of Builders' Foremen and Clerks of Works, and the Builders' Clerks' Benevolent Institution. The first-named body, established in 1842, has a good record of work done, and it might do much more if all eligible men would join its ranks. It is, we believe, the only Provident Institution of its kind, and we trust that the principle of "self-help" will impel many to join it. The other society we have named, the Builders' Clerks' Benevolent Institution, is well worthy of the active support of the building trade, and of builders' clerks in particular, as subscriptions paid by them in times of prosperity may be in a sense regarded as premiums for insurance against times of want or sickness, distressed subscribers having, of course, a prior claim on the funds of the Institution. From our own knowledge we are able to say that some very urgent applications have lately engaged the attention of the Committee, and it is to be feared that in this period of depression such cases are likely to increase in number. In order to meet all worthy claims, it is desired to make the Relief Fund as large as possible this year. Therefore, to slightly vary an old couplet,—

"Let those now give who never gave before,  
And those who always gave now give the more;"

that is, if they possibly can. Another excellent trade charity,—the Builders' Benevolent Institution, must not be forgotten in the midst of the many calls from other quarters.

\* Since this was in type, further information on the find has been made public. It appears that one of the heads found had a glass eye in it; nothing surprising, since it has long been believed that this practice was frequently adopted in older Greek work. The Candian Ion (British Museum) had obviously some inserted eyes of this kind.

THE "Selected Exhibition of high-class Water-colours" at Messrs. Agnew's Gallery in Bond-street does not belie its title. It contains, among other things, a superb work of De Wint's, "Lancaster" (45), a landscape which seems built rather than painted, with De Wint's great broad masses of colour, yet full of aerial effect, distance stretching behind distance in far-reaching perspective. Some of Barrett's large classical landscapes, which seem to be becoming a fashion again, serve, in comparison with De Wint, to emphasise the distinction between power and mere ambition in water-colour art. Barrett meant to do something very fine and poetical, and his works may be admired for their poetic interest, in spite of their unreality; but the style is feeble, or rather it is not style, but manner. Mr. Fulleylove's "Diana Fountain, Bushey Park" (29), we think we have seen before, but it is welcome again, as are one or two others of his works, which are to be seen here. Certain rustic subjects bearing the name of Luigi Chialiva (81, 82, 85, 87), a name not familiar to us, exhibit a certain individuality, with a little suspicion of trickery. There is a large Turner (large for a water-colour), "Carnarvon Castle" (7), effect fine, architecture questionable and rather shirked, but the castle fills its place in the sentiment of the scene. There are a good many works by deceased artists, Copley Fielding, Duncan, Stanfield, &c. The collection is well worth seeing.

THE last number of the *Revue Archéologique* has an interesting paper on the tombs recently opened at Bologna. These tombs are thought to date from 400 to 200 B.C. They call for special notice because, in addition to the usual features of Etruscan sepulchral architecture, a number of curious funeral stelæ have been found. On these stelæ are carved, in relief, figures of chariots, with winged horses, and horse and foot soldiers; also, a frequent subject is a ship surrounded by waves, and a monster with a fish's tail supporting a rock in her hands. These monsters the *Revue* calls sirens; we prefer to leave them unnamed, as we believe the siren of antiquity was invariably either of human or of mixed bird and woman form.

THE *Berliner Philologische Wochenschrift* reports that a large seated statue of Zeus has been excavated at Trèves. It is made of limestone, and is in excellent preservation. The throne of Zeus is adorned with a relief representing Herakles resting his right arm on his club and holding in his left a bow. The bow, it will be remembered, is the earlier attribute of Herakles, the club never appearing on very archaic monuments. The combination of the earlier and later attributes is uncommon.

THE Dudley Gallery Exhibition of Water-colour Drawings, though of a moderate scale of excellence, contains some very nice works. There is nothing in the exhibition calling for special remark; but we may mention "Battersea Bridge and Chelsea Church," by Miss Kate Macaulay (11); "On the Norfolk Broads" (19), by Mr. W. E. Bowman; "Tarbert" (32), by Mr. G. P. Lillington; "Birches" (63), by Mr. W. H. Wheeler; "The Sentinels of Bear Head" (76), two perpendicular masses of chalk cliff, by Mr. B. J. M. Donne; "Vauxhall Bridge" (117), by Mr. Hubert Medleycott; "Twilight, Ross-shire" (140), by Mr. A. W. Weedon; "A Reach on the Thames, Belov Bridge" (164), by Mr. Medleycott; "Pink Peonies" (180), by Miss Helen Thornycroft; "A Hymn of the Morning" (201), a fine sunrise effect, by Mr. G. S. Walters; an old mill, Essex (206), by Mr. F. Hines; a study near Loch Torridon (246), by Mr. C. B. Phillip; "North Glen, Arran" (247), by Mr. Eyre Walker; "The Quiet of an Autumn Afternoon" (274), by Mr. G. Marks; and "The Late Snow" (22nd January), Fancourt, Chertsey" (417), a very delicate and beautiful study of snow effect, by Mr. Walter Severn, now the President of the Dudley Gallery Art Society.



THE Society of Lady Artists has a room this season in the Egyptian Hall, and exhibits upwards of 500 works there. We have before expressed an opinion that there is no possible *raison d'être* for a special Society of Lady Artists, as ladies who can paint in a high style of art can get a good position in general exhibitions along with men, and do get it; and those who cannot had better not exhibit. Among the few works which "gave us pause" in the present case were "A Quiet Backwater on the Thames" (173), and a very clever "Portrait Sketch, taken at One Sitting" (333). On referring to the catalogue, these proved to be respectively by Miss Maud Naftel and Mrs. Jopling, whose works secure them a place in the best exhibitions of the day. We do not require to go to an exhibition of lady artists to make their acquaintance. There is here and there another work a little above the level of the rest, but in general there is a dead sea of mediocrity. We repeat that we cannot possibly see the use of the society, except because so many of its members would have no chance of getting into any other exhibition. Men and women who paint with real power are completely on a level now; there are no "female disabilities" of any kind; they take their places side by side in such exhibitions as those of the Society of Painters in Water-Colours, where, in fact, one lady, Mrs. Allingham, is one of the few who stand before all the rest in giving the exhibitions their high interest. But here we are asked to be interested in an exhibition of almost entirely poor and weak paintings, because they are the work of ladies. With all possible respect and gallantry towards the sex, we really cannot see it.

FROM Rome comes news of the discovery of a fine antique mosaic. Some workmen engaged in digging the foundations of the new military hospital on Mount Celio came upon a rectangular piece of pavement five metres long by three broad. When cleaned the mosaic was seen to represent a gladiatorial combat. Both the design and the inscriptions are in excellent preservation. The mosaic is being excavated with great care, and will eventually be placed in the Capitoline Museum.

WE have received the annual report of the Kyrle Society. In the decorative branch they mention a good many clubs, mission-rooms, &c., decorated by the Society's workers, and at the "Open Spaces Department" they have secured part of the burial-ground of St. George-the-Martyr, Bloomsbury, a piece of waste ground in Quaker-st., Spitalfields, and Ion-sq., for open recreation-grounds for the people, besides supplying seats and trees in other open spaces. This latter portion of the work is an excellent if not very extensive achievement. Decoration may be good or bad, and we have no doubts whether there is rational ground in presenting people with decoration *gratis*, or any more than for presenting them with food and money; but the securing of open spaces in large towns is a public and not a private matter, and the Society cannot go wrong in directing their efforts to that end.

WE perceive that Messrs. Peters, Bartsch, & Co., the agents for *Carbolinum venereum*, are issuing a circular in which they quote our "Note" of August 29, 1885, in favour of its usefulness as a preservative, but omitting the concluding words, in which we stated that it had a tendency to render wood more easily inflammable. We published a counter statement from the agents, to the effect that *Carbolinum* had this result only when freshly applied, giving it on their authority only; but we will not allow our remarks to be circulated as an unconditional recommendation, by the omission of an important paragraph.

**The "Shipperies" Exhibition, Liverpool.**—As will be seen by an advertisement which appears in another column, the whole of the allotments of space have now been made, and exhibitors are desired to complete their arrangements by March 1st.

#### ESSEX-STREET CHAPEL.

"Next whereunto there stands a stately place,  
Where oft I gazed gifts and goodly grace  
Of that great lord which therein went to dwell,  
Whose want too well now feels my friendless case."  
*Spenser's Proclamation.*

This chapel in Essex-street has long formed the head-quarters of the Unitarian community in London. It is just now being thoroughly rehabilitated for conversion into a hall or place of assembly. The existing basement and middle floor will serve for store-rooms and offices; the floor next above, having been cleared of the pews, &c., is to be used henceforward for purposes of meeting and congress.

Standing almost north and south, behind the western side of Essex-street, and lately distinguished by the Raikes memorial, this little-known building occupies a position that in point of historical and personal interest has but few rivals in the whole town. Whilst the names of Devereux-court and Essex-street quicken our memory of the ill-starred career of a Queen's favourite, — the friend of Spenser and of Shakespeare's patron, Lord Southampton, — the earlier record of their situation must not be overlooked.

Removing from Old Temple, their original settlement by Southampton Buildings, the Knights Templar were established at the New Temple, between Whitefriars and the Mill-ford, in or about the year 1184. Here they remained until their downfall, temp. Edward II. That sovereign made over this their property to Thomas, Earl of Lancaster (1310), on whose attainder a grant thereof was assigned to the renowned Adomar, or Aymer, de Valence, Earl of Pembroke, which grant carried also the Fiquet (New-square, Lincoln's Inn-fields), and the Fleet Crofts. From Aymer de Valence, who died in 1323, the house passed to Hugh le Despencer the younger, and, at his execution, reverted, 1 Edward III., to the Crown. It then passed to the Knights of St. John of Jerusalem, who, however, soon demised it for a rent of 10*l.* a year to certain students of the common law, who are supposed to have collected hither from Thave's or Thavie's Inn. Immortalised by Chaucer in his Prologue to the "Canterbury Tales," the students so far recovered from their attack and plunder by Wat Tyler's men as to occasion their division into the Inner and Middle Temple Societies, whilst continuing to hold as tenants to the Hospitallers until the general suppression temp. Henry VIII.

So much of New Temple as then lay without Temple Bar would seem to have never been occupied as an Inn of Court. Dugdale opines, indeed, that it served for the reserved use of the prior and canons of the Holy Sepulchre. This portion, — by the style of Outer Temple, — was leased by the knights of St. John to Walter Stapleton, bishop of Exeter, who here suffered investment and death at the citizens' hands in 1326. Built by Stapleton, Exeter House thus formed one of the earliest of the riverside "inns," or town-mansions of our provincial bishops, for which the Strand became so chosen a locality. It continued to appertain to Exeter See up to the era of the Reformation. Its subsequent titles of Paget-place, Norfolk House, Leicester House, and Essex House, are in themselves a chronicle *in petto*. King Henry VIII. bestowed Exeter House upon his trusty councillor and executor, Sir William Paget, who was summoned to Parliament as Baron Paget of Beaudesert, county Stafford, on the 23rd of June, 1552. He was ancestor to the now Pagets, Marquesses of Anglesey. Paget-place, as re-edified by him, next went by purchase to Thomas (Howard), fourth duke of Norfolk, who, in 1550, had married, as his first wife, Mary, heiress of the Fitzalan, earls of Arundel. Duke Thomas, attainted of high treason for his communications with Mary, Queen of Scots, suffered in 1572 the same fate which fifteen years later, and for the same cause, overtook Thomas, third Baron Paget, grandson to William, the first of that title. At this juncture of the house's history Stow makes some confusion, for he speaks of the purchase by Thomas, Duke of Norfolk, as having taken place after the attainder, in 1587, of the third Baron Paget. We learn, however, from him that this Duke passed the property "over to the Earl of Leicester, who bequeathed it to his son, Sir Robert Dudley, and of whom the late Earl of Essex purchased it, and it is now called Essex House." Meanwhile Henry Fitzalan, Earl of Arundel, had

become possessed of Hampton-place, "inn" of the Bishops of Bath and Wells, which stood next westwards on the other side of Milford-lane, together with certain tenements and messuages thereunto adjoining, for the sum of 41*l.* 6*s.* 8*d.* At his death, in 1579, Arundel-place, which lay over all the ground between Milford-lane and Strand Bridge-lane, devolved upon his only child Mary. As Arundel House it constituted the repository of the celebrated works of art which were brought hither from Rome and elsewhere by Thomas, grandson of the fourth Duke of Norfolk, to whom James I. restored the earldom forfeited through his father Philip's attainder.

In Arundel House was lodged Hollar, whose views thereof are supplemented by his plan before us showing ground-plans of Arundel and Essex Houses. The latter, abutting on the Strand, lies between Essex Court, Temple, and Milford-lane. From the middle point of the garden terrace runs an alley or walk to the river, at the foot whereof is a "bridge" or landing-stage. This stage may be taken, we think, to mark the position now occupied by the archway and steps at the foot of Essex-street. There is an entrance to Essex House from the Strand over against the eastern end of St. Clement Dane's Church, and opposite to the corner of the houses which formerly filled the space where the cab-stand now is. His house besieged, and guns laid against it from the tower of old St. Clement Danes, Essex betook himself along Fleet-street and Ludgate-hill into the City. But there he found that a falling favourite has no friends, and after hearing himself proclaimed traitor in Gracechurch-street, ultimately surrendered on Queen Hithe, being partly moved, he says, "by the cries of ladies." It is said that the Countess of Nottingham, who withheld from Queen Elizabeth his last hope of clemency, died in the neighbouring Arundel House. In Essex House was born his son, Robert Devereux, the Parliament general; during whose residence it was known to royalist songsters as "Cuckold's Hall." On the successor to the old Grecian Coffee-house, in Devereux-court, is his bust: some would ascribe the bust to Cibber's chisel. The Palgrave was lodged here when he came to marry the Princess Elizabeth, "Queen of Hearts"; and here Anne Sydney, daughter to the Earl of Leicester, passed her childhood. Lord Essex let one-half of his mansion, from the 11th of March, 1639, for ninety-nine years at a charge of 1,100*l.*, to William (Seymour), advanced Duke of Somerset on the 13th of September, 1660, who as Earl of Hertford had married the unfortunate Lady Arabella Stewart. Cunningham tells us that Lord Treasurer Southampton was living in Essex House at the Restoration, and Sir Orlando Bridgman, Lord Keeper, in 1669, when Pepys describes it as "a large, but ugly house." It was eventually acquired by Dr. Barton, the builder, who with others laid out the property as we now find it, subject to the later improvements by Alderman Pickett in 1810.

In a part of the old house, clearly marked on the plan mentioned above, the Cottonian MSS. and books were lodged during the interval 1712-1730. Paterson, the auctioneer, next rented this portion, which was then demolished *circa* 1775. On its site the Rev. Theophilus Lindsey, a convert from the Church of England, and Dr. Disney, forthwith established their Unitarian Chapel; Benjamin Franklin being present at the opening ceremony. After Dr. Disney's death in 1805, Mr. Thomas Belsham came hither from the Gravel-pit at Hackney. The present congregation, we are informed, have opened a fresh place of worship at the West End, where a memorial stone of Essex Chapel was laid on the 25th inst. at the Unitarian Chapel, Notting-hill-gate. The new works in Essex-street are being carried out by Mr. John T. Chappell, of Piccadilly, Messrs. T. Chatfield Clarke & Son being the architects.

**Convict Labour in America.**—An important measure will be brought forward by the American Congress, prior to the termination of the present session, prohibiting the Government contracts for buildings or public works being given in future to contractors employing convict labour, or using any of the materials produced by that class of workmen. This measure was resolved on in consequence of Secretary Manning's report, in which he states that under the existing law there is no power to reject or exclude any offer for public works.

\* See *Builder*, November 28, 1885.

† A name revived in the chambers lately erected over the site of Palgrave-place, Strand.



## ICE MAKING: ARTIFICIAL AND REAL.

ALTHOUGH ice may be produced by artificial means, it is not always, of necessity, artificial ice that is so produced, as we will presently show. By the employment of certain chemicals in combination an intensely cold substance may be formed sufficiently hard, when laid on a perfectly smooth flooring, to enable persons to skate upon it with ordinary steel skates. This is true "artificial" ice, as it is the result of artificial means scientifically applied; but in no way does it pretend to be frozen water, or anything approaching it, and therefore should, strictly speaking, hardly be termed "ice" at all.

Another way of producing what is sometimes, though erroneously, called "artificial" ice is by carrying out certain principles well known in natural philosophy, and, by the help of elaborate and most ingenious machinery, producing blocks of actually frozen water, and, therefore, in the true sense of the word, ice pure and simple,—real ice, in fact, but originated by scientific appliances. In both cases the article is manufactured by man's ingenuity; but, in the first, an actually artificial substance is obtained; in the second, a real substance by artificial means.

The manufacturing of "artificial" ice is not altogether new. The pleasure-seeking world of London were surprised and amused, in the year 1840, by the opening of an exhibition of artificial ice, called by the fancy name of the "Glaciarium." The exhibition was established at the now almost forgotten Colosseum, which stood in Regent's Park, and of which Braham, the great tenor, was then the lessee. Among its attractions was a rockery or grotto, with a cascade supplied by a fifteen horse-power engine. It was at the bottom of this rockery that the exhibition of the "Glaciarium" was arranged. The rocks were cleverly covered with chalk powder to represent snow, and this, with the aid of a few small fir trees stuck about here and there, a very fair,—if rather theatrical,—picture of "winter" was carried out. The level floor of this small confined space was covered with a preparation chiefly composed of muriate of ammonia, nitrate of potash, and sulphate of soda, which was formed into a thin sheet of artificial ice, yet sufficiently hard and thick to allow skating on it in ordinary skates. When the place was lighted up at night with a pale white light the effect of the rocks, the fire, the snow, and the skaters was undoubtedly not only very good, but very natural. The speculation paid so well at first that the patentee (Mr. Kirke) ultimately removed the exhibition to larger and far more convenient premises in Baker-street, a spot afterwards known as the "Carriage Bazaar," below Madame Tussaud's Gallery.\* The edges or sides of the ice were surrounded by rockwork a couple of feet high, covered with powdered chalk and young fir trees, and dried grasses were planted about in different spots. Near to one corner was a hole broken in the ice, through which could be seen the water just below, and on a pole close by was the ominous word "Dangerous" painted in large letters, a joke which took very well. The walls of the place were lined with painted canvas, representing a winter landscape of hill and dale covered with snow, and the effect of the whole was, in its way, very successful. Here a regular skating club was formed, and a small band played an excellent selection of music every evening, and, as any one might skate by paying a shilling, very pleasant and novel reunions took place, and for a time the "Glaciarium" at Baker-street was all the fashion. In course of time, however, it outlived its popularity, like many other human institutions, and at last it was closed altogether, and has never since been attempted in London on the same plan, that is of actually making artificial ice of chemical compounds.

When "rinking" was all the rage, some years ago, and skates running on wheels were employed, the rink was merely a level surface of timber, slate, marble, or asphalt. This, however, was greatly improved upon by a curious and novel invention, for which Dr. Gummee took out a patent, and which consisted of a skating-rink of real ice, formed by most ingenious artificial means. The rink was opened in Chelsea, and the surface of a small sheet of very shallow water was frozen by the

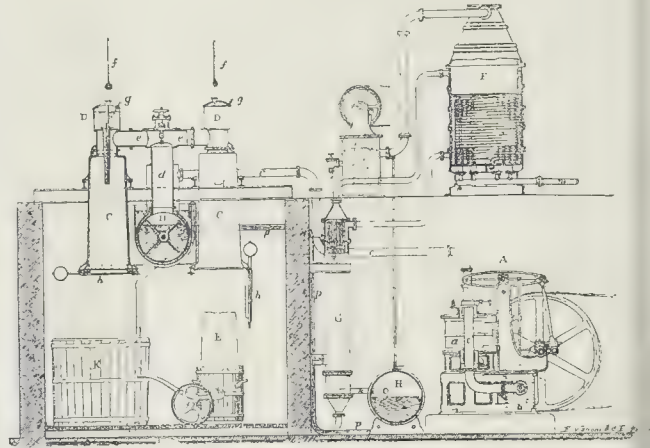
action of a powerful freezing mixture forced through a series of thin copper pipes passing up and down from end to end, laid close together just beneath the surface. So effective was this plan in its action on the water, that, even in summer, solid ice was always produced of sufficient thickness to enable persons to skate upon it with ordinary steel skates. The surface was flooded twice a day with fresh water, which was soon frozen, and skating was carried on with great enthusiasm in the middle of summer, and yet on "real ice." But, like everything else that is governed by "fashion," rinking, whether on wheeled skates running on marble or asphalt, or on steel skates on real ice, gradually seemed to lose favour, and thus the exhibition at Chelsea followed the rest of the rinks into oblivion.

But by far the most useful, as it is the most practical, system of making real ice by artificial means is the invention of Herr Windhausen, a German engineer, of Berlin. The plan adopted, though simple in principle, yet requires a large plant of somewhat elaborate machinery to carry out, and by its means ice can be manufactured by the ton, or more, at a time, not for the pur-

taken up, or absorbed, by the acid, whilst the liberated air is at once exhausted by the pump. The result is that, in consequence of the absorption of heat during the process of the evaporation of part of the water, the rest which remains is so entirely cooled down that it is almost immediately frozen into ice pure and simple, and is, in fact, genuine ice produced by artificial means, thereby differing widely from Mr. Kirke's patent, where both the ice and the producing power were alike artificial.

Herr Windhausen's most useful invention is, therefore, only a very ingenious and clever adaptation of the above well-known and oft-repeated experiment, by the aid of beautiful and rather complicated machinery, which was designed by him in 1879, when many factories were opened in different German cities, and where ice was retailed at the low price of 6d. per cwt. The first manufactory opened in London was established at the premises of the Aylesbury Dairy Company, Baywater, about September, 1882, but was removed last year to West Brompton, where it is now in full operation.

To describe machinery so as to be intelligible



Outline Sketch of the Patent Vacuum Pump and Ice Machine.

- A.—Vacuum Pump.  
B.—Large cylinder; C, small cylinder; c, suction pipe from pump to absorber and freezing cylinders.  
D.—The Absorber, containing sulphuric acid, which is kept in motion by revolving arms, a vacuum being maintained. d and e, pipes connecting absorber with ice cylinders, the connection between d and e being controlled by valve at top of d.  
E.—The Cylinders in which the ice is formed, i.e., the Freezing Chambers.  
F.—Vessels into which the water to be frozen first passes from the pipe f, before flowing into the cylinders, through the valve controlled by the lever g; h, the lid or bottom of the ice cylinder which is opened so as to allow the ice to fall out.  
G.—Block of ice.  
H.—The Concentrator, in which the acid is freed from the vapours absorbed during the passage of the water from D to C.  
I.—Exchange apparatus through which the dilute acid ascends to be concentrated, and the concentrated acid descends to the store-tank H, from which it can be drawn by the vacuum into the absorber as required. In the exchange apparatus the boiling concentrated acid is cooled during its descent by passing over and outside the pipes through which the cold dilute acid is ascending.  
J.—Tank into which the acid is received from the absorber after it has become diluted, and from which it is drawn into the concentrator.  
K.—Small vacuum pump for maintaining vacuum in the concentrator. L, pipe conveying concentrated acid to store-tank H.  
M.—Steam pipe from boiler.  
N.—Connection-pipe between absorber and store-tank.

poses of mere amusement for skating on, but for the usual and general use to which ice is now so largely applied by confectioners, fishermen, private families, and the medical profession. The principles on which this system are based are well known to most students of natural philosophy, and especially to those who have practically examined the air-pump, and its powers and capabilities. The one great principle involved has been the subject, in almost all laboratories, of repeated experiments, and those of our readers who may recollect the old original Polytechnic Institution, when under the direction of Dr. Bachofner and Professor Pepper, may perhaps remember to have seen,—for it was often exhibited there,—the very experiment on which Herr Windhausen's system is based. The experiment referred to is the freezing of water under the receiver of an air-pump, which was usually accomplished by placing two small shallow saucers, one filled with water and the other with concentrated sulphuric acid, under the glass receiver of an air-pump. When the action of the pump has produced a good vacuum, the water immediately begins to bubble up and evaporate, and the vapour so formed is rapidly

to ordinary readers, without the aid of diagrams, is perhaps somewhat difficult. We will, therefore, not attempt minute details, but endeavour to give a simple outline sketch of the machinery and its action generally in the operation of ice-making.

On entering the factory, the first object which strikes the eye is the conical-topped concentrator, a circular cast-iron vessel, enclosed in a timber jacket, 7 ft. 6 in. high by 4 ft. 6 in. in diameter, and lined with lead. This vessel contains many steam coils by which the acid to be concentrated is heated before it passes onwards, and is kept in *vacuo* by a small air-pump close by. From this concentrator the acid passes through several channels until it reaches the acid tank, or absorber, a long narrow, horizontal cylinder of cast iron, 33 in. in diameter and 23 ft. long, having a dome top for collecting the air from the freezing-chambers. This absorber represents the "small saucer of acid" in the well-known experiment, and the "small saucer of water" is represented by six upright cast-iron freezing chambers, of sugar-loaf shape, which are placed three on each side of the absorber, and the whole,—including, of course, the concentrator,—connected by pipe

\* Since removed to the corner of Baker-street.



with a powerful double-action air-pump of very peculiar construction, the design, we believe, of Mr. Windhausen. These six freezing-chambers are about 7 ft. in extreme height, but half of their length, together with the absorber, is beneath the floor, and can only be seen by entering the chamber immediately below, from whence they appear to hang from the roof. The pure water is let into these chambers at the top, by means of a governing valve, and their lower extremities are fitted with hinged bottoms, which swing back, for the discharge of the block of ice within, when made. The ingenious manner in which the absorber is emptied of the diluted acid, and the acid forced, by vacuum pressure produced by the air-pumps, through various stages, back again into the concentrator, to be again returned, when concentrated, into the absorber, for further use, is a matter of minute detail, which we need not go into, as it is the great principle involved, and how it is carried out on so large a scale, that we wish to put before our readers.

We will now suppose that all is in readiness. The air-pumps are set in motion by the steam-engine, the concentrated acid passes from the concentrator into the absorber, and pure water is let into the six freezing-chambers. The air and vapour from these chambers pass, by vacuum-pressure, into the absorber, when the vapour is instantly taken up by the acid, exactly as it was in the small experiment, whilst the air collected in the dome of the absorber is exhausted by the larger air-pump, and the inevitable consequence being that each one of the freezing-chambers speedily contains a block of pure ice. The hinged bottoms of these cylinders (which, as already stated, appear as if suspended from the roof of the lower chamber, at about 6 ft. or 7 ft. from the ground) are then unscrewed, and if the external atmospheric pressure is not enough to drive out the ice within, at a given signal a little steam is introduced, when the huge block descends with a tremendous crash into a receptacle, like a large wash-tub on wheels, provided to receive it, when it is immediately removed to the store-house, to be trimmed for the market.

The blocks are about 5 ft. high, and average 370 lb. in weight, requiring only an hour's time to produce. Thus with six freezing-chambers nearly two tons of ice can be made in one hour, the cost of producing which is stated to be not more than 5s. per ton, which, if sold at 6d. per cwt. (as it is said it can be), or 10s. per ton, would give a fair enough profit.

The ice has a perfectly pure white opaque appearance, very much like frozen milk or cream. A scientific writer\* says that this is possibly caused by the enclosure of infinitely fine bubbles containing air, and we are assured that in consequence of this enclosed air this ice does not melt nearly so rapidly as the transparent block ice."

In shape the blocks have much the appearance of gigantic sugar-loaves, the top being usually somewhat depressed, but surrounded by a thin wall of ice, often assuming exceedingly pretty open-work patterns, not altogether unlike oint lace.

The air-pumps and other revolving work are driven by a small steam-engine of 8-h.p., and with the present plant at Lillie-bridge of six freezing-chambers about twelve tons of ice can be produced per day, the cost of which does of exceed 5s. per ton; and, although the machinery is rather elaborate, yet not more than two or three men are required to perform all the duties and keep the work going.

By the courtesy of the authorities the factory, during the summer, was visited by large numbers of persons, who were always invited to wait to see the "fall," and the managers generally contrived to produce a capital effect by discharging the whole six freezing-chambers either at once with a crash like a small thunder-clap or firing them off one after another in quick succession. It must not be forgotten that if ice is largely used as a table-luxury it is also most extensively employed for the cure of disease and for the alleviation of human suffering, and, as such, it becomes a most important adjunct to the labours of the medical profession. It is to be hoped, therefore, that Herr Windhausen's admirable system of ice-making may be soon extensively adopted throughout the country, more especially in all our larger cities.

## ARCHITECTURAL EDUCATION.\*

BY GEORGE AITCHISON, A.R.A.

In all affairs, the best beginning is to find out the point at which to aim; the weapon we have to use; and the training to be gone through to hit the mark. The aim of the architect is to direct building, so that it may be substantial and enduring without waste of material; that the structure built may be more conveniently arranged than common, untrained sense can make it; that it be fit for human habitation, or for the purpose intended; and so fashioned inside and out, that it exhibits rhythm, and pleases the cultivated eye.

The 1st we call the science of construction; the 2nd, the art of planning; the 3rd, fitness; the 4th, the fine art of harmonic proportions, and the disposition of light and shade; to which may be added those phonetic and graphic arts which enable a project to be shown to the employer, and by which the directions are conveyed to the workmen.

### Speaking, Writing, and Drawing.

Although these arts are subsidiary to architecture, and hypothetically it might be carried on without them; yet as they are mostly the first studies of the architect, it may be well to begin with them. It may, too, be truly said, that in the present day the greatest architect who did not possess them would have but a poor chance of being employed; though if such a one could get an important building to erect, his success might do much to send them out of fashion,—“a consummation most devoutly to be wished” when draughtsmanship is mistaken for architecture; and to be a master of sketching in water-colours is considered to be a more valuable accomplishment than to be a master of harmonic proportions.

As the architect has merely to instruct and order, it is essential that he should possess that clearness of thought and expression that will convey his meaning, and not mislead. Writing is essential for instructions to be conveyed to a distance, is useful for reference in case of mistakes, and supplants memory when operations are extended over a length of time.

Mechanical drawing is the readiest way of showing the shape buildings and their parts are to take; is less liable to be misunderstood than verbal description; and, where geometry is used graphically, is essential.

Stereotomy, the art of depicting the cutting of solids, is too much neglected by architects in this country. And so is descriptive geometry. The lines for staircases and for vaulting that in France would be drawn by an architect, are here left to the joiner or the mason. The elaborate stellar groining and fan-vaulting of the Middle Ages, the honeycomb work and interlacing patterns of the Saracens, not to speak of the exquisite mouldings of the Greeks, could never have been invented by persons ignorant of geometry. Rondelet, in his “Art of Building,” devotes a book of 182 pp. and forty plates to this subject.

Stone-cutting has been treated by Philibert de l'Orme; by Mathurin Jousse, who calls it “The Secret of Architecture,” who also wrote a treatise on carpentry; and by Professor Willis in the Transactions of the Royal Institute of British Architects. M. Jules Bourgeois has treated of the geometry used in forming the interlacing patterns of the Saracens in his book of “The Arab Arts.” It is unnecessary to speak of Peter Nicholson's well-known books.

Perspective, too, is often of use in enabling the architect to see how his building, or any part of it, will look from a given point. It also enables him to present the form of his building to the employer, before a model is necessary.

The science of sciagraphy, or of shading and shadows, is also useful, as it shows the extent of projections and the forms of things. Architecture proper demands no freehand drawing, but the architect will find it of great value if he can acquire it; it improves his accuracy of eye, and may improve his taste at the same time; it is a ready means of explanation, and by it he can rapidly record for himself the look of any original, beautiful, or picturesque composition he may see. It enables him, too, to give some notion of the ornament, sculpture, or painting he wishes the sculptor or painter to use on his buildings. An excellent plan might be adopted here of handing over the finished compositions of the architectural students to

the students of painting and sculpture, so that the latter might draw in the statues, bas-reliefs, and carved ornaments; and the former might colour the figure-friezes, figure-panels, and coloured ornaments, and complete the colouring of the building. By these means the painters and sculptors would gain some knowledge of architecture; an insight into the severe style required of them when their compositions were to give greater value to the lines of the architecture, and receive greater value from them; it would enlighten the architects on the choice of places for painting and sculpture, and relieve them from covering spaces with dull ornament where painting and sculpture should be; it would be of invaluable service to the three arts, which are never so thoroughly effective as when they are properly combined.

### Colour.

An architect must have a natural gift for colour, and his eye must be trained to appreciate harmonious colour, and to compose harmoniously, if he is to supersede the painter and successfully use colour, coloured marbles, or other coloured materials. The use of the brush is almost necessary for this study, and is absolutely necessary when he cannot choose on the spot the colours that are to be used. To be a good draughtsman in mechanical and freehand drawing confers great incidental advantages on the architect,—often undue advantages,—enabling him at any rate to present his projects in the most favourable manner. A large proportion of the great architects,—at least, since the Renaissance,—have been excellent draughtsmen. Nevertheless, it is better to have the substance than the shadow, and be a good architect rather than a clever draughtsman.

### Construction.

The science of construction is founded on statics, or opposing forces producing equilibrium, and on hydraulics and hydrodynamics when the pressure of fluids has to be dealt with. If a knowledge of these sciences can be acquired, it will save much loading of the memory. The investigation of statics, hydraulics, and hydrodynamics is mainly carried on by algebra and geometry. Statics and hydrodynamics solve the abstract problems, while the architect has to deal with them wrapped up in those actual things we call materials, and the stratum of the earth on which they stand.

### Statics, Hydraulics, and Hydrodynamics.

The statical problems that are mainly to be dealt with in construction are,—the stability of piers, including columns and walls, *i.e.*, their power of resistance from being overturned by the wind, their capacity to bear the weight put on them, their diminution of strength by flexure, when tall in proportion to their diameter; the resistance of walls to the pressure of earth; their resistance to the thrust of arches, vaults, domes, and of inclined pieces of untrussed timber or iron; the strength of arches to stand alone, to support walls upon them, and to support weights in the shape of columns, piers, girders, or trusses that only occur at intervals; the strength of vaults to support themselves, and also to support weights equally and unequally distributed over them. Domes have also to stand alone, to support regular and irregular loads. Those that are to crown buildings often have to support lanterns; in this case the curve of the section of the dome is one of the elements of its stability. The other problems to be solved are,—the cross strains exerted on lintels, breastsummers, girders, beams, corbels, &c., the stresses and strains in trusses, roofs, and partitions. Hydraulics and hydrodynamics treat of the pressure of water against river walls, embankments and tanks, in aqueducts, pipes, sewers, and drains. The importance of this knowledge is readily shown. Many of you may recollect the bursting of the Sheffield reservoir, flooding an immense tract of country, drowning people, herds, and flocks, and washing down or overturning houses; while the bursting of the tank on St. George's Hospital broke down the whole series of wards under it to the ground-floor, killing some people and injuring others.

The answers we get to these problems are in general terms, either in an algebraic or geometric form, and to be practically useful have to be translated by arithmetic into the form wanted, when the weight and strength of the materials and the weight to be carried or the force exerted have been supplied. If we are unacquainted

\* Engineering, 1882.

\* A Lecture delivered at the Royal Academy on Monday evening last.



with statics and hydrodynamics, the rules of which can be applied to each fresh case, we must remember existing cases in buildings which have stood the test of time.

The ignorance of these laws means that we cannot lead in construction, but only follow; the few geniuses that can invent without having learned these laws systematically are rare exceptions.

It is also essential to know the weight and strength of the materials we daily use, and to have tables at hand for those we occasionally deal with. In addition to this we want to know the resistance of each material to the destructive effects of time and weather, and their excellence for the purposes required; the right proportions, and the right methods of mixing the materials of which mortars and concretes are composed; the proper bonding of bricks, stones, &c.; the jointing and putting together of stone, timber, and ironwork; and the various devices by which the inherent weakness of each material may be guarded against.

Although foundations are a part of statics or hydrodynamics, the solution of difficult cases calls for ingenuity and resource, i.e., where the ground is soft, marshy, or of variable powers of resistance; and still more when bogs or quicksands have to be built on, or the foundations are beneath water.

A large proportion of the young architects are in a state of prehistoric knowledge, everything is carried on by them unscientifically; they do not know the weight or strength of any of the materials they use, and are merely safeguarded by working within known examples; an instance may perhaps exemplify this better than much narration. I was once present when a young architect had to submit the drawings for a church to the inspection of a superior authority. The first question was, "Of what stone are the nave columns?" Answer, "Bath stone." Question, "What will the Bath stone you are going to use bear per foot?" A. "I do not know." Q. "What weight have they got to carry?" A. "I do not know." Q. "How do you know they will bear the weight?" A. "Sir G. Scott built a church higher and wider than this, with Bath stone columns of the same diameter; and it still stands." Q. "What is the thrust of the vaults at the main ribs?" A. "There is no thrust." Q. "Why have you flying buttresses?" A. "On account of their picturesque effect." No wonder the engineers laugh at us when our knowledge is of this sort; though I must admit that with this sort of second-hand knowledge, imitation of Mediæval construction has been done, which no engineer would venture to do.

Pascal says architecture is one of the progressive arts, but it certainly will not progress structurally if we know nothing of these laws. In the case of iron, it is much too expensive a material to be used in an unsound way. We cannot afford to use twice the necessary quantity of material, and, if it is ever to be used architecturally, it is not easy to get an engineer to tell us what a column or a girder will carry if we are to shape, mould, and ornament it afterwards.

Much of the halo that surrounds Roman buildings is due to their daring construction, and to their permanence. The Romans built the largest dome yet erected in the world; perhaps the widest vault, but even in the vaults of St. Peter's at Rome exceed those of the Basilica of Maxentius, it is only by a foot or two; and yet the Romans were hampered by the cost, as we may see by the devices they used to lessen the cost of the shoring and centering of their vaults and domes. This is explained in M. Choisy's work "The Art of Building among the Romans." The Mediæval architects built the highest buildings that we have record of, and though their vaults did not equal the span of the Roman vaults, the quantity of material used in them was comparatively trifling. Not to speak of the feats the Mediæval architects did, in their vaults with pendants, they were constantly improving their methods of construction, and became at last so skilful that much of their work is like a bird-cage. I do not speak of this as an æsthetic success, but merely as showing their knowledge, skill, and boldness in construction. We have had imitations of Mediæval buildings by the hundred, but I never saw any attempt made to rival their constructive skill, either by using thinner columns of the same stone or by making the vaults of wider span.

Before you can hope to rival the fame of the Romans or the Mediævals, you must show that your constructive skill is greater than theirs.

Scott Russell's dome at Vienna is 360 ft. in diameter; the Britannia tube is 450 ft. span, and the New Tay Bridge is said to be 1,700 ft., and these are by the engineers so many of us pretend to look down on.

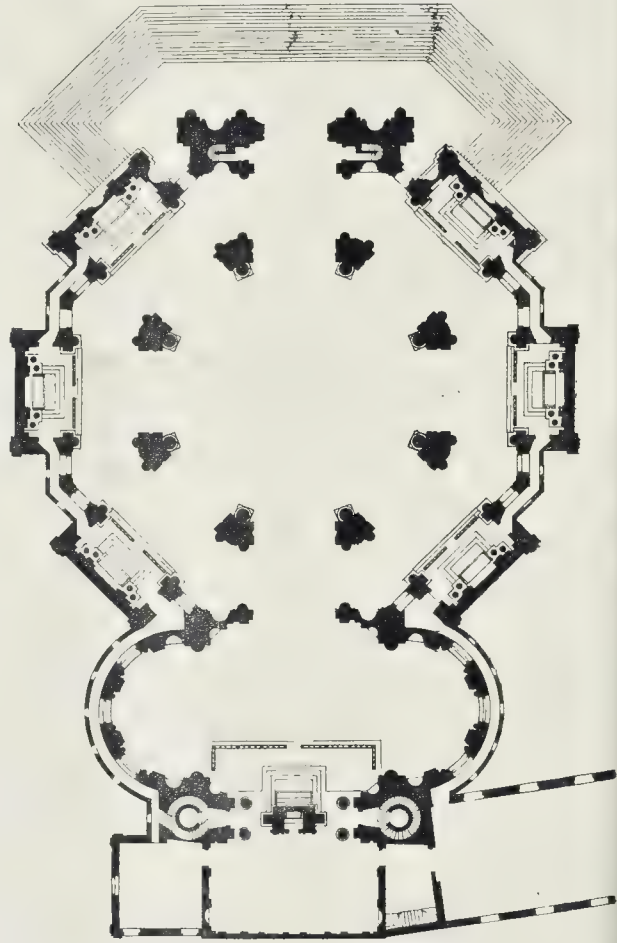
Let us not barter away our fame as great constructors to become fourth-rate painters, modellers, or etchers in black-and-white.

I shall be delighted to see competent architects, with minds as encyclopædian as those of the old Italian architects, who were often goldsmiths, painters, and sculptors, and sometimes poets besides.

We begin with architecture. When you are

until some mastery is gained; then to attack cathedrals, town-halls, palaces, and the like; and, finally, to practise planning on irregular-shaped pieces of ground—at first without regard to the elevations, but eventually bearing in mind the effect that the shapes in the plans may or will have on the elevations. When some progress has been made, fine plans of existing buildings should be paraphrased, and the methods by which the various shapes have been turned to æsthetic account should be noted at least, if not paraphrased.

St. Paul's is a model for its vistas; St. Mark's for effects of light; St. Stephen's, Walbrook, for arrangement of columns with a dome; and nearly all Wren's churches are admirable for their ingenuity in planning; Sta. Maria della



Plan of S. Maria della Salute, Venice.—By Longhena.

perfect in that, by all means be a landscape-painter, like Inigo Jones; or a mathematician, astronomer, and anatomist, like Wren; or a playwright, like Vanbrugh; or a barrister, like Alfieri; or reverse the epigram on Perrault,—

"De méchant médecin devient bon architecte,"

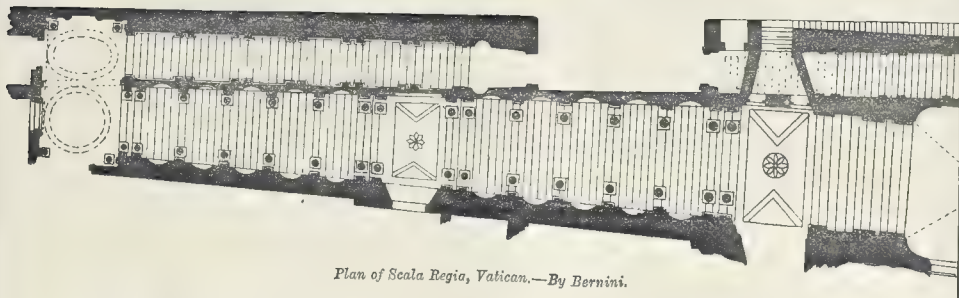
and become a good doctor after having been an excellent architect.

#### Planning.

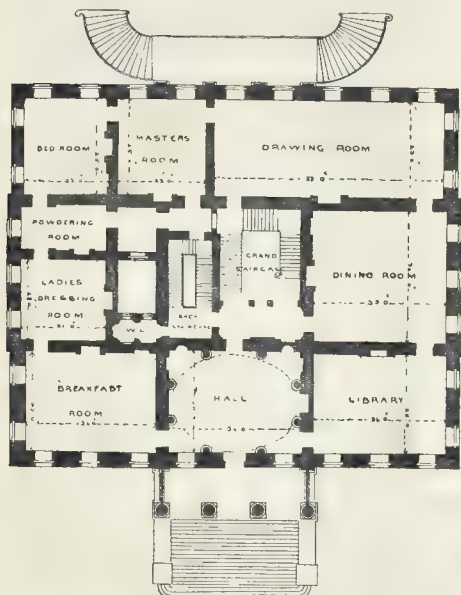
Common planning is but a matter of common sense, but original and brilliant planning evinces a special genius. The method to be adopted is to begin with a cottage, or some other simple building, and plan on paper ruled in squares, and proceed gradually through houses, mansions, chapels, churches, libraries, and hospitals,

Salute, by Longhena, for its shape; the Scala Regia at the Vatican, by Bernini, for its ingenuity and grandeur; the three Massimi palaces at Rome, by B. Peruzzi, for adaptation to an irregular site; the opera-house at Paris, by M. Chas. Garnier, for its simplicity and elegance; Blenheim, by Sir J. Vanbrugh, for its excellent arrangement as a palace, both for convenience and effect; and the Houses of Parliament, by Sir Chas. Barry, for simplicity and grandeur. Capability Brown was said to

• We append a few of the plans referred to. We hope, however, that Mr. Aitchison does not mean to recommend to the admiration of students the trick of false perspective by converging the lines of the staircase, whereby Bernini sought to give an impression of greater length to the spectator entering the staircase. The best criticism on such an architectural "dodge" is to look at the perspective from the narrow end.—Ed.



Plan of Scala Regia, Vatican.—By Bernini.



Plan of Claremont.—By Lancelot Brown.



Massimi Palace, Rome.—By Baldassare Peruzzi.

grasp at the same time the utility of the form chosen in the plan for the external effect he wishes to produce.

#### Fitness.

To begin with human habitations, and with those, too, in towns where the site is already chosen; the requisites to make the buildings fit are that the inside be sheltered from the wind, be dry, with light enough for health and for indoor occupations; that each room contains sufficient air for the occupiers, has a constant supply of fresh air, and the means of escape for the air fouled by human breath and exhalations, and by artificial light. The lantern-maker learned this lesson long ago. He found out that when the door was shut, the light gradually went out; and he eventually had to make a hole at the top for the foul air to get out, and one or several at the bottom for the fresh air to get in. Most rooms have fire-places, doors are often opened, and windows occasionally. Most materials are pervious to air, and most work is ill-fitting, so the health of the occupant of a room is only damaged; he is not suffocated, or the fault of having no permanent ingress and egress for air would have been corrected before the lantern was invented.

The Egyptians found this out, as there is a vent for the air to enter, and another for the air to go out in the chambers of the Pyramids. Easy means of well warming the house must be provided. It must be furnished with a sufficient supply of good water for drinking, cooking, washing, and cleaning; and this water when used, and all excreta, must be carried away from the site; as well as the water that falls upon the house; the house, too, must be free from bad smells and pernicious gases, and be so made that it is not too easily heated by the sun, nor chilled by the cold.

When a house is built in the open country, care must be taken to remove it from undrained and marshy ground, from the immediate neighbourhood of trees or woods; to place it where it is not overshadowed by mountains, and neither scorched by the sun nor exposed to piercing winds. In this case, too, the rooms should be so arranged that the light enjoyed by them comes from the right quarter; from the north for libraries, picture galleries, beer cellars, larders, and dairies; from the south for drawing-rooms and nurseries; from the east for bedrooms; and from the west for dining and tea rooms.

Time will not admit of the description of the requisites for all sorts of houses and mansions, much less for all the buildings that are required by man.

#### Architecture as a Fine Art.

The one main requisite is that every part and the whole should be in harmonic proportion, for without that architecture as a fine art can scarcely exist.

Geometrically speaking, the line A B is said to be harmonically divided when the two points, C on the line, and D on its continuation, are so placed that  $A C : C B :: A D : D B$ ; then C D is an harmonic mean between A D and B D. Whether we see any charm in these proportions or not does not matter, for there can be no doubt that certain proportions are much more agreeable to the eye than others.

Æsthetic architecture and music consist in the proportioning of one part to another in such ratios that in one case the cultivated eye, while in the other the cultivated ear, receives delight.

an excellent planner, but I do not know works, mostly consisting of alterations. Claremont," the one house he built, cannot be said to have a brilliant plan. In making elaborate plans, where many rooms are required, of various shapes and

sizes, the cutting out in cardboard the rooms and passages is often of assistance. Planning should be carried on simultaneously with the other architectural studies, but it can only be finally perfected when the æsthetic part has been mastered too, for the architect must



According to Vitruvius, many Greeks and some Romans wrote treatises on harmonic proportions, but all these treatises are lost, and this science can only be recovered by carefully measuring the remains of Greek buildings, and calculating the ratios. Thanks to Mr. Penrose, much of this has been done for us, and we are able to see and appreciate the subtle methods by which optical defects were not only cured, but turned into beauties; there is a treatise on this subject by John Pennethorne, the brother of Sir James Pennethorne,—the only attempt I know in England to elucidate this subject. M. Aubas has also written on the subject, and on the "Scamilli impares" of Vitruvius.

I know of no better way of training a man in proportion than to make him draw out the Greek orders and buildings, and to make careful analyses of the proportions, until his eye gets so skilful that it serves him, like Michelangelo's, instead of compasses. When the pupil has trained himself in this way, he should continue his studies by calculating the ratios of other fine buildings.

I have told you before that the exquisite proportions of the Reform Club were to some extent due to Sir Charles Barry having had the ratios of all the fine Italian palaces carefully calculated, and taking a mean of them for his guide. Sir Charles was, however, specially gifted, if I may be allowed this heresy; at least, all his buildings are characterised by admirable proportions, and if you object to attributing superior genius to any one, let us say he studied the subject more, and make our peace with Buffon, who described genius as the gift of taking pains.

In one very important respect architecture is not like music, for music is purely for delight; it has no substructure, and when its sounds have ceased, there is an end of it; but architecture has not only the substructure of building, but the building itself is for some human need, and its actual proportions have been doubly restricted, i.e., by the necessities of the building, and by the cost.

Architecture, therefore, is like pure geometry, a problem to be solved under restrictions. It is only by skill and artifice that harmonic proportions can be given to buildings whose length and height are determined on other principles, or that have their stories not arranged harmonically; and this is mainly done by means of strings, pilasters, panels and mouldings, &c. Invention, too, is to be shown, and the art of composition. Invention is a natural gift; the great architect is a poet in stone, and as Horace truly says:—"the poet is born and not made," though Ben Jonson corrects part of this too sweeping assertion by the remark, that "poets are made as well as born," by which I understand that however great the native poetic genius may be, a great deal of study is needed as well. By many it is believed that no man should be an architect without possessing fertility of æsthetic invention. In composition there are many rules, and some, if not all, of these can be learned, but I shall not enter on these laws now.

It seems to me that if any one can construct soundly, can plan conveniently, make his building fit for its purpose, and can put it into harmonic proportions, we cannot withhold from him the title of an architect. He may not be a great architect, for this requires that he should construct daringly, plan brilliantly, exhibit more than ordinary fitness in his building, and give novelty, exquisiteness, or marked and appropriate character to his building.

It seems to me that if a building is well planned and made fit, it must have the character of its purpose impressed upon it. Supposing Mr. Zola's remarks on modern churches in France be true, they could only show that the architects had not sufficiently studied the necessities of churches, though I by no means agree with him. The new church of St. Augustin, in the Boulevard Malesherbes, is to me a most characteristic and beautiful church, and I fancy that the habit of seeing most churches of the Gothic type has insensibly warped his judgment. This is what he says:—"Have you remarked what sort of churches they build nowadays? They resemble anything you like,—libraries, observatories, pigeon-houses, barracks, but surely no one is convinced that the Almighty dwells therein."

No architect, I imagine, would leave his buildings without sculpture if he could help it, and by sculpture I mean all carving,—whether

of ornament or figures,—and few would not call in the painter's aid as well, for it is his art to deal with colour.

It seems at first as if light, shade, and shadow were only the necessities by which the shape of buildings, and their parts, are shown, and that it is as unnecessary to mention light and shade as to say that a project can only be exhibited by models or delineation; but on reflection we shall be convinced that they fulfil certain functions of their own. Shadow alone is perpetually forming new shapes; shade is the spirit attached to light, relative projection, and to modulation of surface; but daylight and moonlight shadow is dependent not only on projection, recesses, and modulation of surface, but on centres of light and motion. Too little regard is paid to these conditions. Which greatly depend on climate. A different treatment is wanted in Egypt,—where the sun is constant and powerful, and where the moonlight is as bright as our sunlight,—from that in Greece or Italy, where though the sun is generally bright, it is less powerful; while in England and the West, shade rather than light is the important consideration, as the air is too often thickened by mist, and the sun is too often invisible, and where to design surfaces for sunlight is to have them spoiled for too great a portion of the year. We had better have buildings look harsh in clear sunshine than have them obliterated for the best part of the year. Small fluted columns high up in a building might as well be plain on dull or misty days; then all fine ornament is obliterated, and delicate mouldings meant for sunlight become at once tame, dull, and ineffective. Nothing can be duller than the Doric of the Greeks in London, but how superb and beautiful in Magna Græcia. Nothing can be finer than the lace work of the Ducal Palace at Venice, shadowed on the wall, or the fretwork of the pierced eaves-boards on the walls at Cairo; but here these effects are generally lost, and unless you see the parts themselves black against the sky they produce no effect. Much too little attention is given to what should be one of the architect's most important observations, the precise effect he is to gain by duly-proportioned projections and recesses, and to the shape of his mouldings; they are too often designed in modern work for sunshine, so that when seen in dull and misty weather,—the bulk of our weather here,—they lack the effect intended. In respect to observation of the effects of climate, the Gothic architects are worthy of all praise. We may like or dislike the proportion or the shape of their mouldings, but they are made to be effective in the duldest weather. In a succeeding lecture I hope to explain mouldings more in detail.

There are a few points I wish to advert to. Although I think that buildings with good harmonic proportions would always give satisfaction to the educated eye, we must not forget the adage that "the human mind is greedy of novelty," and, in the present century, the taste in architecture has been nearly as changeable as the taste in dress. Greek, Italian, Gothic, and the different forms of European Renaissance, have followed one another with remarkable swiftness; the only one that has not been imitated is Early Italian Renaissance, whose effect is greatly due to sculpture. Interspersed with these, a few cases of almost all known styles have been imitated or paraphrased. Whether anything at once stable and progressive is to come out of the present chaos I cannot prophesy, but it is quite evident that unless it does, any architect, however able or fashionable, who is wedded to one scheme of proportion, may find himself left, like some pre-Adamite animal, without the means of subsistence. So let me hand down this warning, given by Professor Cockerell from this Chair to the students of his day. I will give one instance, that of Decimus Burton, born 1800, died 1881, who practised in the Romano-Greek style, and whose triumphal arch and screen still stand; one on Constitution Hill, and the other forming the entry to Hyde Park, nearly opposite. The *Builder*, in speaking of his death, says:—"Mr. Burton's long life is only just terminated, and yet the method of architecture he practised during a long professional career is already like a vanished dream." Another point is the distinction to be made in the treatment of different classes of buildings, and the different treatments require different studies. In designing small private houses, shops, and small villas, lightness, elegance, even eccentricity, may be allowed; whilst in

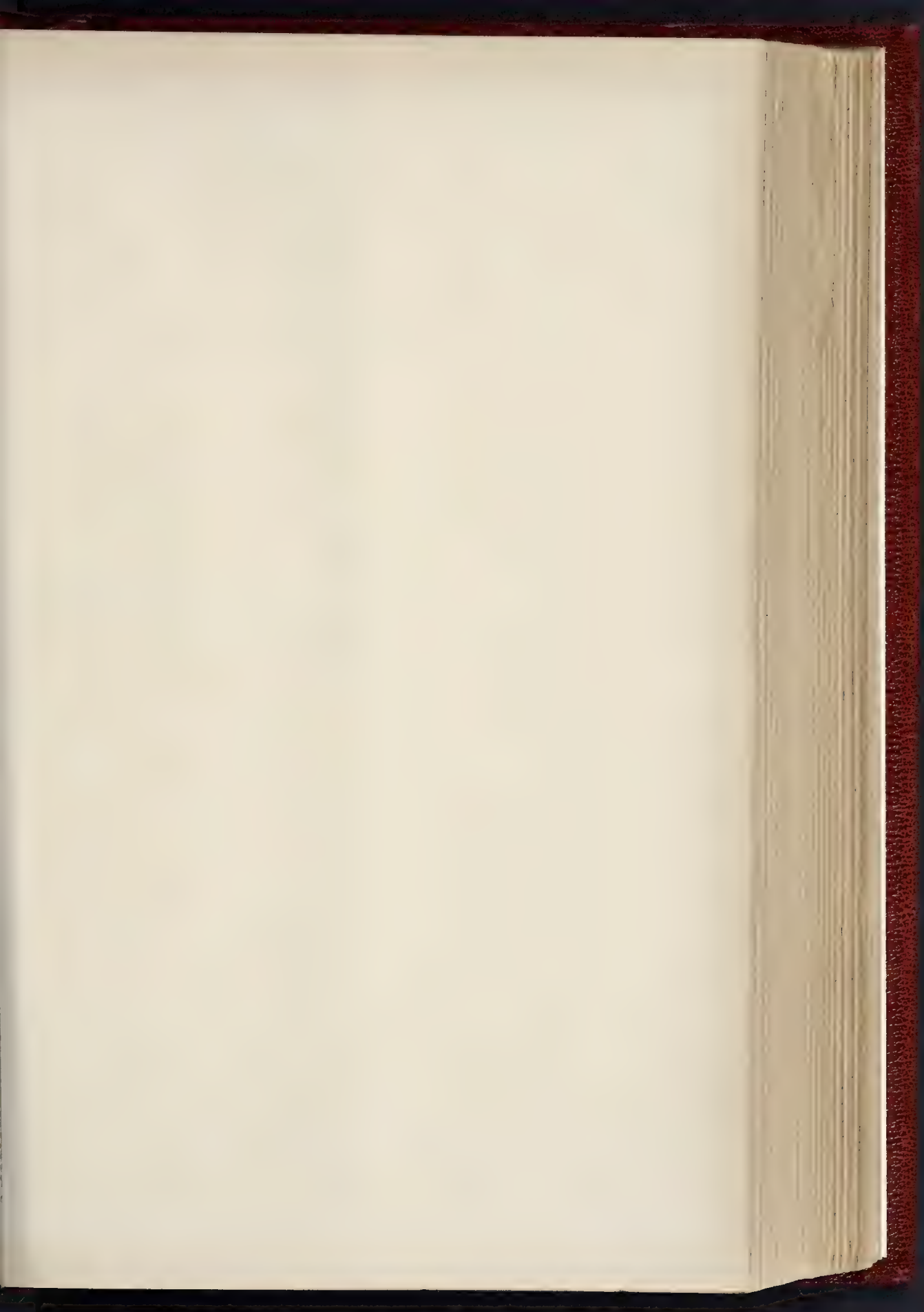
the mansions of judges, great soldiers, great sailors, and great statesmen, a greater character of dignity is required, for they are the sort of halfway house between private and State buildings. The halls for great corporations, whether of doctors, musicians, men of science, merchants, bankers, traders, or towns, require not only greater size and importance, but a certain gravity; theatres are to be treated differently to parish churches and chapels; and at the head of all are buildings for the State, for the Crown, and for the greater functions of religion, which require grandeur, sublimity, and the last efforts of perfected art. You can no more appropriately reduce a temple into a parkkeeper's lodge than you can enlarge an appropriate lodge into a stately mansion or an office of the State. Buildings should be designed from the inside; the proper plan should make the proper building, but much more can be allowed to individual caprice in small private buildings than in great public ones, in which there should be exhibited a greater nobleness and dignity; so that even the uneducated public should discern that the building was for the purposes of the State. Size alone requires a different treatment, and knowledge of the effects produced by distance, and we may even sacrifice some slight convenience for the sake of symmetry, grandeur, and dignity. Most of the great architects of the past caught the grand style by careful measurement, observation, and calculation of the proportions of the ruins of antiquity, but this study seems now to be abandoned. Hence we have but few architects amongst us to whom grand public structures can be safely entrusted.

A very able French architect made the remark in my hearing:—"I have seen a vast number of English buildings in the United Kingdom, and nothing can be more charming and original than the smaller private buildings; every want seems to have been considered, every difficulty carefully worked out, and never unfrequently a beauty made of it; but I cannot say this of your public buildings."

In the present day curious notions are abroad that each class of building is best carried out in a different style. This is, of course, an abominable heresy, and merely results from the present jumble of styles. At each period of the so-called styles originated there was a thought of such a thing. Civil, military, æsthetic, small, middling, and great buildings were built in the same style, and only differed in their shape, size, greater dignity, and amount of elaboration, and when we get a style they will again be the case.

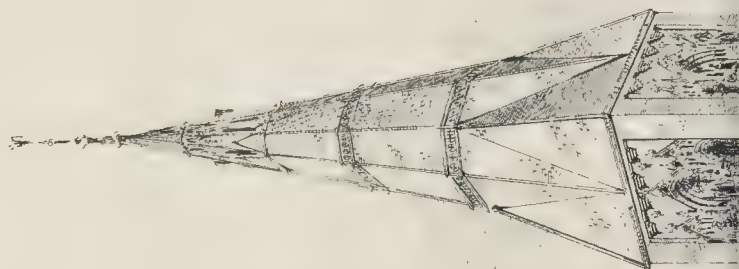
The students of the present day resolutely set their faces against iron. They know nothing about it, and do not want to know anything about it, and do not want to know anything about it. Is this wise, even in the lowest and most meagre sense? Every section that is published of any important modern building, whether at home or abroad, bristles with iron girders, iron columns, and iron stanchions. In warehouses and workshops the employer will not have the space at his command wasted, nor his building encumbered by huge piles of brick or stone. In large rooms, deep enough will not be given for long girders, one span, and iron columns have to be introduced. In our narrow streets, and with our dusty and misty atmosphere, shopkeepers will have all their light obstructed, nor their opportunity of exposing their wares restricted, by having the greater part of the fronts of the shops dead wall. Why, then, should the student object to study that, which they will almost certainly have to use, and be wholly in the hands of engineers and ironfounders in making construction, and the papier-mâché making for their ornament? But I put it on me, higher ground,—you have to your hands a new material in several conditions, each with peculiarities, advantages, and disadvantages inherent in it. I speak mainly of cast-iron wrought-iron and steel. What can better your real skill in designing than these new materials, absolutely unhampered by any tradition? If you were fired with any noble ambition, or were even desirous of furthering your art, nothing could be more fascinating than the endeavour to bring these new materials into the domain of architecture. None are more ready to exclaim against the monstrosities and abortions of the engineers than young architects; yet they decline the attempt to bring the constructions within the pale of architecture.

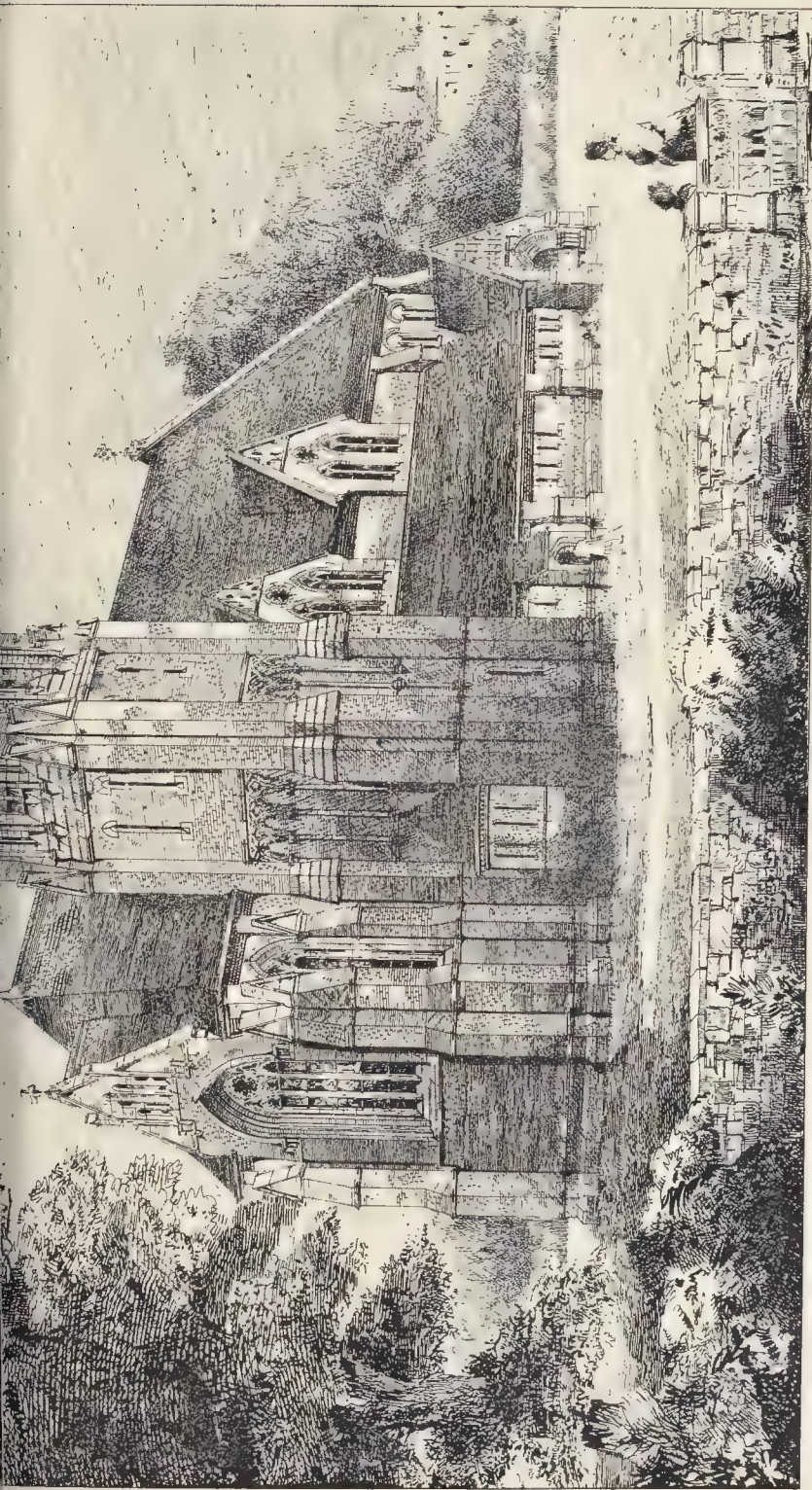
As far as I can judge, the ambition of the





THE BUILDER, FEBRUARY 27, 1886





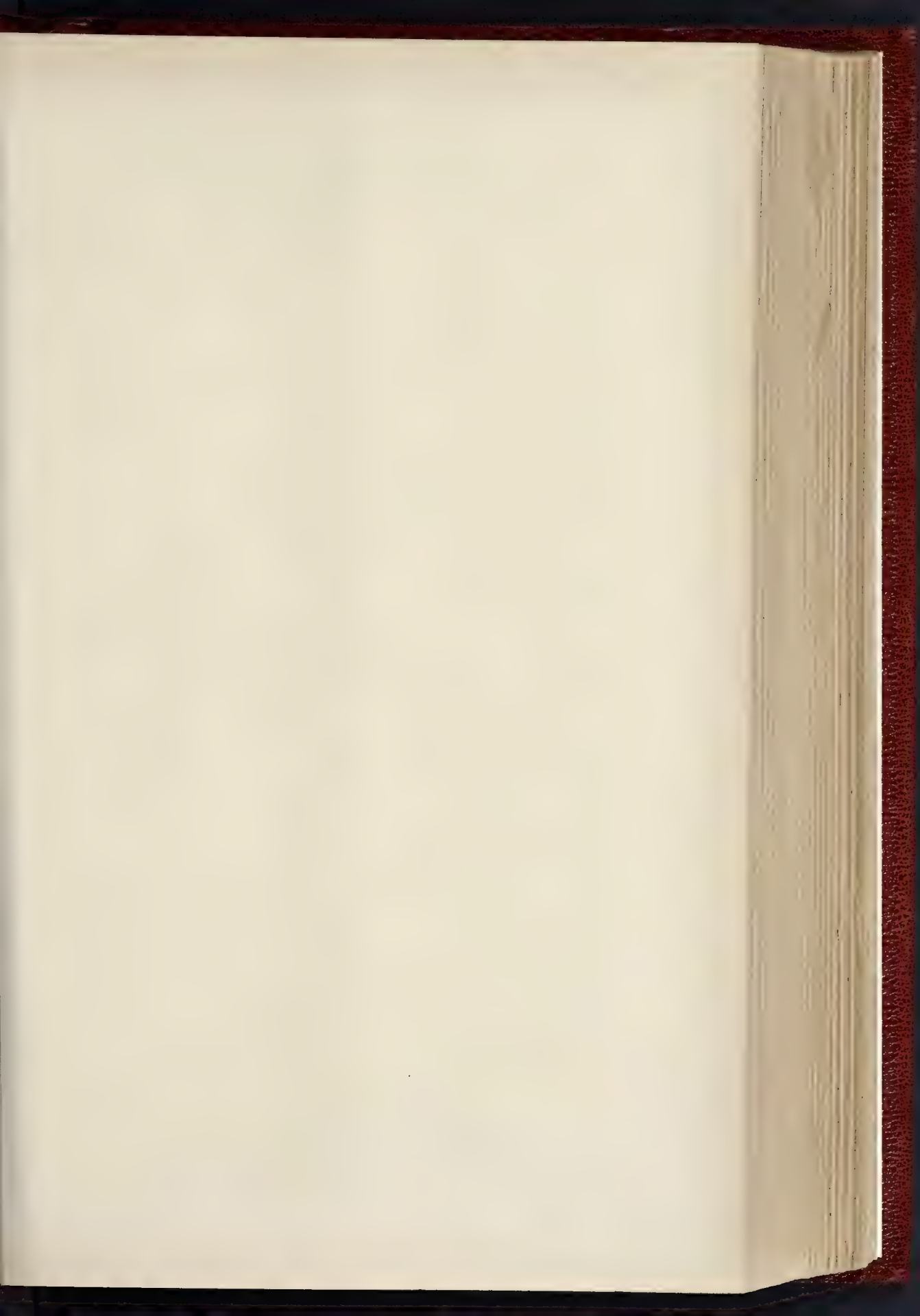
CHURCH OF ST. MICHAEL AND ALL ANGELS, WALTHAMSTOW. MR. J. DUGGELL, ARCHT. T.

EXTERIOR VIEW.

PHOTO L. H. SPRAGUE & CO. - OGDEN

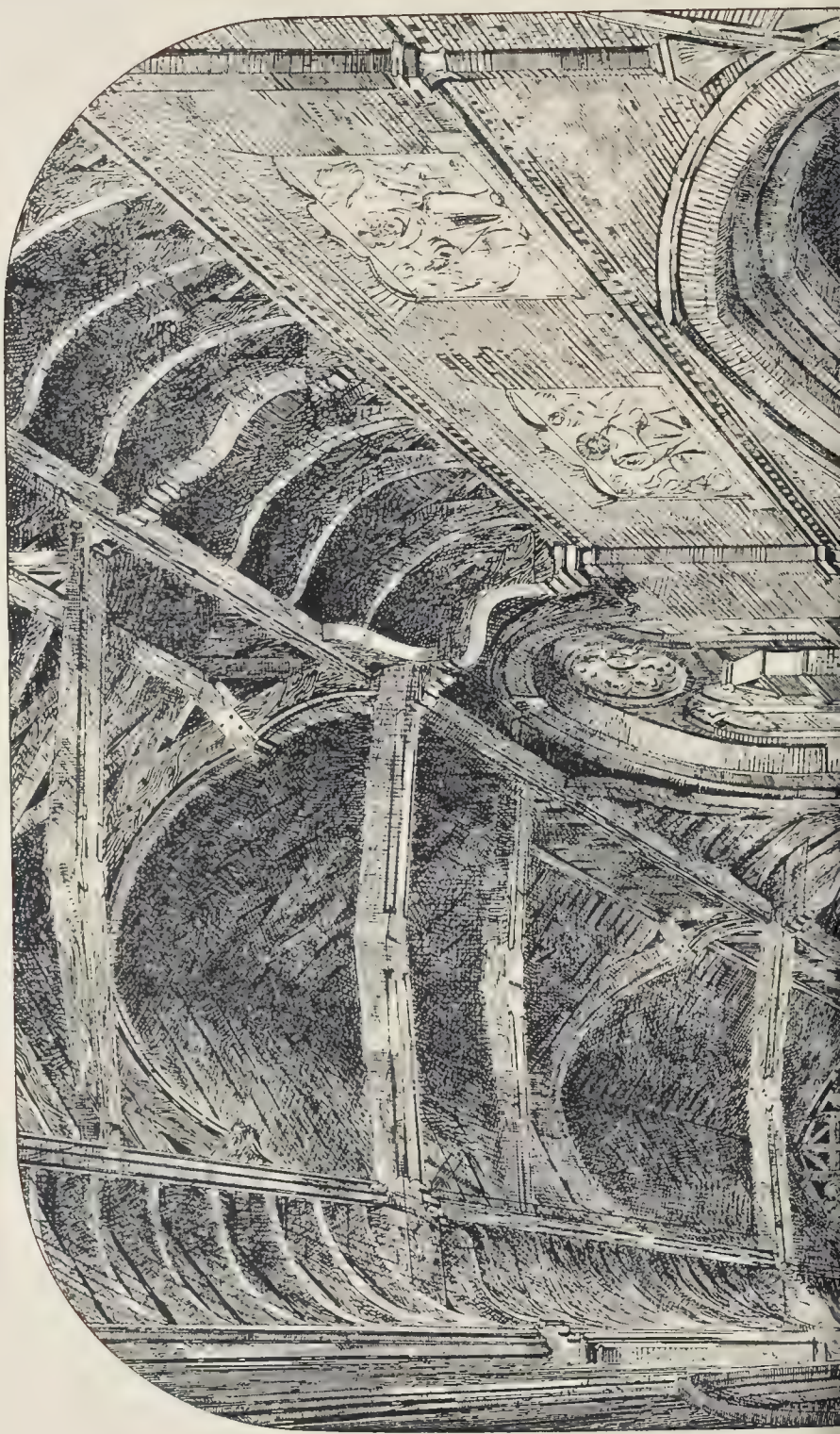








THE BUILDER, FEBRUARY 27 1886





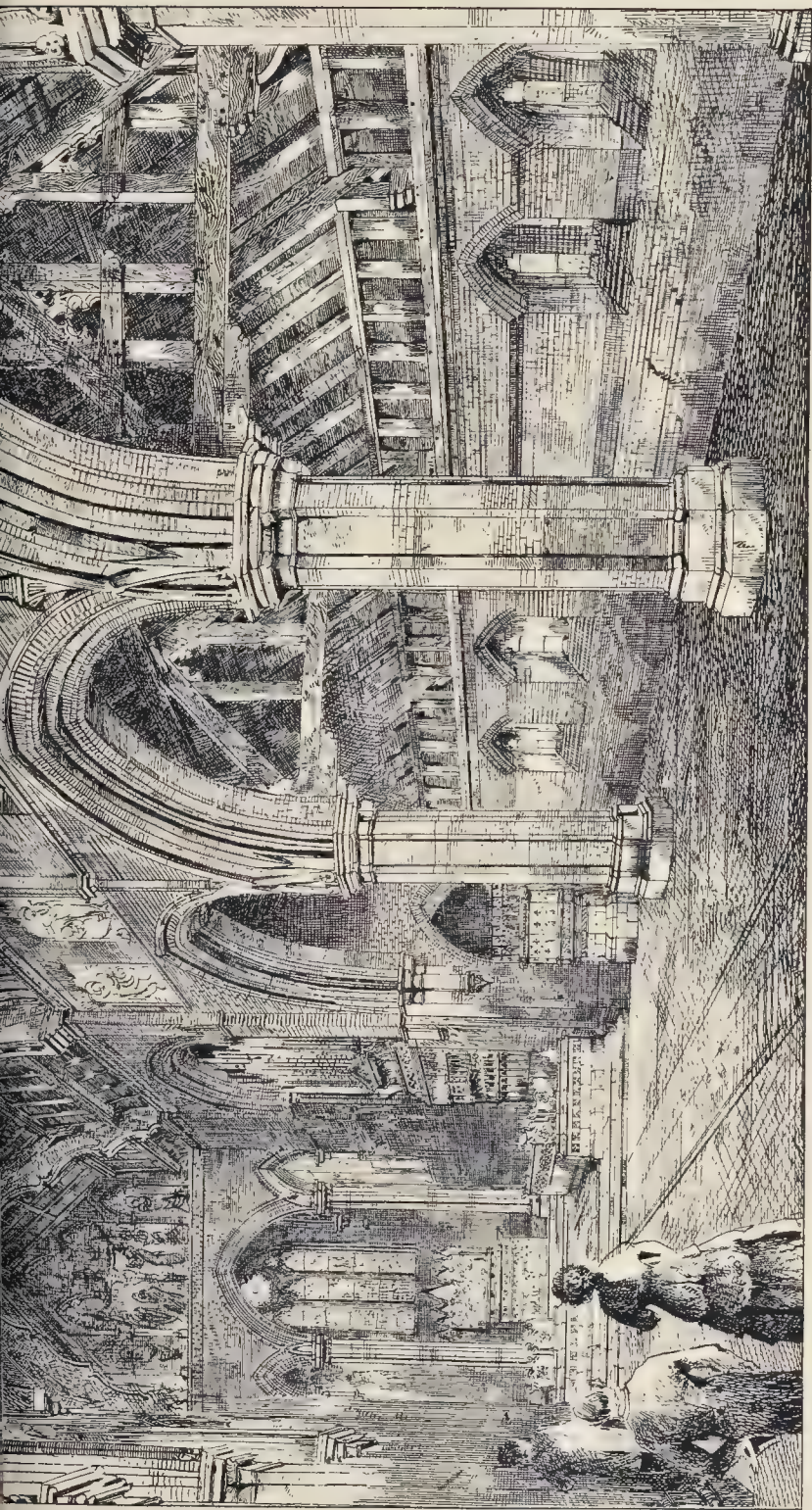


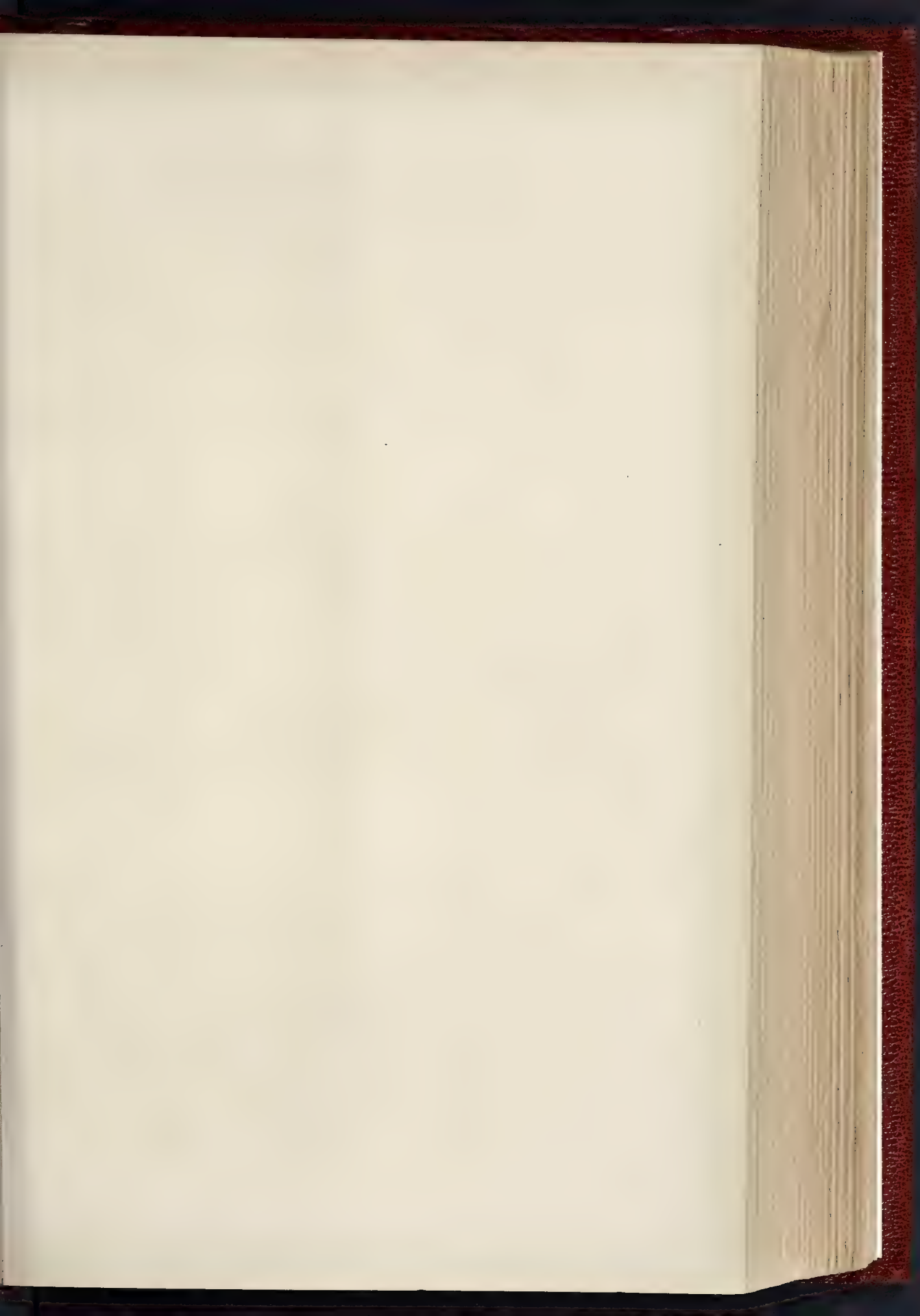
PHOTO BY THE SPHAGLE & CO. LONDON

CHURCH OF ST. MICHAEL AND ALL ANGELS, WALTHAMSTOW.—Mr. J. BIGNELL, ARCHITECT.

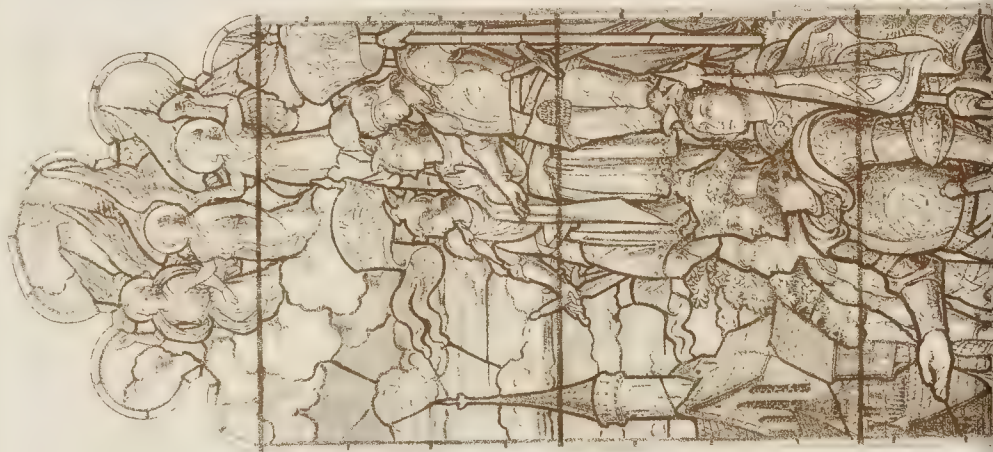
INTERIOR, LOOKING EAST.







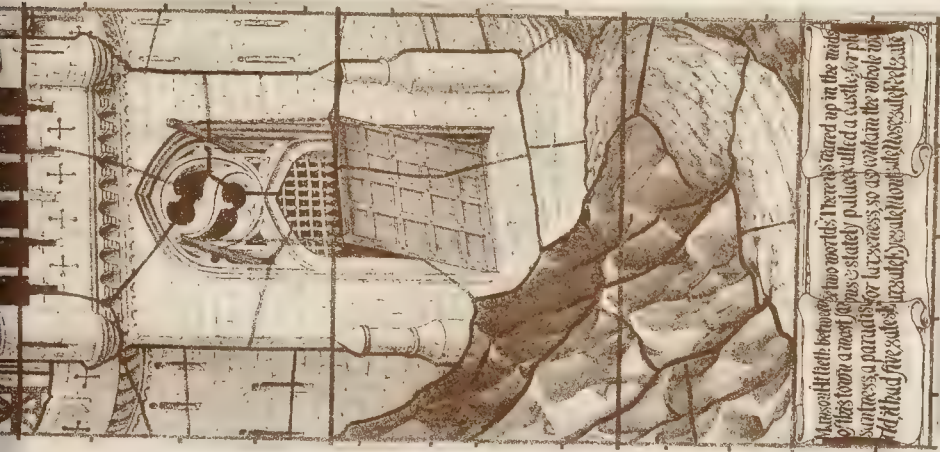








Well upon a time there was one Diabolus made an assault upon this famous town of Mansoul, and to take it, and possesse his own habitation. This Scourge was king of the Plagues, and a most cruel prince he was.



Mansoul it hath bene, two worlds there is tured up in the mind of his town a most glorious stately palace, called a castle, for place, sometimes a parliament for largeness, so as within the whole town it had five gates, namely, of knowledge, of holiness, of justice,

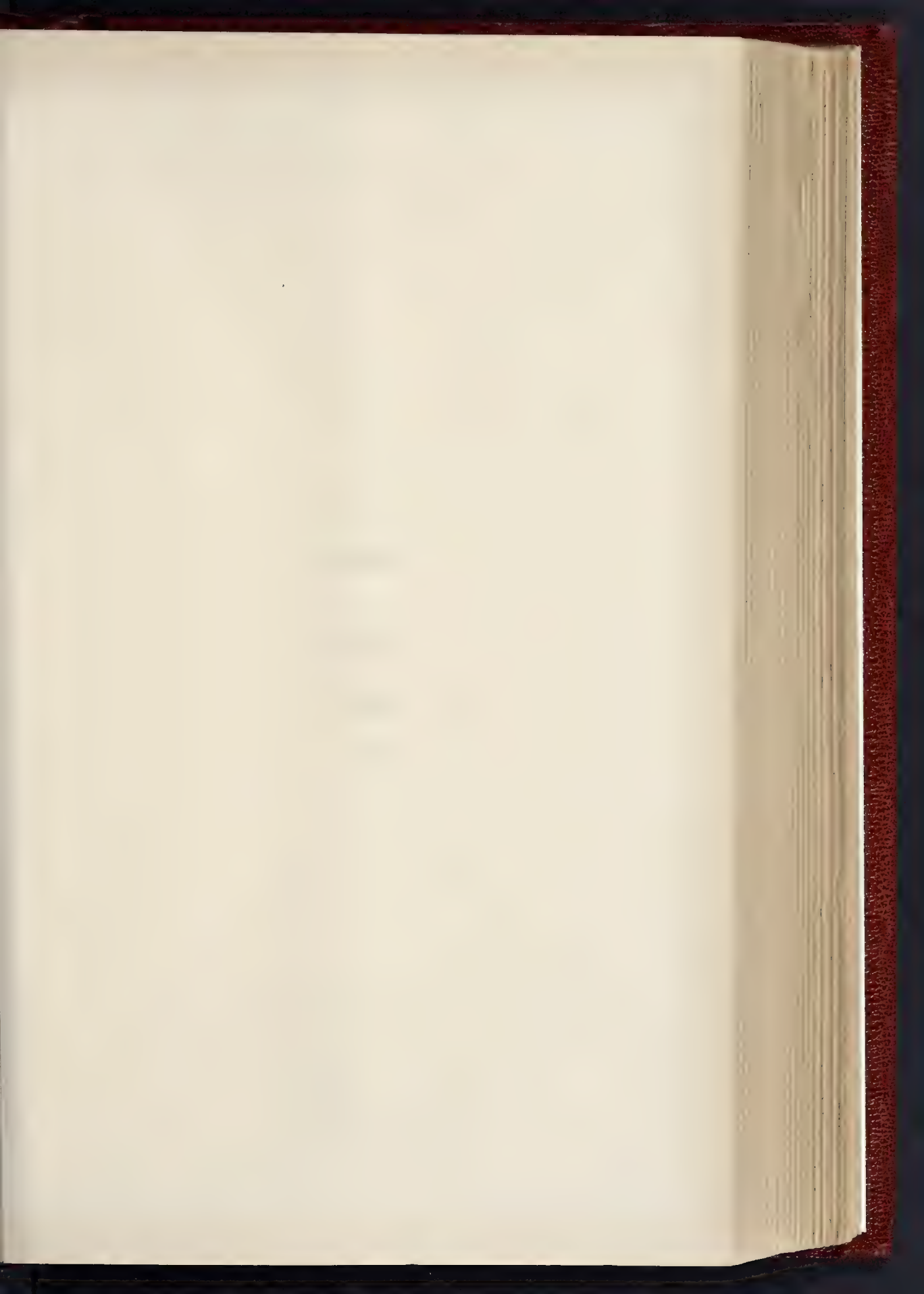


Unmarried, and to make war upon the Giant Diabolus, even while he was possessed of the town of Mansoul, and that he would take by strength of hand, drive him out of his hold, and take it to himself to be his habitation.

WINDOW, ELSTOW CHURCH—DESIGNED BY MR. T. W. CARR. EXECUTED BY MESSRS R. W. WINFIELD & CO. SUBJECT FROM HUNYAN'S "HOLY WAR".

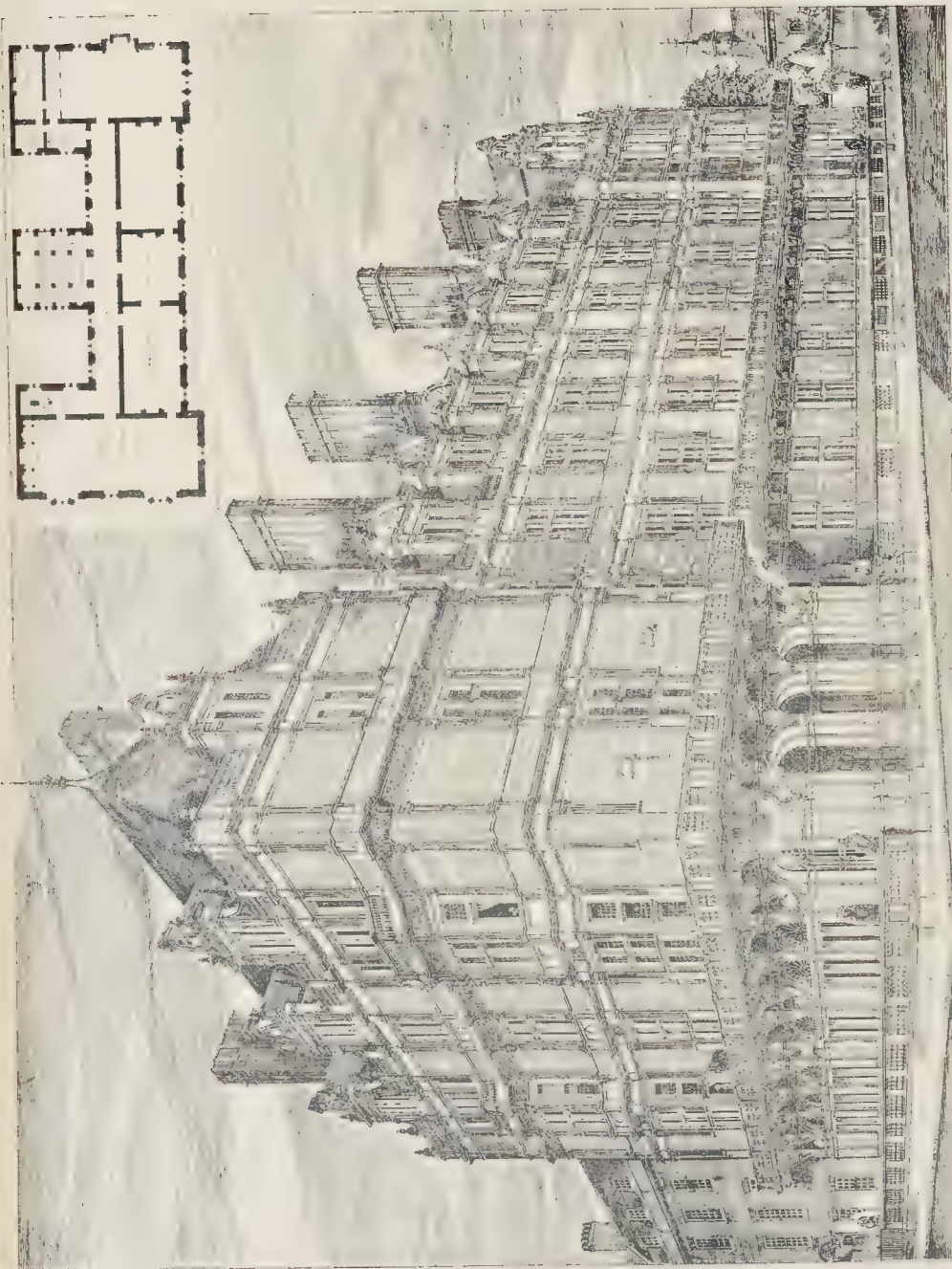




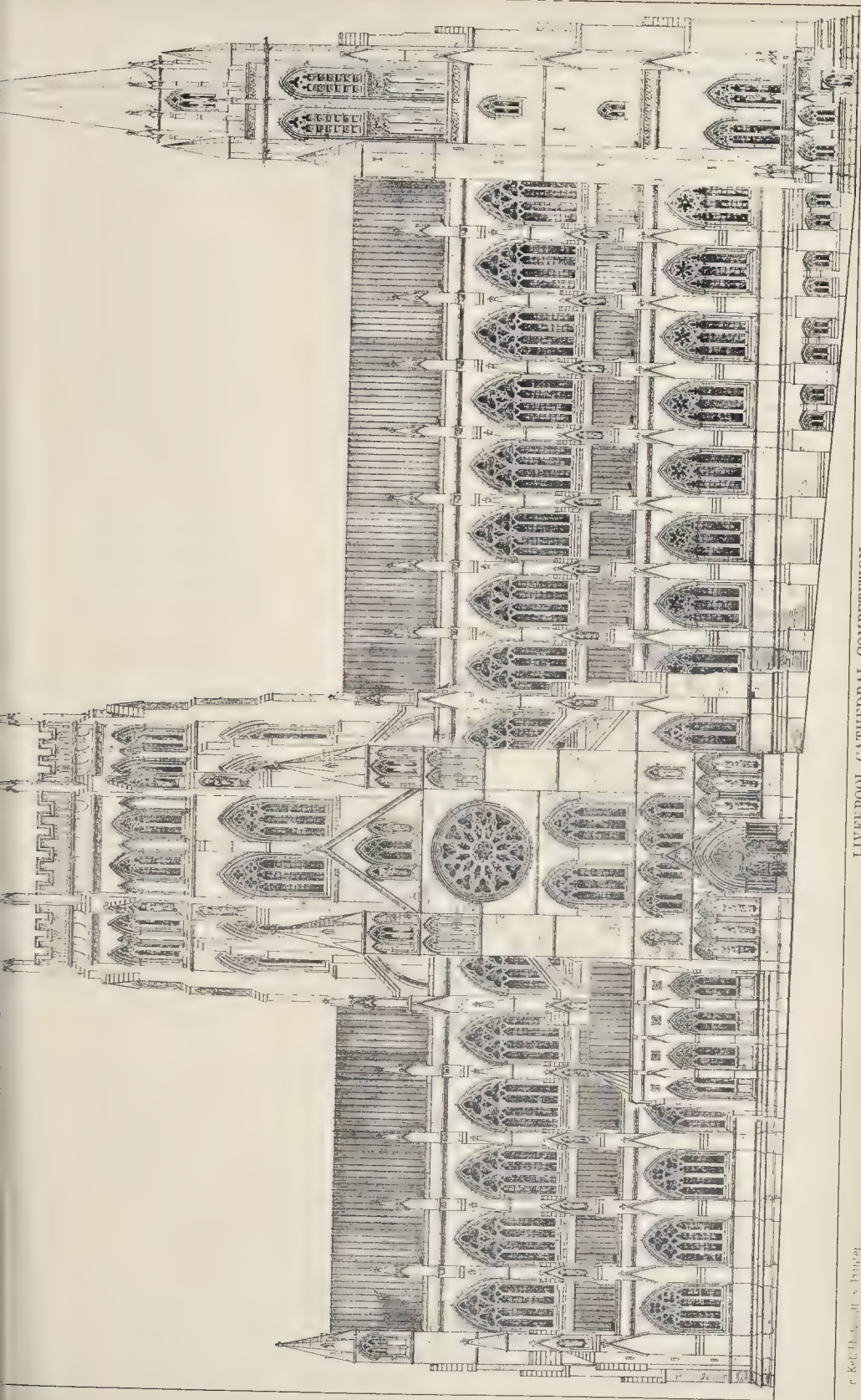




THE BUILDER, FEBRUARY 27, 1888



DESIGN FOR A TOWN MANSION, BY MR. H. O. CRESSWELL.



W. & A. G. & Co. Ltd.

# LIVERPOOL CATHEDRAL COMPETITION.

DESIGN BY MESSRS. G. F. BODLEY, A.R.A., AND T. GARNER.

NORTH ELEVATION, SHOWN WITH THE LANTERN ONLY, WITHOUT CENTRAL SPIRE.

Scale: 1/4" = 10'.





rising generation of architects is to be purely designers, to forego the masculine and grand work of constructive architecture, to fit themselves to be "the young men clever with their fingers" who are employed by the builder and the engineer to redeem their work from absolute barbarism. If, with this ideal before them, they will not even take the trouble to emerge from commonplace routine, the sooner the whole generation is swept away, into some more useful channel, the better.

## Illustrations.

### WINDOW, ELSTOW CHURCH.

THIS window, executed by Messrs. R. W. Winfield & Co., has been recently fixed in Elstow Church. A previously-executed window by the same firm, and in the same church, was occupied with subjects from Bunyan's "Pilgrim's Progress." The present one illustrates Bunyan's allegory of the "Siege of Mansoul," in the "Holy War." The following description is reprinted from a portion of an account furnished to the *Birmingham Daily Post* at the time the window was put up:—"The central light of the window represents the town of Mansoul. The text which it illustrates runs as follows:—'It lieth between two worlds. There was reared up in the midst of this town a most sumptuous and stately palace, called a castle, for easiness a paradise, for largeness so as to contain the whole world. It had five gates, Bargate, Ryegate, Mouthgate, Nosegate, and Eelgate.' Bargate is placed in the front, and the main street leads, with buildings right and left, to the citadel, which is surrounded by a triple wall, with gates and towers, and rises to a great height in the centre of the town, and occupies the principal part of this light. On the left side (looking at the window) is the city of Diabolus. The chief figure is Diabolus in consultation with Beelzebub. Below, behind, and above are Alecto, Lucifer, Appollyon, and other officers, waiting for the descent upon the town, with their banners. Below are the emblems of disease, and death and destruction are further indicated in the withered leaf, grass, flame, bones, &c. The tone of this light is low in colour, as suited to the character of a subject. In the opposite panel Emmanuel stands in armour of light gold and silver, and crowned, surrounded by Captains Good hope, Credence, Charity, Innocent, Patience, and their ensigns. Above, angels rejoice at the prospect of the recovery of the city, and below the emblems of Life, Purity, and safety are indicated in the springing flowers of various kinds and hues in their bright array. The tracery lights are filled with Emmanuel's signs, and the text illustrated runs along the top of the window." This and the "Pilgrim's Progress" window occupy the east end of the church, and south aisles of the parish church of Elstow, Bunyan's native village, and are designed by Mr. T. W. Camm.

### LIVERPOOL CATHEDRAL COMPETITION.

DESIGN BY MESSRS. BODLEY & GARNER. We give this week the north elevation of Messrs. Bodley & Garner's design, but with the central spire omitted, showing a central element of the crossing more on the lines of that at Ely, which suggested the plan. On the design as exhibited at Liverpool there was placed so as to cut off the spire at pleasure, to show the effect of either treatment. The central composition with the lantern only, to our thinking, very harmoniously; but were adopted, it would be desirable in that to give rather more height and importance to the western towers and spires, the whole of the composition being altered by the omission of the central spire.

### DESIGN FOR A TOWN MANSION.

This design was submitted in December last in competition for the Biennial Gold Medal and the Alling Studentship of the Royal Academy, but the judges considered that its author, Mr. H. O. Cresswell, had failed to comply with the condition as to the limits of the design, and declined to consider it. The house had been planned and the design dignified and expressive, so that, without questioning the

justice of the decision regarding it, we must regret that the rules of the Royal Academy did not admit of its exhibition with the other designs at Burlington House. The plan given is that of the first or principal floor. The successful design was illustrated in our issue of December 26th, and we hope shortly to give some of the others.

### ST. MICHAEL AND ALL ANGELS' CHURCH, WALTHAMSTOW, ESSEX.

THIS church, which will accommodate 823 persons, was consecrated on the 18th of November last by the Bishop of St. Albans. The walls are built of stock bricks, with red brick band and arches. The tracery and other parts are of stone. The style of the architecture is Early Decorated. The cost was 800*l.*, exclusive of tower and north porch. The schools, which are built, join the church by a cloister at the southwest corner, and the parsonage-house will be commenced in the spring.

The length of nave and aisle is 104 ft.; width of nave, 28 ft.; total width of church, 56 ft. 4 in.; length of chancel, 27 ft.; aisle, 10 ft. wide; height of chancel to wall plate, 39 ft. 6 in. The roofs are open timber, covered with tiles. The flooring is wood-block with open skeleton seats. The side chapel is formed out of the eastern bay of nave arcade. The baptistery is at the west end. The windows in the morning chapel and baptistery are all filled with stained glass.

Mr. J. M. Bignell was the architect, and Messrs. Adamson & Sons, of Putney, were the builders.

### LIVERPOOL CATHEDRAL DESIGNS.

(In the High Court of Justice, Chancery Division.) Before Mr. Justice Kay, Feb. 25, 1886.

COX AND ANOTHER v. BRADLEY AND ANOTHER.

THIS was an action by the proprietors of the *Builder* Newspaper against the printers and publisher of the *Building News* for an injunction to restrain the defendants, their servants and agents, from publishing, printing, selling, or circulating in the *Building News* any photographic, lithographic, or other copies of designs for the Liverpool Cathedral taken from plates published by the *Builder*, and for damages for infringement of copyright.

Mr. Hadley appeared for the plaintiffs, and Mr. Swinfen Eady for the defendants.

Mr. Hadley said.—This is an action by the proprietors of the *Builder* against the printers and publishers of the *Building News*, in respect of the copying, by a photo-lithographic process, of the *Builder's* plates of the Liverpool Cathedral. Since the notice of motion,—leave to serve which with the writ was given by your Lordship,—the defendants have confessed that they have been doing that which was wrong, and Mr. Swinfen Eady is instructed to consent to a perpetual injunction in the terms of the notice of motion, and to pay all costs, the plaintiffs waiving the question of damages. The action, therefore, stands in this way: the plaintiffs take a perpetual injunction in the terms of their notice of motion, as regards copying the *Builder's* plates of the designs of the Liverpool Cathedral, the defendants paying the costs.

Mr. Justice Kay.—Let it be so.

### ARCHITECTURAL SOCIETIES.

*Architectural Association.*—The next meeting in connexion with the intended excursion to Italy will be held at 9, Conduit-street, on Tuesday next, the 2nd of March, at 6-30, when the subject of Renaissance work at Rome will be considered.

*Birmingham Architectural Association.*—The fourth ordinary meeting of the current session was held at Queen's College, Paradise-street, on Monday evening last; Mr. John Cotton (Vice-President) in the chair. The following gentlemen were nominated for membership:—Mr. T. N. Parr and Mr. F. W. Baker. A paper was read by Mr. W. Henman on the "Construction and Arrangement of Staircases," which was fully illustrated by diagrams, sketches, &c. A discussion followed. A vote of thanks, proposed by Mr. T. P. Osborne, and supported by Messrs. T. Newton, F. Peacock, J. Cotton, and the secretary, was unanimously accorded to the lecturer. After a lengthy response by Mr. Henman to the many questions propounded, the meeting terminated.

### COMPETITIONS.

*New Public Offices, West Hartlepool.*—Mr. Alfred Waterhouse has acted as assessor in this competition and awarded the premium to Mr. R. Knill Freeman, of Bolton-le-Moors. There were thirty-one competitors. At the meeting of the Commissioners, held on the 16th inst., the award was confirmed, and Mr. Freeman appointed as architect to carry out the works.

*Kingston Infectious Hospital Competition.*—On Wednesday, the 17th inst., the members of the Kingston Rural Sanitary Authority were engaged in making the selection of designs sent in for this hospital, the result being as follows:—The first premiated design was that under the motto "Efficiency with Economy" (Messrs. W. Jacob Gibbon & W. H. Woodroffe); the second premiated design was "Three Fishes" (Messrs. Carritt & Monier Williams); the third was "Isolation" (Mr. Charles Boil). The design placed first consists of an administration block, three isolation-ward pavilions, and a laundry &c. block, with a suggested alternative special isolation and probationary ward pavilion. A feature specially considered in this design was the ventilation and drainage, of which elaborate details were given. The system of drainage adopted was to treat all slop-water by the process known as "Intermittent Downward Filtration," which consists of evenly and intermittently distributing the slop-water over a well-prepared area of land and collecting it after filtration by under-drains, the effluent water being discharged in a pure condition. Earth-closets are used throughout. The cost of the buildings, &c., will amount to some 6,000*l.*

### THE PRESERVATION OF TIMBER.

AMERICAN engineers appear to be awaking to the fact that even the vast stretches of forest land within the Union will not supply timber for ever at the extravagant way in which it is now used. With a view to stopping, as far as possible, one important source of waste, the American Society of Civil Engineers appointed a committee in 1880 to inquire into the best means of preserving timber from decay, and their report has just been published in their Transactions.

The leading methods of preserving timber in use in the United States appear to be the following:—(1) Kyanizing, which is an application of corrosive sublimate; (2) Burnettising, or the use of chloride of zinc; (3) creosoting; and (4) Boucherie's process, which is an application of sulphate of copper.

The result of exhaustive and long-continued observations showed that kyanised timber is well adapted for bridges, trestles, fences, and exposed structures generally, but for railway sleepers, pavements, and other works, subject to damp the system is not so well adapted, as the corrosive sublimate is apt to get washed out. The floor of an engine-house in Charleston was treated in this way because the location was very damp, but the wood decayed apparently as fast as if no special precautions had been taken.

In Burnettising chloride of zinc is used instead of chloride of mercury, and this process appears to be better suited to sleepers and work of the kind than for bridge work. Pine timber Burnettised becomes brittle, and when zinc solutions weak enough not to impair the strength of the timber are employed, they are likely to be washed out by rain. Creosoting is too well known in England to require dwelling on here, as, by the law of the survival of the fittest, it has been proved to be the best means of preserving timber in almost all instances. Creosote, however, is dear in America, and the price of labour also tells against the application of the system in the United States. On the whole, the Committee came to the conclusion that it would be cheaper in most cases to let the timber rot, and replace it, than to incur the expense of creosoting it.

Dr. Boucherie's method of forcing a solution of sulphate of copper into the timber with the grain is well known in France, where it has been in successful operation for many years, but the Committee finds many objections to its use in America. The logs have to be treated on the ground when freshly cut, and, putting aside other inconveniences, the frost would prevent the application of the system, especially in the



Northern States, where the timber is cut in the winter.

Among other systems experimented on was the Earle process, which consists of immersing timber in a hot solution of sulphate of copper and sulphate of iron. The durability of the wood was in this way increased, but the strength was impaired, and it became so badly warped as to be useless: the system was therefore abandoned. Lime and salt were both used for impregnating timber, but with poor success, and charring it gave unsatisfactory results. A dry powder, consisting of salt, arsenic, and corrosive sublimate, was introduced some years ago. It scarcely had a fair trial as a system of timber preservation. Railway sleepers treated with it were eagerly licked by cattle for the sake of the salt. The line was strewn with dead cows for ten miles. The farmers rose in arms, and forced the railway company to take up and burn the sleepers.

In an appendix to the report, comparison is made between the respective merits, from a financial point of view, of the different systems, but it is questionable how far the bases worked upon may be accepted, and in any case the result would have comparatively small value for English readers. The preservation of forests is also treated of in a separate appendix. From this we learn that the supply of first-growth white pine will be practically exhausted in the course of eleven years. The lumber cut during a single year in the States of Michigan, Wisconsin, and Minnesota would load a line of trucks nearly 7,000 miles in length. Vast quantities of hemlock have been destroyed for the bark alone, elms have been burned for the sake of the potash in their ashes, and a great deal of growing timber is burned in order to clear the ground. But the greatest destroyers of timber are the forest fires. In Ottawa, it is said, ten times as much timber is burned as cut. In spite of all this, the compiler of the appendix concludes that if reasonable care were taken to prevent waste, and the forests were duly re-planted, an abundance of timber may be secured for many generations yet to come.

#### THE SIXTIETH EXHIBITION OF THE ROYAL SCOTTISH ACADEMY.

A FOREIGNER who this year paid his first visit to Edinburgh, after making the round of the galleries of the Royal Scottish Academy, asked "Is this the best that your Academy can produce after an existence of sixty years?" The catalogue gives the number of works exhibited as 1,167; of these only about a dozen are at all remarkable, one or two hundred do not reach beyond mediocrity, and the rest are,—well." In reply he was informed that the Scottish Academy was in the position of a feeder to the Royal Academy; it was pointed out to him that the work he most admired, "The Salon of Madame Récamier," was the work of Mr. Orchardson, a Scottish Academician resident in London, and that the "Church Lottery in Spain" hanging opposite it,—a remarkably vivacious expression and rich harmonious colouring,—was from the studio of Mr. W. E. Lockhart, who was about to join the Scottish contingent in London.

It is certainly the case that there are fewer important pictures exhibited than usual, the collection owing very little to extraneous sources. There are no canvases by Leighton, Millais, Alma Tadema, or other distinguished Royal Academicians. There is, indeed, the portrait of Lord Balfour of Burleigh, by Frank Holl, and two charming landscapes by J. W. Oakes. Of non-resident Scotchmen there are examples of the handiwork of James Archer, John Ballantyne, Hugh Cameron, Thomas Graham, K. Halswell, D. A. Murray, Calder Marshall, G. A. Lawson, and John R. Reid. The pathetic subject of the last-named artist, entitled "The Fatherless," tells its own story and excites the sympathy of the spectator. Opposite this picture we have a happier theme, "A Story of the Flood," by R. Macgregor, who introduces us to a homely interior, admirably painted and lighted, where a hearty old grandfather exhibits to his grandchildren the contents of a toy ark and tells the often-told tale to the wondering young folk.

Mr. Martin Hardy, in his delineations of everyday life, has now got quit of a taint of vulgarity

which detracted from their merit, but they have not lost in vigour of characterisation thereby. He gives us a delightful representation of "Our Grandmother's Dancing School." Facing us stand a row of blooming young damsels, one of whom is being specially put through her steps by the alert dancing-master, who, clad in green coat and black velvet "smalls," shows the awkward pupil how to do it. Another damsel watches the teacher with attention, but the rest are more attracted by the groups of male pupils who wait their turn for instruction. In drawing, colour, and expression this work is very satisfactory. Mr. Hardy, we suspect, will succumb to the magnetic attraction, and by and by migrate to the metropolis.

"The Stroller's Tale" is graphically rendered by Mr. G. O. Reid. The stroller, dressed in tights, over which he has thrown a top-coat, has retired to the village inn to enjoy refreshment after labour, his daughter, exhausted by her exertions and still arrayed in tawdry finery, has fallen asleep against the big drum, whilst the mother is engaged in cooking something at the fire, and the stroller himself is discoursing at large to a group of rustics. While admirably conceived, the colour is somewhat crude and lacking in harmony. Robert Alexander's "Wet and Weary," a ploughman returning homeward with his team under a drenching rain, and over the saturated fields, conveys to the mind what the artist intended. The cold, damp, gray atmosphere is admirably rendered, and both horse and man are well put in. John Lavery, a Glasgow artist, whose name is new to us, has a clever picture which he calls "A Pupil of Mine," depicting a young lady engaged in making a study from nature in a garden.

But really the most interesting work in the Exhibition is that of a group of young men (some of them not of age, and still pupils), which if sustained in their future career from the present standpoint will lead to great results. Duddingstone Herdman's portrait of his father will compare favourably with any similar work in the rooms. John Gangee Stanton, son of Clark Stanton, R.S.A., has a small landscape, "Where Branches dip in a quiet Pool," full of sunshine, and showing solid brushwork. David Murray Smith (nephew of the author of a "Life Drama") shows admirable handling and feeling in "Evening, Coldingham," which has been purchased by the Royal Academy. Erskine Nichol, jun., has excellent water-colour drawings. Mr. Jennings Brown is perhaps drawn in the scale adopted is perhaps "Quartette." Joseph Milne gives admirable sea-side views; and Mr. Thomas Wiseman McNee follows the late President (Sir Daniel McNeel) in the production of portraits, but as a sculptor and not as a painter, his medallion of Mr. Clark Stanton being refined, yet spirited in execution.

#### THE UNEXHIBITED SCULPTURES IN THE BRITISH MUSEUM.—II. ROMAN SEPULCHRAL MONUMENTS.

PROFESSOR C. T. NEWTON, C.B., delivered his second lecture\* on the unexhibited sculptures in the British Museum on Tuesday afternoon last, in the Theatre of the Royal Institution, Albemarle-street. He commenced by saying that the particular monuments with which he had to deal in the present lecture were for the most part found in Rome or Italy, and were distinctively Roman in character, and nearly all of them were of Imperial time. There were two points which should be borne in mind as distinctive features of Roman sepulchral monuments when compared with Greek monuments: the first was that of a sepulchral character. The first was that when a portrait was seen on a Roman sepulchral monument it was invariably and unmistakably the portrait of the individual who was commemorated by the monument, or of one of his family, for it bore the strongest marks of individual likeness. Secondly, as mentioned in the first lecture, while there was little or no attempt at portraiture on Greek monuments, the Romans at a very early time delighted in the images of their ancestors. Now, with regard to the sepulchral monuments themselves, there were a number of varieties of type which he should not touch upon, as he was not giving a lecture on Roman tombs in general. But there was one kind of sepulchral monument which was very characteristic of the Romans, and which they seemed to have borrowed from the Etruscans, viz., the

sarcophagus, a great stone chest. These sarcophagi were originally made of a particular kind of stone found at Assos, in Asia Minor, which stone was said to possess the property of completely assimilating or consuming human remains, the word "sarcophagus" being derived from a Greek word signifying "flesh-eater." He (the lecturer) had in his time found and opened sarcophagi in which there was absolutely nothing left but a little fine dust and some vases. The word "sarcophagus," however, ultimately came to be used by Roman writers to signify any kind of chest for burial purposes, whether of marble or of other material. The Romans followed the Etruscans in placing on the lids of their sarcophagi a recumbent figure of the deceased, or figures of the deceased and his wife, and upon the sides and ends of the sarcophagi they placed sculptures in relief. A fine example of a sarcophagus in its complete state was the one now at Rome (of which there was a cast in the cellars of the British Museum) in which the celebrated Portland vase was found. The cast was given to the British Museum by a gentleman who wrote many years ago upon the Portland vase, but his liberality had not been of much benefit to the public, because his gift had been buried in the vaults of the Museum. The sarcophagus in question was long believed to be that of the Emperor Alexander Severus, but that idea had been shown to be erroneous. The lecturer next pointed to a drawing of a Roman sarcophagus, which he had himself dug up at Cnidus, one of three which he discovered in a Roman tomb,—a tomb such as was to be seen on the roads leading out of Rome, such as the Via Flaminia, the Via Appia, and others. Referring to the tombs in the immediate neighbourhood of Rome, the lecturer mentioned an interesting tomb of the baker Eurysaces, which bore reliefs representing the whole of the processes connected with his trade, from the grinding of the flour to the baking of the bread. Unfortunately these tombs, owing their conspicuous situation above ground, early attracted the attention of the spoiler, and of the various barbarians who in turn invaded Italy. Subsequently to the overthrow of the Roman empire, a great deal of damage was done in Medieval times by the breaking open and spoliation of the tombs of Rome. What those tombs and sarcophagi were like, however, we knew pretty well by those which had been found in distant parts of the empire, such as the coasts of Asia Minor, in Syria, and in Crete and other islands, though the sarcophagi found in the remote parts of the empire were very much less rich in sculptural decorations than those found in Rome itself. Those found in Italy had enriched many museums and private collections. We had in the British Museum several fine specimens of these sarcophagi. In Paris there was a very fine collection of them, and there were many in the possession of English private collectors in the provinces, as would be seen by reference to the work of Michaëlis. What, then, were the subjects represented by the sculptures on these sarcophagi? They were, with very few exceptions, taken from Greek mythology. That was also the case with the Etruscans. There were stories such as were familiar to us from the Greek and Roman poets, and which were, no doubt, known to the people commemorated by the monuments, and there was a marked preference for scenes which related to untimely death, or for some reference to the other world. For example, the death of Meleager and the death of the family of Niobe were favourite subjects. Other subjects, such as the marriage of Cupid and Psyche, and some very curious representations of the creation of man and of mankind before the soul was put into the body, pointed to the belief in a future state, and there were other sarcophagi in the sculptures of which this doctrine seemed to be taught. For instance, there were some relating to the rape of Proserpine, and to her coming back,—a distinct reference to a future state. Then there were others relating to the mysteries of Dionysiac worship. The lecturer next proceeded to point out some of these characteristics by reference to drawings from marbles or casts in the basement of the British Museum. One of these sarcophagi, found not in Italy, but in Sidon, in Phœnicia, exhibited the characteristics as well as the faults of the sarcophagi of a later time. The composition, consisting of horsemen, and men on foot, was exceedingly crowded, and not harmoniously disposed like the figures in a Greek frieze; the example in ques-

\* For report of the first lecture, see *Builder*, Feb. 20, p. 298, ante.



tion, indeed, seemed as though the sculptor had aimed at crowding as many figures together as he could. Although the sculptor of this relief had evidently some idea of the anatomy of the human figure, it was evidently merely traditional, and was the anatomy of degradation or decline. The sculptor had, in fact, copied the earlier anatomy without knowing what he was doing. A most signal instance of that practice had been met with in the course of the great excavations at Pergamos, where a Greek frieze, representing a battle of the gods and giants, was found. In the Vatican at Rome was to be seen a later relief representing the same incident; and in the Museum at Berlin there were now to be seen the two in juxtaposition, the relief in Rome being represented at Berlin by a cast for purposes of comparison with the marble from Pergamos. In short, just as the Roman poets adopted and stole all manner of imagery from the earlier Greek poets, so the Roman sculptors, first of all with discrimination, and afterwards indiscriminately, imitated the sculpture of the Greeks. But although we might condemn the art of the greater part of the Roman sarcophagi, it must not be said that they were of no interest, because the sculptures which were upon them undoubtedly represented combinations and groups which once existed in a much more perfect form, and on a larger scale, in the statues in the round or in the great reliefs of the Greeks, such as those found at Pergamos. These Roman reliefs thus threw considerable light on many questions that would otherwise have remained in doubt, and gave us a tolerably faithful idea of the way in which certain subjects had been treated by the Greeks, as had been very clearly shown by Overbeck. Pointing to another example—the sculptured end of a sarcophagus from the Townley Collection, the lecturer said it was a very beautiful composition in its way. It was the representation of a Roman marriage. The bridegroom, it must be confessed, had a somewhat sorrowful look. He was attended by his "best man." Then there was the bride, attended by her *pronuba*, or bridesmaid. Some persons, taking an idealistic view of the group, thought they saw in this last-named figure Juno, the goddess of marriage. In his left hand the bridegroom held what was once regarded as a very important ornament, but one which there seemed to be some disposition in the present day to improve the face of the earth, viz., the marriage settlement, or *tabula*, as the Romans called it. The arrangement of this composition was exceedingly beautiful, and he (the lecturer) could not place it later than the Antonines. It should be disposed of to put it down to the time of the Flavian emperors. A small figure of a boy had once stood in the foreground of the composition, and a piece of his torch remained. Those who wished to regard the relief as an ideal composition considered this figure to have represented Hymeneus, the god of marriage; but he (the lecturer) only regarded it as having been a representation of the youth who carried the nuptial torch. Another very charming composition, the lecturer said, was purchased by him at the Porticoes, and although it was Roman, and not of very early period, it was an exceedingly beautiful group. It represented a number of boys playing at some game (the precise nature of which he had been unable to guess) in the *lastra*, or playground. Above the group of boys were two winged Cupids, who held in the air an inscribed label, which told us that the group commemorated was a little boy who died just four years and six days, and that the monument was dedicated by his mother. He (the lecturer) thought he had never seen a monument which possessed a greater charm than this; and, in view of the belief of the ancients that they might properly seek to mitigate the sorrowful aspect of the place where the dead are buried by a certain playfulness, a certain assertion of life, nothing could be more appropriate than the manner in which the boy commemorated her loss by reminding the Roman bystander of the games in which no little son had been in the habit of taking part. Among other interesting specimens of Roman sepulchral monuments referred to by the lecturer was one of a poet, who, as a metrical inscription informed us, was a member of the sacred synod, supposed to be one of those companies of dramatic performers who spread all over Asia Minor in the times of the kings of Pergamos. The metrical in-

scription was written by the poet himself, and if the remainder of his poetry was no better than this, his demise was no great loss to his time. But the inscription was exceedingly curious and interesting as affording some reflex of the time in which he lived, for he exhibited what we should regard as effrontery in the shameless statement which he recorded of himself that "he was also a merchant who traded in beautiful women,"—in other words, he bought beautiful slaves for Rome. This monument was probably not earlier than the time of Septimius Severus. In conclusion, Professor Newton referred to the "pigeon-holes" or *columbaria* in which the ashes of the slaves or dependents of Roman households were placed, and made a few observations on cremation, pointing out that while it was popularly believed that the Greeks buried their dead and that the Romans cremated theirs, the practice of cremation was not by any means so universal amongst the Romans as was imagined. When it prevailed most fully, under the Empire, poisoning attained almost the perfection of a fine art.

#### THE ART EXHIBITION AT BERLIN.

In place of the regular annual exhibition of the Berlin Academy, it has been arranged to hold during the coming summer an international display, in which architecture and decorative art will be prominently represented. It is intended to make a more distinctive feature of the latter sections than was the case at the Munich Art Exhibition, where they only formed an adjunct to the collections of paintings. Amongst the most notable exhibits will be a reconstruction of the Pergamon altar and the Olympian temple of Zeus in the dimensions of the original.

An attempt will be made to illustrate the development of German art since the time of Frederick the Great, who first established these academical exhibitions in 1786. Electric illumination will be provided by Messrs. Siemens & Halske in the main building, while the park and its surroundings will be fitted up by the Berlin Electrical Works. The principal building will contain twenty rooms and two large galleries, while a courtyard, covered with glass (of about 27,000 square feet area), will contain the historical division. The artistic treatment of the interior has been entrusted, after a competition, to two firms,—Kayser & Von Groszheim and Cremer & Wolfenstein. Professor Otzen has undertaken the arrangement of an internal room. A special building, illustrative of ecclesiastical art, is being arranged by Herr Orth. In addition to the reconstruction of the Olympian temple of Zeus, there will be an Egyptian temple, the interior of which will contain a diorama of the German possessions in Africa, on which five artists are employed.

The masonry and carpentry have been undertaken by a company, and the iron construction has been entrusted to Messrs. Pfeifer & Druckenmüller. Herr Mächig, who devised the effective arrangements of the grounds in the case of the Hygienic Exhibition, will exercise similar functions in the present instance. The entire cost is estimated at 37,500*l.*, towards which the city of Berlin has contributed 5,000*l.*, a like sum having been given by the Landtag or State Council. It is generally considered that the receipts for admission may be expected to make up the difference.

The exhibition being international in its character, the *Deutsche Bauzeitung* and other technical journals have given prominence to the details already arranged, with the view of encouraging architects of all nations to co-operate in the work by sending drawings or other suitable contributions, illustrating the history and condition of architecture in various lands. The arrangements for the reception of such exhibits are being made by the Senate of the Academy of Arts at Berlin.

**New Swindon.**—St. Paul's Vicarage has just been completed from the designs of Mr. John Bevan, architect, Bristol, who also designed and carried out the chancel of the church. The walls are built of local bricks, relieved with bands of blue brick, and the roof is covered with Broseley tiles. The total cost, including extensive boundary-walls, iron gates, and palisading, with legal and other expenses, will not exceed the sum of 1,730*l.* The builder is Mr. W. Jones, of Gloucester.

#### FREE LECTURES TO ARTISANS AT CARPENTERS' HALL.

PROFESSOR CORFIELD ON "WATER-TRAPS."

THE second of the present series of free lectures, under the auspices of the Carpenters' Company, was delivered on Wednesday evening last by Professor Corfield, M.A., on "Water Traps." Mr. Joseph Preston, a senior member of the Court of the Company, occupied the chair, and the attendance was again large.

The Professor said that one of the most important matters connected with practical sanitation was that if traps were used at all, they should be of the best possible kind. The conditions requisite for a good trap were that it should be in the first place self-cleansing; secondly, it should not be larger than the amount of water supplied by the particular house or apparatus was capable of supplying to flush it; it should have no angles or obstructions; it should be smooth inside; and lastly, it should be ventilated on the side furthest from the house. A considerable number of the constituents of foul air contained in sewers were capable of being absorbed and given out on the other side of the trap. If a large body of water was thrown at once into the trap, under certain conditions, little or none of it would remain in it to seal the trap. Where a number of traps discharged into the same pipe, under certain circumstances water discharged from the uppermost trap would draw the water out of the traps below, and this was a reason why ventilation was necessary. Dealing with the different kinds of inlet traps to drains, he mentioned that the dipstone trap, simple as it was for preventing the passage of foul air, was yet a comparatively modern invention. The ancient Roman engineers, who were in many respects excellent sanitarians, had no notion whatever of a water-trap, and, indeed, he could find no idea of one before the last century. The well-known bell-trap was one of the worst contrivances ever devised. It was not self-cleansing, and when the grating was taken off, the trap was done away with. He considered the bell-trap should be abolished, and exhibited an improvement on it by Mr. Jennings, in which the bell was not fastened to the cover. The Antil Trap, with two lips, was also a decided improvement on the bell-trap, though likely to be choked up with sediment. Gully traps, or syphon gullies, were a vast improvement on those already referred to, being self-cleansing, with no enclosing angles for the collection of filth, and they were now made enamelled inside. Waste-pipes of sinks should never be directly connected with the drains, but made to discharge into the open air, over a gully. It was necessary, however, to have a trap to the sink, because the waste-pipe of a sink was always, after a little use, a foul pipe. If the pipe passed out into the open air, the air entering the house by its means would carry some amount of foulness with it, so that it was necessary to have traps in the waste-pipe immediately under the sink. The most commonly used trap was what was known as the D-trap, or as Sir William Jenner had termed it, the "Double D" trap,—a trap which dealt disease and death. Its great defect was that it was not self-cleansing, it being, in fact, a small cess-pool. The next improvement was the "Eclipse" trap, but it had the disadvantage of being unsyphoned by momentum. The simplest contrivance of all was not invented until all sorts of complex things had gone forth to the world,—he referred to the syphon-trap in all its different forms. Traps of this kind were self-cleansing, so long as they fulfilled the conditions for such traps, and were not too large for the water which had to pass through them. Under certain circumstances they acted as syphons, and several devices had been contrived for preventing syphonage. Turning to the question of water-closets, the lecturer produced the first patent for these, taken out by Alex. Cunningham in 1775, containing what was called the "re-curved" pipe, and which was really a sort of syphon-pipe. This early trap, however, was displaced by the D-trap, because it was liable to be unsyphoned. The "Eclipse" trap was also used for water-closets, and the latest invention in this direction was termed the "Anti-D Trap," from which the water could not be drawn. The lecturer concluded by explaining the different kinds of drain-inlet and air-inlet pipes. The lecture was well illustrated by specimens of water-traps lent by Messrs. Doulton and other manufacturers.



## PRISON CONSTRUCTION IN GERMANY.

SOME years ago a meeting took place at Vienna, at which prison officials of various European countries discussed the general principles of the above question, with the result that it was arranged to draw up within a year's time a scheme applicable to prison construction in general, which would embrace and illustrate the various principles which had stood the test of practical experience. After the task was ended it was resolved to print the work thus compiled, and, from a statement made by Herr Schuster, one of the editors, before the Hanover Architects' and Engineers' Association, it would seem that the following general principles have been established:—

1. *Size of Prisons.*—Where solitary confinement is contemplated the buildings should be arranged for not less than 200 and not more than 600 inmates. It is desirable for the maximum number to be 400, but motives of economy necessitate the adoption of the higher number.

2. *Situation of Prisons.*—It is recommended to avoid the interior of towns and situations where building is likely to be soon brought close to the site chosen. The neighbourhood of medium-sized towns is a good locality, provided a railway station is near. The building should stand at a height permitting the easy removal of refuse liquids, &c. In the preliminary surveys as to water supply it is advisable to count upon a quantity of 22 gallons daily per inmate being necessary. The highest point reached by underground water should be at least 20 in. below the deepest portions of the building.

3. *Dimensions of the Site.*—Within the circular walls there should be about 100 to 120 acres and outside a surface of sufficient extent to prevent the walls being too closely approached by neighbouring buildings. Convenient sites for the dwellings of officials have likewise to be provided.

4. *Arrangements of the Building.*—The cells are best arranged in three wings, the fourth containing in the lower portion the administrative offices, and in the upper part the church. The cells should be of about 900 cubic feet capacity, with windows 6 ft. 6 in. above the floor.

Various indications are given upon other matters affecting the internal construction of prisons. It is remarked that gas is more advantageous than petroleum for illuminating purposes, when 900 cubic feet do not cost more than 3 cwt. of coal.

## BUILDERS' CLERKS' BENEVOLENT INSTITUTION.

THE nineteenth annual meeting of this useful and deserving Institution was held at the offices, 21, New Bridge-street, on Tuesday evening last, Mr. George Haward Trollope, President-elect, in the chair.

The Secretary, Mr. H. J. Wheatley, read the annual report, from which we take the following passages:—

"The Committee, in again meeting the donors and subscribers, are glad to be able to lay before them a more favourable report than at one time seemed probable. Owing, doubtless, to the continued depression in trade, there has been a decrease of income; nevertheless, the sum received, including dividends on Stock, amounted for the year to a total of 682. 0s. 2d. This sum was made up of 237. 1s. 6d. in annual subscriptions, 320. 14s. 6d. in donations; and 75. 4s. 2d. in dividends.

The disbursements during the year consisted of 308. 6s. 8d. on account of the Relief Fund, which included, besides the pensions, several cases of temporary relief, which were promptly assisted. In addition, there were the general expenses for rent, printing, advertising, secretary's salary, collector's commission, &c., amounting to 95. 3s. 7d.

Referring to the Relief Fund, it will be seen from the Statement of Balances that the sum expended on account of this Fund was 367. 11s., while the ordinary income to the same arising from annual subscriptions and dividends amounted only to 246. 8s. 9d., the balance of 121. 2s. 3d. being provided out of the special donations given at the last annual dinner. Your Committee are, therefore, most anxious that the regular income to this useful fund should be materially increased, and fully hope the forthcoming dinner will prove very successful in bringing in some permanent annual help to this particular fund.

In July last, an additional pensioner, Mrs. Hamilton, was elected, making a total of fifteen\* now on

\* Sixteen with the one elected on Tuesday evening last.

the books, the males receiving 25l. per annum, and the females 20l. per annum. Ellen Kelly and Edith Friend are the children at present in the Orphan Working School as wards of the Institution. The annual dinner took place on the 24th of March, at the Holborn Restaurant, Jas. Greenwood, esq., the President, in the chair. On that occasion the Society was materially assisted by the announcement of 173. 12s. donations and subscriptions to the Relief Fund, and 169. 3s. 6d. to the Orphan Fund, making a total of 342. 15s. 6d. Your committee have announced a further purchase of 800l. stock on account of the Orphan Fund.

In conclusion, the report expressed the thanks of the Committee to the retiring President, Mr. James Greenwood, for his assistance during the year, especially for his services connected with the annual dinner.

The balance-sheets, signed by the auditors (Messrs. S. J. Thacker, Thos. Stirling, and Thos. Bishop), showed that the Institution has an invested fund of upwards of 3,000l., while there was a balance at the banker's at the end of the year of 177. 16s. 2d.

The Chairman, in moving the adoption of the report and balance-sheets, said that during the coming year he would do his utmost to maintain the Institution in its present effective and prosperous condition. He had great pleasure in accepting the position of President of the Institution because, in 1875 (eleven years ago), his father occupied that office; but at the same time he (the chairman) felt the responsibilities of the post, for while in 1875 the total income of the Institution was 271l., it had risen last year to nearly 700l. It would be his earnest endeavour to make the Institution equal to the demands which might be made upon it, but they could not disguise from themselves the fact that the trade of this country had for the present fallen upon very evil times, and he feared that the number of claims upon the funds of the Institution were likely to increase. With the aid of the committee and secretary, however, he had good hopes of being able to keep the society in its present state of efficiency.

Mr. Edwin Brooks, in seconding the motion, urged that during the coming year a special effort should be made to strengthen the Relief Fund, upon which there were likely, he was afraid, to be many claims for temporary relief.

Mr. Bugg supported the motion, which was unanimously agreed to.

On the motion of Mr. Roe, seconded by Mr. Gilbert, a vote of thanks was accorded to Mr. James Greenwood and the other retiring officers for their services to the Institution during the past year, and Mr. Greenwood said a few words in reply.

It was then resolved that Mr. George Haward Trollope be the President for the coming year; that Mr. James Greenwood be elected vice-president; that Messrs. S. J. Thacker, T. Stirling, and T. Bishop be re-elected auditors for the year; and that Messrs. E. Brooks, F. H. Burchell, W. D. Gilbert, E. Graystone, H. Mason, H. Poston, C. Powell, and C. K. Turpin, retiring members of the committee, be re-elected.

On the motion of Mr. Roe, seconded by Mr. Gilbert, Mrs. Emma Chapman was elected a pensioner on the funds of the Institution.

Mr. Mullett, in moving a vote of thanks to the President for acting as Chairman of the meeting, said that on the completion of Mr. Trollope's term of office the Institution will have attained its majority.

Mr. Poston seconded the motion, and in doing so referred to the late Mr. William Bangs, who was a warm friend of the Institution.

Mr. Wheatley, in support, spoke of the great benefits which the Institution had received from the services of influential members of the building trade in the presidential chair, and the motion having been put and carried.

The President expressed his acknowledgments, and the meeting terminated.

**Uddington (Lanarkshire).**—It has been decided, owing to the large increase in the congregation, to considerably enlarge and improve the parish church, and Mr. John B. Wilson, Glasgow, has been instructed to prepare plans for that purpose. The enlargement will take the form of an increase in length, and the addition of transepts, as also a chancel, with organ-chamber and choir-gallery. The estimated cost will be about 3,000l., and the proposed increase will give about 450 additional sittings.

## PROVIDENT INSTITUTION OF BUILDERS' FOREMEN AND CLERKS OF WORKS. ANNUAL DINNER.

THE annual dinner of this old-established and useful Institution was held in the Venetian Chamber of the Holborn Restaurant on Saturday evening last, the Governor of the Institution, Mr. George Plucknett, J.P., F.S.A., in the chair. About 250 of the members and friends of the Institution sat down to table. The usual loyal and patriotic toasts having been heartily received (Major Brutton, Secretary of the Builders' Benevolent Institution, responding for "The Army, Navy, and Reserve Forces," and incidentally observing that builders' foremen were to the master-builders what the non-commissioned officers of the Army were to the regimental officers).

The Chairman proposed the toast of the evening, "The Provident Institution of Builders' Foremen and Clerks of Works," and said he had great pleasure in doing so, especially as he had not to solicit the charitable assistance of the company, for that was not a dinner for obtaining help in carrying out the work of the Institution, but a social gathering of the members and their friends. At the same time, he trusted that all who were eligible to become members of the Institution would join it. During the forty-four years of its existence, it had done, and was still doing, a very useful work in encouraging habits of providence amongst builders' foremen and clerks of works. With the toast he coupled the names of Mr. J. W. H. Bedford, the Secretary of the Institution, the toast having been duly honoured.

Mr. Bedford, in responding, said that the Institution, though not so large as he could wish to see it, had been the means of doing a great deal of good, and he trusted it had been able, with the help of its donors and honorary subscribers, to disburse upwards of 6,000l. in pensions and other relief to afflicted and suffering members, their widows, and children.

Mr. Derry next proposed "The Governor and Trustees," and the chairman responded, expressing his gratification that clerks of works and foremen whose avocations were sometimes thought to be antagonistic, had yet such a high opinion of each other that they were able to combine in the work of carrying on so useful an Institution.

Mr. Groome, in proposing "The Donors and Honorary Subscribers," enlarged on the benefits the Institution had received from their support, both in an augmentation of the number of members and in donations and subscriptions. Mr. Horwood responded.

Mr. Rashleigh proposed "The Directors," and on whose behalf Mr. Groome replied, and Mr. Stapleton proposed "The Visitors," coupled with the name of Mr. Ben Turner, who, in replying, urged the importance of efforts being made to obtain more annual subscribers to the funds of the Institution from the foremen and clerks of works themselves.

The other toasts were "The Architects and Surveyors" (proposed by Mr. Merrifield and responded to by Mr. J. H. George); "The Builders" (proposed by Mr. Ross and replied to by Mr. Hall, of the firm of Hall, Beddall, & Co.); "The Press" (proposed by Mr. Bedford and coupled with the name of the representative of the Builder); and "The Officers of the Institution" (proposed from the Chair and responded to by Mr. Welsh, the Treasurer).

We may add that the offices of the Institution are at No. 9, Conduit-street, Regent-street, where meetings are held on the first and third Wednesday in every month at 3.30 p.m.

## COLONIAL AND INDIAN EXHIBITIONS.

THE following are the detailed proposals for facilitating the visits of artisans to this exhibition, to which we referred in our last:—

"The mayors and principal authorities of nearly all the large towns in the United Kingdom have expressed their willingness to co-operate with H.R.H. the Prince of Wales, K.G., Executive President, with the view of organising means whereby artisans and workpeople, with their wives and families, may secure an opportunity, during the present year, of visiting (as much for purposes of instruction as for entertainment) the Colonial and Indian Exhibition. It is advisable, therefore, to offer the members of the classes indicated as their accommodation whilst in London. The stay being taken in the various towns referred to are to be established of clubs, to which, during the early months of the present year, workpeople will periodically subscribe small sums. At any time they may be convenient to them. After the 21st of June, the members of such clubs can withdraw the subscriptions (which, in certain cases, will be aid by grants from the donations of sympathisers), and with members of their families may proceed to London for one or more days; but in no case shall the stay in London under the terms of club membership exceed twelve days. The proprietors of respectable hotels, lodging-houses, &c., who may be disposed to offer accommodation to the class indicated, are requested to send in, not later than the 30th of April,—a statement to the official agent



of the Royal Commission, at the City offices, 96, London-wall, London, E.C., specifying in detail the sum they will be prepared to charge per head for bed, breakfast, dinner, and tea or supper, for adults and for children, for one or more days, not exceeding twelve. After due inquiries have been made as to the respectability of applicants, their names and addresses, and the rates they propose to charge, will be printed in a list which will be supplied to all local clubs. The applicants will be deemed to agree to make only such charges as are indicated in their letter of application. Any complaints made to the Royal Commission by visitors will be inquired into; and, if they be well founded, the names of those persons who have given grounds for such complaints will be removed from the list, with an intimation of the reasons for such a course of procedure. Each member of a club will be supplied with a ticket properly vouchered by the exhibition and the local authorities as a means of identification and as a proof of his right to the special terms indicated on the lists supplied. The Royal Commission limits its responsibility to all parties to the action above described."

#### COMPETITIONS.—MONEY DEPOSITS.

SIR,—You referred, in a paragraph of your last issue [p. 296], to the increasing habit of promoters of competitions demanding money deposits. Leaving out of notice, just now, the real question touching the advantages or disadvantages of such a practice, I would suggest the following modifications:

1. The advertisement asking for designs should state the title of the proposed work, the amount of the premiums, the time for the delivery of the plans, and the amount of the deposit required from each competitor.
2. The conditions of the competition should be supplied free to all intending competitors, and should state clearly all information as to the general conduct of such competition.
3. The deposit would be payable for the detailed information, plan of site, statistics of accommodation required, &c., and such should, of course, be complete and worthy of the deposit.

By this arrangement I think there would be little chance of "buying a pig in a poke," and the advertisement, conditions, and information were what each ought to be, it is probable that the deposit system, if kept within reasonable limits, might tend to raise the level of competitions.

H. F. K.

\*.\* We quite concur in the suggestions of our respondent. What we so strongly object to the request for a deposit before giving any information whatever. We may note here that, among other points, information ought always be given as to whether the promoters of the competition intend to employ a professional adviser or assessor, as a large number of architects have pledged themselves not to compete except under that condition.

#### THAMES RIVER NUISANCE.

SIR,—In reference to a previous letter on a subject, in the *Builder* for Feb. 14, 1885, on the condition of the waters of the River Thames, I take the opportunity of intimating the following experimental observations on them for autumn.

During about three weeks last October and November, the specific gravities and temperatures of the water were taken every morning at eight o'clock, at the Embankment, near Charing-cross, as also its reaction and sensible condition.

For the third week in October, the mean  $\gamma$  was .997 and mean temperature 48 deg.  $\gamma$ , taste fresh, muddy, air 46 deg. Fahr.,  $\gamma$  chiefly easterly.

For the fourth week in October the mean  $\gamma$  was 1.000, mean temperature 47.2 deg.  $\gamma$ , taste fresh, muddy, air above 43.7 deg.  $\gamma$ , winds north-westerly.

For the first week in November the sp. gr. .998, temperature 45.5 deg. Fahr., muddy, taste ditto, air over 44.2 deg. Fahr., winds easterly. Litmus paper was neutral in the  $\gamma$ , but always acid in the air. It would be, therefore, that the river water was land  $\gamma$ , quite sweet and fresh, and fit for household use for the light mud floating in it.

It was not salt or brackish, so that the sea  $\gamma$  brought up by the tides must lie at the bottom of the river, if it comes up to the embankment at Charing-cross at all.

The temperatures of the water were at that time of the day always found higher than those of the air at the same place, but the difference

was gradually diminishing as the winter season was approaching, and the temperatures of the draining soils were being reduced to that of the winter atmospheres.

The litmus paper test showed that the waters were neutral in reaction, while that in the air was always found to be markedly acid in proximity above it. Light mud was always deposited for about 1 in. in depth by every recession of the flow, and was of the usual organic description, denoted by its flocculent gummy character, but it emitted no putrefactive odour.

The air over the river was generally more foggy than further up the streets, and exhibited no character in the spectroscopic, was destitute of ozone, and was saturated with moisture.

The prevailing winds were from all quarters of the compass, but north-east, east, and south-east were more felt than the others, at the Charing-cross bend of the river, and they made the air colder in the mornings than the water temporarily below them at that situation.

The very light specific gravity of the water shows that little soluble mineral matter is taken up by the river passing through London, or by drainage from the contiguous streams along its course in the country westerly of the City.

This flocculent mud appears different from the mud of a river in the open country, and is readily identified with muds deposited at mouths of harbours or large ports, being adherent and miscible, indicating its source from animal decomposition. Its lightness will therefore prevent its being deposited in the centre of the bed of the river, where the current is the strongest, and it will be driven to the sides of the stream, where they are milder.

It will then become embayed in quiet creeks and shores, and will only there get time to settle, and so will be found most abundant on the sides of the river when left bare by the receding tides.

It would be of interest to ascertain by experimental observation how far down the river this sheet of fresh water usually extends, and it would also be useful to find out the depth of this fresh water layer at Charing Cross and other places above and below it,—say at Kew and Greenwich.

W. G. BLACK, F.R.M.Soc.

January, 1886.

#### SIGNALS OF DISTRESS IN PROFESSIONAL CIRCLES.

SIR,—I have just beheld with equal surprise and regret a sad proof that the present depression is beginning to tell upon professional men so severely as to drive them to adopt methods of attracting public notice which it has hitherto been left to the tradesmen alone to profit by; much as a keen winter drives the birds to our window-sills for crumbs.

Between Dalston Junction and Broad-street I have noticed near the railway a large block of buildings in progress, adorned with the usual big, bold, black board announcing who the builder is and where he is to be found; but lo! equally conspicuous on another big, bold, black board were two by no means unknown names of members of the architectural profession bracketed together as "joint architects."

I am so sorry that these gentlemen should be driven to this. If you think well of starting a subscription for their relief my mite is ready, but only on condition that the black board be hauled down.

A FELLOW OF THE INSTITUTE.

#### DOMESTIC FIREPLACES.

SIR,—With five years' start of Mr. Pridgin Teale in the use of what he calls, in his admirable paper [p. 285, ante], the "Economiser," I am glad to be able to testify to the advantages of it. Ten years ago, when moving into a new house, I adopted the idea which had occurred to me of applying a vertical plate as he now describes to close the aperture below the front bars of the fireplace, and thus convert the space below the grate into a kind of box or chamber as an improvement on placing a flat plate on grate at bottom of fireplace, or on the so-called slow-combustion stoves with solid bottoms, and was well satisfied with the result. The immediate effects were less combustion, less required attention to fire, greater warmth in the room, particularly to the feet, less draught along floor; and the chamber forming a convenient place for the ashes to drop into, consequent cleanliness and tidiness.

After trial in dining-room, where there was a cir-

cular-fronted ordinary register stove, it was soon requisitioned into the bedroom. There, in addition to other advantages, that of quiet was appreciated. In certain stages of illness the scraping up of the hearth, the knocking and noises in connexion with the daily cleaning of a stove, are very unpleasant. These, with the use of the vertical plate, were reduced to a minimum, and the stove could be allowed to go several days if required without the ashes being removed. The plate was soon asked for in the nursery and school-room. Eight or nine years ago I applied it at my district office; some six years ago it was fitted to the fireplaces of my offices here; and when I removed to a fresh residence three years ago, I had it fitted all through the house, including to both kitchens.

I have never lost an opportunity of recommending these plates to stove-makers, particularly at exhibitions, and am glad to find that some makers now make them of cast iron, to fit their stoves. When made of wrought iron, they should be of fender-plate, sheet-iron not being stout enough. They are adaptable to any form of stove.

In another point Mr. Teale urges a large grate or bottom to the fireplace. I entirely concur. Small grates, and the lessening of large ones with fire-bricks or otherwise, is always to be avoided, on account of the increased draught. A small fire can be easily kept in a large fireplace, while it is difficult to keep any in a small one.

The vertical bars he recommends are doubtless good, and I find can be obtained through an ironmonger, of cast iron, to fit inside bars of circular-fronted fireplaces, but there are not as yet many wholesale houses who supply them in London.

As regards sides and back of fireplace, I remember a very good effect being produced by lining them about 1 in. thick with plumbago, the materials of some old crucibles. A capital heat was obtained.

The leaning forward of the back plate over the fire is another good point tending to assist in keeping the heat of the fire where it should be, viz., in the fireplace, instead of up the chimney. The good old stoves provided for this by regulating the register from the front, without having to use long or soil the hands, as is unfortunately the case with most new stoves.

ROBERT P. NOTLEY.

35, Bucklebury, E.C., Feb. 17, 1886.

#### SURVEYORS IN NEW ZEALAND.

SIR,—Could any reader of the *Builder* give me information respecting examinations for land surveyors in New Zealand? Where and how are they conducted, and is it a necessary qualification for candidates to have been previously articled in an engineer's or surveyor's office? Also, what are the subjects for examination?

H. H. P.

#### THE INTERNATIONAL HEALTH EXHIBITION, 1884.

SIR,—Referring to the paragraph from *Invention*, in your issue of the 20th inst., complaining that the special certificates awarded at the Health Exhibition of 1884 have not yet reached the exhibitors, we think it only just to the committee to state that we received our certificates three weeks ago.

BANNER BROTHERS.

Billiter-square, E.C.

#### PROVINCIAL NEWS.

Accrington.—At a meeting of the Accrington and Church Outfall Sewerage Board, held on the 4th inst., the Clerk reported the result of an interview, held by a deputation from the Board, with Mr. Petre respecting the purchase of Coppy Clough site for sewage purification works. The deputation had agreed to purchase the site for 5,000l. This was considered very satisfactory, as it was 300l. less than was first asked, and Mr. Petre also agreed to add nearly another acre of land. A satisfactory arrangement was also come to for the lease of a plot of land between the sewage site and the canal for wharfage purposes. The report was approved and adopted. At the same meeting the engineer submitted complete plans and estimates for the proposed outfall sewers and purification works, his estimate for these purposes being 22,767l. It was resolved to apply to the Local Government Board for powers to borrow 28,000l., the difference being made up by cost of site and legal expenses. The engineer for the works is Mr. E. Knowles, C.E., Accrington.

Haverfordwest.—The new Sunday Schools in connexion with the St. Thomas's Church have just been completed by Mr. W. Reynolds, of Haverfordwest, from the designs and under the superintendence of Mr. E. H. Lingen Barker. The main room is 42 ft. by 32 ft., and the four class-rooms 20 ft. by 14 ft. each. The walls are of local stone, and the roofs open-timbered and



slated. The cost has been about 700*l.*, and the accommodation provided is for 308.

**Knutsford.**—New premises for the Post-office authorities were opened at Knutsford last Monday. The new buildings have a frontage to King-street of 50 ft., and are designed on Old English type, of which so many examples are to be found in Chester and throughout the county. The front external walls have for their main feature a series of large brick piers carried from base course to cornice, terminating at the front in three overhanging gables, the windows to the first floor being projecting oriels. The size of the Post-office is 32 ft. by 17 ft. The facing bricks and terra-cotta work have been supplied by Mr. J. C. Edwards, of Raabon; and the works have been carried out by Mr. Henry Pemberton, of Knutsford, from the designs and under the superintendence of Mr. W. Owen, of Manchester.

#### CHURCH-BUILDING NEWS.

**Lancashire.**—The Church of St. David, Haigh, Lancashire, built by a most useful pioneer of the revival of Gothic architecture, T. M. Rickman, is about as dreary a building inside and out as could well be found. The Earl of Crawford and Balcarres having promised a subscription of 500*l.*, and other gifts coming in, it is now proposed to build a chancel, vestries, and organ-chamber, form a baptistery, and make other improvements to render the church more fitting for divine worship. The father of the present Earl was a large subscriber to the Church of St. Elizabeth, built a few years ago in this parish.—The Church of Holy Trinity, Parkfield, Middleton, Lancashire, a poor specimen of Modern Gothic, but which has hearty services and good congregations, has taken a step forward in the direction of internal improvement. Common deal benches have been removed to make way for oaken choir-stalls and prayer-desks. There is also arcaded paneling against the north and south walls of the chancel, and additions to the organ front. Further improvements are in contemplation.—St. Anne's, Brindle Heath, which is a little chapel of ease to St. Thomas Pendleton, has lately been adorned by an oaken reredos, with flanking arcading on the east wall, north and south of the altar. From the central part oaken pillars spring, carrying an arch over the east window, which, heretofore, was plain and bare. The panels of the reredos proper contain a cross and other sacred symbols. The six panels of the arcading have been decorated by paintings of plants, executed by Messrs. Heaton, Butler, & Bayne. The cost of the whole has been defrayed by Mr. Charles J. Heywood, who is warden, and resides in the neighbourhood. Mr. Medland Taylor, of Manchester, is architect for all the above-mentioned works.

**Bestwood (Notts).**—Of late years a colliery village has sprung up at Bestwood, on the estate of the Duke of St. Alban's. The church is a mile and a half away, and the school is the only building in which a service can be held. A mission church has, therefore, been projected by the Rev. A. S. Hawthorne, the vicar, and it is to be built at once. The Duke of St. Alban's gives the site and 600*l.*, and the Colliery Company gives also 600*l.*. A simple brick building is proposed, so planned as to be suitable for lectures and parish gatherings of various kinds. Mr. Medland Taylor, of Manchester, is the architect.

**London.**—St. James's Church (Minor), Garlick-hill, has been entirely redecorated by Messrs. Campbell, Smith, & Campbell, under the superintendence of Mr. Francis Chambers, architect.

**Carmarthen.**—A new church to seat 300 adults is to be built near Carmarthen from the designs of Mr. J. Buckley Wilson, architect, Swansea.

#### The New Surrey Chapel Buildings.

The erection of the new Surrey Chapel, in Blackfriars-road, is about to be commenced. The site of the new chapel is only a few yards distant from that which it is to succeed. Three properties on the east side of Blackfriars-road have been purchased to clear the site for the new building, including the premises now occupied as Turkish Baths. The building will have a frontage of 54 ft. to Blackfriars-road, and will extend to a depth eastward of 96 ft. The cost of the new chapel and schools in connexion is estimated at 12,000*l.*

## The Student's Column.

### FOUNDATIONS.—IX.

**R**ILES should always, if possible, be driven through such soft earth into solid ground below. They have thus been made to penetrate several feet through the hardest clay or gravel. They cannot be driven into pure sand, as the force of the blow is not spent in producing penetration, but is spread downward in a conical form through the body of the sand so as to give complete resistance to the blow. The effect of pure, fine gravel in resisting the penetration of a pile is somewhat similar, in proportion to its fineness. In making the foundations for the high-level bridge at Newcastle, piles were driven through 40 ft. of mixed sand and gravel, so as to rest upon the rock. A pile so driven would bear 150 tons for several days without sign of failure. Holes have been made in rock in order to receive the feet of piles. It is considered that a pile is well driven when it will stand thirty blows of a ram weighing 800 lb., with a fall of 5 ft., without sinking more than one-fifth of an inch. The safe load upon a pile that is driven in firm ground may be taken to be 1,000 lb. per square inch of the head of the pile, but in soft ground this must depend upon the degree of resistance which it affords,—about 200 lb. per inch being generally reckoned upon in practice. With regard to the actual capacity of the pile to carry weight, looking upon it as a square column of timber, and allowing that such a column might, if fixed above ground, be safely loaded to one-tenth of its breaking-weight, the pile (being surrounded by earth) may be loaded to one-fifth of the breaking-weight. But, on the other hand, the breaking-weight of wet timber is only about half that of timber that is dry,—as in the case of a wooden stanchion or story-post. Therefore, the safe load upon a pile is practically the same as that upon a stanchion of similar length and section. No account is taken of any direct support to a building that may be obtained from the earth that is between the piles.

The best material practically available for piles is elm, both on account of its toughness under the blows of the ram and of its durability. Some of the piles under old London Bridge were of this wood. Elm is one of the few kinds of timber in which the sap-wood appears to be of equal durability with the heart. It should be used green. American elm has been largely used, but Memel timber is most generally employed. Whole timbers from 9 in. to 18 in. square are available, or half-timbers which are made by dividing the square balks into two pieces longitudinally. When the ground is hard it is necessary to fit a ring of wrought-iron round the head of each pile to prevent splitting, and also to put a wrought-iron or cast-iron shoe, either pointed or chisel shaped, at the foot to enable it to penetrate the earth.

The application of piling to the various purposes for which foundations require to be made in soft earth or under water is a subject of great extent and variety; but, in general, these foundations are made by the use of bearing piles of whole timbers which carry the whole weight of the structure. *Sheeting* piles made of half-timbers are used either in the making of a cofferdam to keep out the water during construction, or as a permanent enclosure of the area in which the bearing-piles have been driven. The bearing-piles are usually placed in pairs along the course of a wall, or in groups under large piers, or under the foundation of a tower or chimney-shaft, the tops of the piles being cut off level to receive planking to carry the brickwork or masonry. It is not usual to drive the piles much closer together than 3 ft. between their centres, and it is not advisable to disturb the soil around them more than is necessary. In the case of a group of piles that are intended to carry a massive base, the soft earth may be cleared away for some 3 ft. below the level of the heads, and the space so found may be filled with concrete on which the planking used in important works under water is that which is made by first mixing sand and a good hydraulic lime into a paste or mortar, and then adding the broken stone or gravel. In France, where material so compounded is largely used, it is called *béton*.

In forming the inclosure round such a foundation the sheet piling is put in by driving, in

the first instance, "guide" piles at the angles and at intervals between them, and tying these piles together by horizontal timbers fixed on both sides of them. The ordinary piles are then driven between them, beginning in each case close to a guide-pile, and making the chisel-shaped shoe of the sheeting pile with the edge inclined, so that it has a tendency to press towards the guide-pile as it descends. In the centre of each space a pile which exactly fits the opening that is left is driven so as to complete the inclosure at that spot. The swelling of the timber through being soaked with the water suffices to make the sheeting sufficiently tight.

Cast-iron piles driven in the ordinary way have been used, a wooden block being placed between the ram and the head of the pile to prevent danger of fracture from the blow. Such a block or "dolly" has often to be used in order to transmit the blow from the ram down to a pile that is lower than the base of the machine. The loss of effective power is very considerable. Cast-iron plates have also been used where the object was to inclose a waterway or space rather than to carry a building.

### Books.

*Wood-carving: Practically, Theoretically, and Historically considered.* By FRED MILLER. London: Wyman & Sons.

**T**HE book so entitled covers a great deal of ground and raises a multitude of questions touching the philosophy of art in its widest sense, into the discussion of which we cannot now afford space to follow the author. Mr. Miller is known to be an experienced and accomplished worker in many of the by-paths of art, possessed of quick sympathies and a facility of exposition which is not given to every practical artist. His subject is one of engrossing interest, and the field it offers is almost unexplored. We cannot but regret, therefore, that he has treated it in a partial, and somewhat discursive fashion; saying many things which might well have been left unsaid, and omitting much which is essential to an adequate treatment of the art and mystery of carving in wood. He is a declared Goth, and expends some energy in attacking certain forms of art with which he has but an imperfect sympathy, and he falls into the common error of attempting to exalt the craft of which he undertakes the elucidation by unfair depreciation of its rivals, going so far as to speak of the "faunting, brazen splendour of stucco and carton pierre." The head, as he truly says, is the only perfect machine for artistic expression, but the hand can surely express itself as effectually in a plastic material as in the more refractory oak. Nor can we see that moulded is of necessity more "aggressive" than carved ornament. More may be overdone, and one may, in such circumstances, be as reasonably accused of "bragiant boldness" as the other. This is, however, by the way. The main purport of the book is to recommend the art of carving in wood, to mark out the lines upon which its study should proceed, and to explain the mechanical processes incident to its practice and the several tools and appliances required by the carver. All this is done earnestly, intelligently, and according to knowledge, and we confidently commend the result to the student and amateur. The opinions expressed on the relative value of various phases of the art may be read to be "weighed and considered," as Bacon recommends. Mr. Miller has elected for a certain school and cannot bring himself to tolerate any other. Classic art is with him effete, and the methods of the artists of the Italian Renaissance little short of immoral. We would plead for a somewhat broader view of the subject, and will even confess that we are unable to see with his eyes the wickedness of mixing up animal and vegetable forms in purely ornamental designs as the Renaissance artists did, or the essential difference in their use of such ornamental opportunities and those "gorgons, hydras, and chimeras dire" of the Mediaeval carvers, which are often allied and interwoven with their works. Of the censur with which he visits the realistic school of Grinling Gibbons we make no complaint, and we are not quite sure that some of the modern work which the author commends is not approaching Gibbons's type a little too closely.



The infinite variety and endless play of fancy efficiently insisted upon, and we cannot help feeling that some of the examples given by Mr. Miller, without reprehension, are mechanical, ill, and inartistic to the last degree, "as dead leaves in December, without one tender touch one warm stroke" in their composition.

The illustrations are the least satisfactory part of the book. We cannot honestly commend the selection when we remember the wealth of available examples. They are largely rendered, and they do not by any means give expression to those special characteristics which differentiate carving in wood. The German examples are the best, and show what excellence this charming form of art is capable, and in what direction the student must look for success.

We are sorry to appear to speak disparagingly of a book which, although not without certain shortcomings, should find its way into the hands of every carver in wood, if only for the instruction it conveys as to methods of working and the interesting æsthetic questions which it raises. But Mr. Miller has not done himself justice in this hasty and imperfect treatment of a noble subject, for a more satisfactory elucidation of which he possesses my qualifications.

*Sculpture Antique: Origines, Description, Classification des Monuments de l'Égypte et de la Grèce.* PAR ADRIEN WAGNON. Avec 16 Planches. Paris: Rothschild. 1885.

WAGNON has done well in dedicating his book to M. G. Perrot. It is impossible to read single page without recognising the inspiration of the "Histoire de l'Art dans l'Antiquité," which, in its three successive volumes, we have from time to time occasion to notice. Both terms find that when they come to the detailed systematic comparison of the art of Egypt Greece what strikes them is rather contrast than analogy, and both point for the solution of the problem to the diverse character of physical configuration and climate in the two countries. Egypt is the country of level plains, of a vast expanse, of intense protracted heat; hence it might forth a people laborious, monotonous, servative, who in turn created an art, a life, a monument, realistic, unimaginative. Egypt was a land of hills, of sea, of keen wind clear sunlight; its children were a people of warriors, navigators, climbers, adventurers; its art was vital, plant, ideal, individual. This is M. Wagnon's constant text, nor can we call it a novel one, but he drives it home by illustration; he compares such statues as of the Egyptian "scribe" and the Greek "Apollo" of Tenos, and by thus choosing monuments supposed to be analogous, and indeed officially so, he emphasises more cogently fundamental sub-surface contrasts. The one is that can scarcely fail to suggest to both artist and archaeologist. It has a good plates, and many more excessively lines.

*Little Books and Lines for Working Drawings useful in the Workshop.* Manchester: J. Heywood & Son. London: Simpkin, Marshall, & Co.

This little book has been compiled for the use of working men. It appears, however, to be suited to the drawing-office than the workshop.

Working men, as a rule, leave to the draughtsmen such subjects as the consideration of "lines used in geometrical construction," official forms or figures bounded by right angles, straight lines, finding "the points through which the curve of a Grecian cyma recta is to be drawn," and such like matters. We quite agree with them, however, with the desire of the draughtsmen of this volume to lead workmen to more intelligent interest in their work, and to show that there is nothing in the volume in beyond the reach of any man gifted with moderate industry and a fair share of common sense. The elucidation of the different parts of the subject is rendered easier by a large number of illustrations, and whether used in the drawing-office or workshop, the little book will be useful in a great number of cases.

*Boiler-makers' Ready Reckoner.* By JOHN KINNEAR, revised and edited by D. KINNEAR. London: Crosby Lockwood & Co. This is a book of quite the right sort. A pocket-sized volume, so as to be easy of access, treating of but one subject in a

thoroughly practical manner. The author has not aimed at writing a treatise on boiler-making, but has endeavoured to set before practical men a collection of rules and tables to which they can turn for assistance on doubtful points, or which will shorten and simplify the necessary calculations required in designing steam boilers.

The value of the work would be increased by some data as to testing, and the section that treats of the riveting of boilers might well be enlarged, especially in view of the light that has been thrown on the subject lately by the labours of the Commission on riveting of the Institution of Mechanical Engineers.

*The Engineer's, Millwright's, and Machinist's Practical Assistant.* By WILLIAM TEMPLETON. London: Crosby Lockwood & Co.

This is a collection of tables, rules, and data compiled for the use of engineers, the whole being comprised in just over one hundred pages. There are the usual weights and measures, tables of circumferences and areas of circles, weights of flat and round iron, tables of specific gravities, pitch circles of wheels, &c. The desultory remarks on the properties of steam and construction of steam boilers might well have been left out. They are useless to those acquainted with the subjects, and not sufficient to instruct those ignorant of such matters; there is plenty of useful matter left out of the book that might well fill the space. The information given on the use of the slide-rule is of some value to practical men, but it is difficult to imagine why the "table of railway gradients and resistance to trains per ton of inclination," standing as it does almost alone, was inserted.

#### RECENT PATENTS.

##### ABSTRACTS OF SPECIFICATIONS.

7,763. Drain Pipe. T. Watson, Glasgow. The drain-pipe is trough-shaped, and fitted with a movable longitudinal cover. The lengths are connected by spigot and faucet joints.

13,036. Street Lamp-post. T. Lumley.

Consists in the combination of a street lamp-post, a post-office letter-box, and a fire alarm, or any two of these.

13,136. Window-sash Fastener. G. Guy.

The latch guard of an ordinary sash-fastener is slotted, and a bent lever pivoted within it so as to fall behind the arm of the fastener and secure it.

14,974. Fireplaces. T. Fraser.

An arched recess is formed at the back of an ordinary open fireplace, into which fuel is fed to be coked. The coke is raked forward and burned, while fresh fuel is fed into the recess.

15,506. Bath. S. Owen.

The bath is cast with a seat at the head. Pipes from the hot and cold water tanks are led into the supply pipe, and thus the mixing is effected before discharging into the bath.

16,452. Manhole-cover for Sewers. B. Badham.

The manhole cover and ventilator are cast in one piece with a chilled surface. A catch-pit is built in the brickwork underneath the ventilator to intercept any dirt which may gain access. To facilitate the removal of this dirt, the ventilator is hinged and fastened down by a catch. The escaping gas may be disinfected by passing it through charcoal, &c. To flush the sewer, it is only necessary to raise the ventilator, and introduce a hose-pipe by the opening.

13,497. Exhaust Ventilator. S. Chinn.

Three series of vertical plates are arranged one within the other on the shaft top, between a plate and a cover. The plates of one series overlap the spaces between those of the series next inside. The outer and inner plates are slightly bent, the middle ones being flat.

#### NEW APPLICATIONS FOR PATENTS.

Feb. 12.—2,063, H. Morris, Window Fastenings.—2,070, J. Watson, Cowl for Preventing Down-draughts.—2,072, E. Steward and J. Martin, Gully Traps.

Feb. 13.—2,131, R. Greenwood and J. Webb, Sash Fasteners.—2,141, L. Baudouin, Bakers' Ovens.

Feb. 15.—2,149, S. Bridges, Fittings for Gas Brackets, Chandeliers, &c.—2,150, B. Twigg, Chandeliers.—2,157, E. Kirchner, Mortising Machines.—2,165, W. Telford and J. Shaw, Cooking Ranges.—2,189, W. Tylor and W. Drayson, Closet Basin and other Joints.

Feb. 16.—2,214, R. Hayhurst, Spring Hinge.—2,255, W. Farley, Cisterns for Flushing Water-closets, &c.—2,251, A. Boulton, Saws.—2,255, L. Nash, Water Meters.—2,269, W. Payton, Preventing the Bursting of Water-pipes by Frost.—2,273,

A. Clark, Locks.—2,285, A. Schauschiff, Locks and Latches.

Feb. 17.—2,302, B. Phillipson, Water-closets, &c.—2,310, D. Swan, Pigments.—2,326, R. Rae, Water-closets.

Feb. 18.—2,348, D. Wilson, Building Blocks, Window Sills, Door Steps, &c.—2,351, G. Pridmore and G. Wakeman, Window Fastenings.—2,371, E. Houghton, Chimney Tops.—2,374, C. Groombridge and J. Rickman, Fastenings for Doors.—2,378, S. Varley, Electric Balls.—2,399, H. Fajia, Apparatus for Mixing Concrete.

#### PROVISIONAL SPECIFICATIONS ACCEPTED.

15,782, H. and T. Riddiough, Painters and Paper-hangers' Folding Table.—15,464, E. Preston and E. de Russett, Lavatories.—15,738, W. Egglestone, Sanitary Traps.—525, W. Morrison, Cooking Ranges.—371, S. Osborn, Combined Bed Couch and Chair.—979, W. Leggett, Regulating Fanlights, Ventilators, or Casements.—981, W. Leggett, Regulating Skylights.—1,007, J. Spong, Automatic Fire Alarm.—1,109, J. Shanks and J. Lyon, Excavating Apparatus.—487, E. McClellan, Traps for Waste Pipes and Drains.—521, J. Hicken, Automatic Door Opener.—538, R. Somers, Fireplaces.—1,139, T. Walton, Lever Locks and Latches.—1,163, H. Vaughan, Floors for Drying Bricks, &c.—1,206, G. Whitehead, Ventilator or Chimney Cowl.—1,351, H. Holland, Preventing Down-draughts in Chimneys.

#### COMPLETE SPECIFICATIONS ACCEPTED.

##### Open to opposition for two months.

3,809, J. Carpenter, Fire Grates and Stoves.—4,429, T. Redman, Hanging Stoves.—4,663, B. Boothroyd, Automatically Opening and Closing Ventilators.—5,042, J. Howlett and T. Panario, Water-waste Preventing Cisterns.—5,278, B. Verity, Warm-air Stove.—5,442, F. Ransome, Manufacture of Cement.—6,034, B. Hale, Ventilating.—9,528, A. Gates, Bakers' Ovens.—12,642, E. Ferrari, Ladders.—650, K. Weise, Pan-Tile Roofing.—602, W. Zimmermann, Automatic Locking Mechanism for Doors, Windows, Casements, &c.—4,646, E. Showell, Sash Fastenings.—4,901, H. Pinkerton, Spring Hinges.—7,579, W. Bruce, Syphon Traps.—12,278, J. Thorpe, Spirit Level.—805, W. Jukes and W. Kershaw, Ornamenting Sheet or Plate Glass.

#### RECENT SALES OF PROPERTY.

##### ESTATE EXCHANGE REPORT.

By A. CHANCELLOR.	
Richmond—15, 16, and 17, Parkshot, copyhold .....	£350
Sunbury, near—A plot of freehold land .....	80
Richmond, Paradise-road—House and shop .....	380
Char h-walk—House and shop .....	290
Lower-road—Hope Cottage, copyhold .....	410
Perseverance-place—A copyhold plot of land .....	65
Red Lion-street—One-third share of copyhold yard and stabling .....	530
2 and 3, The Square, copyhold .....	425
Upper Hill-street—Copyhold house and shop .....	450
George-street—Copyhold yard with sheds .....	310
8, 10, and 12, Artichoke-alley, copyhold .....	345
5, Perseverance-place, copyhold .....	125
Upper Hill-street—House and shop, 6 years, ground-rent 24s. .....	20
2 and 3, Kew-road, 7 years, ground-rent 60s. .....	250
Kew-road—Laburnham and Albert Houses, 43 years, ground-rent 48s. .....	500

By DRY, SOF, & HILTON.	
Greenwich—7, Cottage-place, freehold .....	305
9, College-place East, 20 years, ground-rent 1l. 16s. .....	145

By RUSHWORTH & STEVENS.	
Regent's Park—42, Avenue-road, 51 years, ground-rent 26s. .....	1,500

By A. WATSON.	
Harrow—The Wealdston Post-office, freehold .....	580

By W. WHITELEY.	
Harrow-road—30, Woodchester-street, 66 years, ground-rent 1l. .....	370

By J. C. PLATT.	
Notting Hill—119, Cambridge-gardens, 99 years, ground-rent 1l. .....	1,650

By J. C. PLATT.	
Chislewick—17, Bolton-gardens, 94 years, ground-rent 6s. .....	250

By INMAN, SHARP, & HARRINGTON.	
Hutton, near Brentwood—Hutton Lodge, with grounds, freehold .....	650

#### MEETINGS.

##### SATURDAY, FEBRUARY 27.

Architectural Association.—Visit to the New Buildings of St. John College and the Offices of the London School Board. Members to meet at the College, Victoria Embankment, at 2.30 p.m.

Royal Institution.—Rev. C. Taylor, D.D., on "The History of Geometry." 3 p.m.

St. Paul's Ecclesiastical Society.—Visit to St. Paul's Cathedral. 7.15 p.m.

Edinburgh Architectural Association.—The Visit to the Museum of Science and Art will not take place, as announced last week, in consequence of the recent illness of Col. Murdoch Smith, who was to have conducted the party.

##### MONDAY, MARCH 1.

Royal Academy of Arts.—Lectures in Architecture: Mr. G. Aitchison, A.R.A., on "Style and Composition." 8 p.m.

Royal Institute of British Architects.—Special General Meeting. 8 p.m.

Society of Engineers.—Mr. E. S. Bellasis on "The Roorkee Hydraulic Experiments." 7.30 p.m.

Victoria Institute.—8 p.m.



**Clerks of Works' Association.**—Monthly meeting at 31, Spring-gardens, 8 p.m.  
**Philosophical Society of Glasgow (Architectural Section).**  
 Papers by Mr. David Thomson and Mr. W. F. Buchan, On Ventilation."

## TUESDAY, MARCH 2.

**Royal Institution.**—Professor C. T. Newton, C.B., on "The Unexplored Portions of the Greek and Roman Sculptures in the British Museum," III. 3 p.m.  
**Female School of Art.**—Annual Distribution of Prizes, at Freemasons' Hall, 3 p.m.  
**Institution of Civil Engineers.**—Further discussion on Mr. L. F. Vernon-Harcourt's paper on "The River Seine," 8 p.m.  
**Society of Biblical Archaeology.**—8 p.m.  
**Manchester Architectural Association.**—Paper by Mr. Alfred Darbyshire, F.R.I.B.A., 7.30 p.m.

## WEDNESDAY, MARCH 3.

**Carpenters' Hall, London Wall.**—Professor Kerr, F.R.I.B.A., will give a Lecture entitled "A Gossip on the Philosophy of Building Materials," 8 p.m.  
**British Archaeological Association.**—(1) Mr. T. Morgan, F.S.A., will read a paper entitled "Notes on Haslemere." (2) Mr. H. Mann on "The Roman Villa at Box," 8 p.m.  
**Society of Arts.**—Mr. C. V. Boys on "Calculating Machines," 8 p.m.  
**Builders' Foremen and Clerks of Works' Institution.**—Ordinary Meeting, 8.30 p.m.

## THURSDAY, MARCH 4.

**Royal Academy of Arts.**—Lectures in Architecture: Mr. W. Watkiss Lloyd on "The Theory of Proportion in the Arts generally, and particularly in Architecture," 8 p.m.  
**Society for the Encouragement of the Fine Arts.**—Mr. W. Cave Thomas on "The Proportions of the Beautiful of the Human Form," 8 p.m.  
**Society of Antiquaries.**—Ballot for the Election of Fellows, 8.30 p.m.  
**Parkes Museum of Hygiene.**—Mr. Shirley Murphy on "Metropolitan Defences against Infectious Diseases," 8 p.m.  
**Royal Archaeological Institute.**—(1) Mr. G. J. Bain on "The Grashams or Greenes of the Debatable Land." (2) Mr. G. Warden on "The Ancient Buildings of the Charterhouse." (3) Mr. W. T. Watkin on "Roman Inscriptions found in Britain in 1885," 4 p.m.  
**Edinburgh Architectural Association.**—Mr. John McEachlan on "Old Edinburgh Architects," 8.30 p.m.

## FRIDAY, MARCH 5.

**University College.**—Professor C. T. Newton, C.B., on "Greek Myths illustrated by Fictile Vases and other Monuments," II. 4 p.m.  
**Lincoln Diocesan Architectural Society.**—12.15 p.m.  
**SATURDAY, MARCH 6.**  
**Royal Institution.**—The Rev. C. Taylor, D.D., on "The History of Geometry," II. 3 p.m.  
**Association of Public Sanitary Inspectors.**—Mr. W. Warner on "The Disposal of Sewage Sludge," 8.30 p.m.

## Miscellaneous.

## British Archaeological Association.

At the meeting of this Association on the 17th inst., Mr. George R. Wright, F.S.A., in the chair, the Rev. Scott Sartree exhibited photographs, &c., of the Church at Heysham, a portion of which building is of Saxon date. Mr. Proctor Barroughs, F.S.A., described a curious ring with a cameo head of early work set in gold. Mr. Loftus Brock, F.S.A., exhibited some objects of fictile ware discovered in excavations in the City of London, among which was an altar flower vase of green glazed pottery, probably from one of the parish churches. The Rev. G. F. Browne, of Cambridge, exhibited rubbings of the remarkable Saxon sepulchral stone at Whitchurch, Hants. This stone is semicircular in form, having an inscription around the semicircular edge, a bust being in the front face and a charming design of interlaced work on the corresponding position behind. The first paper was by Mr. E. Walford, M.A., on the custom of burial in woollen. After referring to the Act 13th of Charles II., which provides that every person should be buried in woollen and not wrapped in linen, in order to prevent the importation of the latter fabric into England, the mode of procedure was stated. In the discussion which followed, it was pointed out that the law was probably but an amplification of a much older custom. Mr. Hodgkiss showing that a Saxon chief was buried in his cloak. Mr. Birch that Queen Elizabeth believed that the custom would improve the woollen trade, and Mr. Mould that the custom was not yet quite extinct. A paper was then read by Mr. Romilly Allen, F.S.A. (Scot.), on the remarkable Saxon cross stones at Halton and Heysham, Lancashire. One of these has the emblems of the Evangelists, another has a curious representation of a Saxon building, there being interlaced patterns on all.

**Maidstone.**—Another Munich stained-glass window has just been erected by Messrs. Mayer & Co., of Munich and London, in St. Philip's Church, Maidstone, representing in two lights Samuel as a child ministering to the Lord and Hannah presenting Samuel with a coat. The window is a memorial to Mr. Collis, mother of the present vicar, the Rev. H. Collis, M.A.

**Glasgow.**—At the meeting of the Deacon's Court of Stockwell Free Church a few days ago a design prepared by Mr. John B. Wilson, of Glasgow, was selected for erection from seven submitted in limited competition for the new church proposed to be erected in Pollokshields. The selected design is Italian Renaissance in style, and will have a tower at the corner about 120 ft. high. The church will give accommodation to over 970 sitters, and has also a hall seating 400 persons, besides class-rooms, vestry, &c. The proposed cost is 6,500l.

**Royal School of Mines.**—Prof. Warington Smyth, F.R.S., in continuing his lectures on Mining, in the theatre of the Geological Museum, Jermyn-street, considered the various details connected with the laying of the piers for Blackfriars Bridge. The foundations of the piers were put in by means of wrought-iron caissons, the casings of the lower part of which were left permanently in the work. The upper part, which was formed of buckle-plates, was afterwards removed. The iron used in the caissons was, in every case, to be capable of bearing a tensile strain of eighteen tons per square inch. The faces of the L-irons and plates which formed the outer edge of the movable panels were so placed up as, after riveting, to insure perfect accuracy in the dimensions and form of these movable panels, without which a watertight dam never can be obtained. The caissons were rendered perfectly watertight before the last spit of excavation, previously to commencing the foundation, was allowed to be removed. The joints of the movable panels of the caissons were made good with vulcanised indiarubber. A complete covering round the whole of the edges of the panels to be joined was cemented on before the panels were put in place, and a strip of indiarubber was also cemented over the edge of the permanent part before the temporary superstructure was erected, thus giving a double strip of indiarubber, 2½ in. by ¾ in. between every joint. The space allowed for the indiarubber, when screwed up, was ½ in. The central or rectangular caissons were of the same dimensions for all the piers, but the cut-water caissons for the two middle piers were larger than those for the piers next the abutments by 1 ft. 9 in. on the two convex sides. The ground was carefully prepared before the caissons were lowered, all stones, piles, and old timber being removed, and the bed of the river dredged to a level. Guide piles, strongly framed and secured were used to guide the caissons into place, the caissons being lowered by strong tackling attached to six points. Weights were then applied to force down the caissons. The excavation of gravel and clay from the interior was partly done by dredging and partly by divers, and when the bottom was laid dry, by ordinary working. When the separate caissons of each pier were sunk to the full depth, the foundations were then put in up to the level of the top of the permanent plates. The intermediate spaces were then dredged out, the ends closed with double piling and clay. The enclosed space was then also filled up to the top of the permanent plates with cement concrete. When thus secured, the water was pumped out, and the temporary plates removed as the work proceeded, thus clearing the whole pier from end to end, and allowing it to be bonded throughout.

**Coventry.**—A four-light stained-glass window has just been erected in Holy Trinity Church, Coventry, in memory of Alderman Fynes, by his family and old friends. The subject, which occupies the whole of the window, illustrates the Adoration of the Magi. Messrs. Heaton, Butler, & Bayne, of Garlick-street, London, were the artists who designed and executed the work.

**The Late Earl Cairns's Town Residence in the Auction Market.**—Last week at the Auction Mart, by direction of the executors, Messrs. J. & N. Kemp, of Albany-street, Regent's Park, submitted to competition the town mansion of the late Earl Cairns, in Cromwell-road, and known as No. 5, Cromwell Houses, within a short distance of Cromwell-place and the South Kensington railway station. The mansion, which is held on lease for an unexpired term of several years, was stated to be very substantially built and to contain a large number of reception and entertaining apartments. The highest offer for the property being 15,300l., it was withdrawn, as being considerably below the reserve.

**The New Railway Bridge and Station at Blackfriars.**—The London, Chatham, and Dover Railway Company's new bridge and station works at Blackfriars are approaching completion, and it is expected that they will be opened for traffic early in the summer. The bridge across the Thames is all but finished, and the rails are now being laid. The bridge carries six lines of rails, and as the existing bridge carries four lines, there will be ten lines of metals between the Middlesex and Surrey shores when the line, as widened, is opened for traffic. The iron and steel used in the construction of the bridge has been supplied by the Thames Iron Company. The station buildings in Queen Victoria-street have also been externally completed, and are now receiving their interior fittings. The building is faced with red brick and Cornish stone, and has a frontage to Queen Victoria-street of 120 ft. in length, with three entrances. From the booking-office on the ground-floor, the railway level and platforms are reached by spacious staircases. In addition to the trains to be despatched from the new station, there will also be a connexion with the Ludgate-hill Station, effected by an additional line on the east side of the existing girder bridge, over Queen Victoria-street. The roof over the station area is likewise in course of construction. The station area, with covered platforms, extends a considerable distance southwards over the Thames. The station buildings have been erected in part over the Metropolitan District line, with the Blackfriars Station of which there will be a communication. The old Blackfriars Station on the Surrey side of the Thames will not again be opened for passenger traffic, the Company intending to appropriate it exclusively as a goods depot, and the new station on the Middlesex side taking its place as the Blackfriars passenger station. The works are being carried out under the direction of Mr. Wolfe Barry, the Company's engineer, Messrs. Lucas & Aird being the contractors.

**International Congress on Inland Navigation.**—Following up the Congress which assembled in Brussels last summer on the general subject of inland navigation, it has been decided to hold a second international meeting in the city of Vienna on the same subject during the coming summer. A committee of the Danube-Verein, or Danubian Club, in the Austrian capital, has been appointed to make all necessary preparations. It is intended that the conference shall the general question of inland water communication shall be discussed from the scientific as well as practical point of view. The programme will contain four principal sections. The first will discuss the best means of making more generally known the advantages of inland navigation or canal traffic. The second will deal with the question of the best dimensions of canals, locks, &c. The third section refers to organisation of traffic on canals, whilst the fourth section relates to ships, canals for sea-going vessels. The Vienna committee proposes to organise two or three trips which cannot fail to be of the highest interest to all engineers who take part in the proceedings. One of the excursions, for instance, will be down the Danube to the celebrated Iron Gate, in order to enable the visitors to witness what Austrian engineers have been able to effect for the regulation of the Danube at this difficult spot. Another trip will be up the Danube to Linz, through the Rapids at Grein. The conference will assemble in Vienna early in the month of June.

**Llanelli (South Wales).**—The first portion of the Lakefield-road Schools, viz., the Department for Infants, has just been completed by Messrs. Thomas, Watkins, & Jenkins, of Swansea, from the designs and under the superintendence of Mr. E. H. Lingen Barkie. The buildings accommodate 250 children, at a cost, including fittings, being 1,043l. 4s. 11d. and the offices and boundary walls have been carried out at a cost of 302l. 17s. 6d.

**Trade Mems.**—Messrs. Clark, Hunt, & Co. have removed their stock of stoves, chimneys, pieces, &c., from 49, Old Bailey, to their show-rooms in Shoreditch (Nos. 159 and 160). Mr. T. W. Helliwell asks us to mention that his London address will be No. 5, Westminster Chambers.—Messrs. Gibbs & Cannell have opened a London office and show-room, Bridge House, 181, Queen Victoria-street, E.C., and have appointed Mr. F. W. Geddes to represent them.



**The Engineering Society.**—On the evening of Wednesday, February 17th, Professor A. B. W. Kennedy and the Committee of the Engineering Society held a most successful *soirée* at University College, London, in connection with the College Society. Visitors who received in the Engineering Laboratory, where machinery was in motion, and Mr. A. S. Ashcroft's autographic stress diagram apparatus was shown in action. All the available space was occupied with exhibits, among which were working models of the Westinghouse Brake Company and the Worthington Pumping Company. Mr. P. Brotherhood showed a three-cylinder engine and centrifugal pump. The Manganese Bronze Company gave a large exhibit of fittings, with two specimens, which were tested during the evening; while a piece of the Mersey lift-ram, with drawings of the lift, and a hydraulic ram, with a work air-vessel, were sent by Messrs. Easton & Smith. The Electric Apparatus Company and Messrs. Goodhouse & Rawson both gave electrical exhibits, which proved very popular, and mathematical instruments and indicators were shown by Messrs. Stacey & Elliott Brothers. Numerous photographs by the students of the College, and excellent photographs lent by Mr. Treddell, the Worthington Company, Messrs. Perkins & Son, and others, were presented the exhibits. The College Society organised a show of photographs and photographic apparatus in the Library, where Messrs. Clarke & Clarke exhibited their method of tinting by gaslight. They also gave a concert at the Botanical Theatre, which was transmitted by telephone to a distant room.

## PRICES CURRENT OF MATERIA

TIMBER.					
	\$.	s.	d.	c.	a.
ashheart, B.G.	ton	6	10	7	0
ah, P.L.	"	12	10	16	10
aspens	ft. cub	0	2	4	0
ch, Canada	land	0	8	4	0
ch "	"	3	0	0	0
ch "	"	3	0	0	0
ch "	"	3	0	0	0
ch "Dantic, &c.	"	1	10	0	0
Canada	"	5	10	0	0
ne, Canada red	"	3	0	0	0
" yellow	"	3	0	0	0
th, Dakota	"	3	10	0	0
St. Petersburg	"	0	8	0	0
usnet, Riga	log	2	15	0	0
" Odessa, crown	"	3	12	6	0
th, Finland, 2nd and 1st	100	1	10	0	0
" 2d and 3rd	"	6	0	0	0
Riga	"	6	0	0	0
t, Petersburg, 1st yel.	"	9	0	14	0
" white	"	7	0	8	0
" father	"	6	0	15	0
wedisch	"	6	0	15	0
White Sea	"	7	0	17	0
ausco, Pine	"	17	0	30	0
" 2nd	"	6	0	10	0
" 3rd, &c.	"	6	0	10	0
" Spruce lat	"	3	0	11	0
" Red and 2nd	"	8	0	7	10
ow Brunswick,	"	4	0	0	0
tens, all kinds	"	4	0	12	0
rving Boards, sq. 1 in.—Pre-	"	0	9	0	13
ard, first	"	0	8	0	8
second	"	0	5	0	8
ther qualities	"	0	5	0	8
ur, Cuba	foot	0	0	3	0
ura, &c.	"	0	0	3	0
ustralian	"	0	0	2	0
ogany, Cuba	"	0	0	3	0
" Domingo, cargo av.	"	0	0	5	0
erican	"	0	0	3	0
cond cargo av.	"	0	0	4	0
andura cargo av.	"	0	0	4	0
id, Bird's eye	"	0	0	7	0
" Rio	ton	7	0	16	0
" Turkey	"	8	0	14	0
" St. Domingo	"	0	0	0	0
to Rico	"	0	0	0	0
nto, Italian	"	0	4	0	0
METALS.					
-Fig in Scotland	ton	1	19	7	0
" Welsh, in London	"	4	15	6	0
" " Wales	"	4	7	6	0
" Staffordshire, London	"	5	15	0	0
" Flint, in London	"	7	10	9	0
ops	"	6	5	7	0
l-rods	"	6	15	0	0
FE—	"	6	15	0	0
th, ch. and ingot.	ton	42	0	44	0
t selected	"	40	0	44	0
ets, strong.	"	50	0	45	0
" India	"	48	0	46	0
trial	"	45	0	46	0
ly, hard	"	45	0	46	0
ow METAL—	"	0	0	45	0
" Fig, Spanish	"	12	15	0	0
ish, com. brands	"	13	0	0	0
g, English	"	14	0	14	2
nian, special	ton	15	2	8	15
nary bands	"	14	2	8	15
ca	"	0	0	0	0
ton	"	0	0	0	0
its	"	93	0	0	0
alian	"	93	0	0	0
lin ingots	"	97	0	0	0
igh sheet	ton	17	0	0	17

OILS.						OILS (continued).									
		£.	s.	d.	£.	s.	d.			£.	s.	d.	£.	s.	d.
Linsced .....	ton	29	0	0	25	0	0	Cottonseed, refined .....		27	10	0	19	0	0
Cocanutt, Cochin .....		29	0	0	30	0	0	Tallow and Oleine .....		18	0	0	10	0	0
Ceylon .....		28	0	0	0	0	0	Lubricating, U.S. ....		28	0	0	10	0	0
Castor .....		13	6	0	15	0	0	" Refined .....		10	0	0	13	0	0
Palm, Java .....		23	0	0	0	0	0	TURPENTINE—							
Palm-nut Kernel .....		23	10	0	0	0	0	American cks. ....cwt.		1	0	0	1	10	0
Rapeseed, English pale .....		23	10	0	0	0	0	Tar-Stockholm .....bbl.		0	10	0	0	19	0
" brown .....		21	15	0	0	0	0	Archeange.....		0	12	0	0	0	0

## CONTRACTS AND PUBLIC APPOINTMENTS.

*Epitome of Advertisements in this Number*

## CONTRACTS

Nature of Work, or Materials.	By whom required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page
Wood Pavement.....	Vestry of St. George's, Hanover-square.....	G. Livingstone .....	March 1st .....	ii.
New Streets Works.....	Vestry of Chelsea .....	G. B. Strachan .....	March 2nd .....	xiii.
Re-paving Street .....	New Windsor U. S. A. G. Official .....	G. B. W. Fowler .....	do. ....	xiii.
Sewerage Works, Street Cleansing, &c.....	Westminster Bd. of Wks. do. ....	do. ....	March 3rd .....	xiii.
Wood Paving .....	Lambeth Vestry .....	H. Molnhoose .....	do. ....	xiii.
Works and Materials .....	Midland Railway Co. Official .....	A. A. Langley .....	March 4th .....	xiii.
Girders, Floorplates, and Erection of Ironwork.....	Dartford Union .....	J. W. Cockrill .....	do. ....	ii.
Guernsey Granite Spalls .....	Ct. Yarmouth U. S. A. Harrogate Corporation .....	E. W. Harry .....	March 5th .....	xiii.
Concrete Footways .....	St. Giles's B'd of Wks. Hendon Local Board .....	G. Wallace .....	March 6th .....	xiii.
Footpaths .....	West Ham Local B'd. Lewisham Board of Wks. Official .....	do. ....	do. ....	ii.
Works and Materials .....	Robertshite Vestry .....	do. ....	do. ....	ii.
Works, Repairs, and Materials .....	Chelsea Vestry .....	G. R. Strachan .....	do. ....	xiii.
Triennial Contracts .....	War Department .....	Official .....	March 10th .....	xiii.
Water Supply Works .....	Atherstone R. S. A. .....	Baldwin Latham .....	do. ....	ii.
Embankment, Landore .....	Grest Western Ery. Co. do. ....	Official .....	do. ....	ii.
Re-construction of Piers to Windsor .....	Wandsworth & Clapham Union .....	T. W. Aldwinckle .....	March 11th .....	xiv.
Dispensary and Relief Station .....	Brighton Town Council South London Tramways Company .....	Official .....	do. ....	xiii.
Alterations at Workhouse School .....	Guardians of St. Mary, Islington .....	J. G. L. Stephenson .....	do. ....	xiii.
Works and Materials .....	War Department .....	Wm. Smith .....	do. ....	xiii.
Underground Urinals, &c.....	Com. of Sewers .....	Official .....	March 12th .....	ii.
Granite Road Pavement, &c.....	Holme Cultrian L. Bd. Sevenoaks U. S. A. .....	R. Stubbs .....	March 6th .....	xiv.
Pipe Sowers .....	T. Hoppell .....	do. ....	March 16th .....	xiii.
New Roof over Machine House .....	Darwen Paper Mill Co. do. ....	Official .....	March 19th .....	xiii.
Masonic Hall and Club .....	Folkstone Masonry Hall Co., Lim. ....	Reg. Pope .....	Not stated .....	xiv.
Erection of Semi-Detached Villas, Peckham.....	J. B. Wotton .....	do. ....	do. ....	xiv.

## PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page.
Clerk of the Works .....	Croydon Union .....	2l. 10s. per week ...	March 1st .....	xviii.
Rating Surveyor and Valuer .....	Faversham Union .....	Not stated .....	March 4th .....	xviii.
Clerk of the Works .....	Tottenham Local Board .....	3l. 3s. per week .....	March 9th .....	xviii.

## TENDERS.

<b>BEXHILL (Susssex).—For alterations and additions at Bexstead, Bexhill, Susssex. Mr. H. Ward, architect, Hastings:—</b>		
F. Jenkins .....	£513	0 0
H. Ward .....	412	0 0
Barker & Parker .....	400	15 0
B. Foster .....	368	0 0
Hutchings .....	346	0 0
<b>CHESHIRE.—For three cottages on the Acton Estate, near Preston Brook, Cheshire, for Mr. A. C. Talbot, Messrs. W. L. Baker &amp; S. Davies, architects, Frodsham:—</b>		
Stelfox & Carter, Northwich .....	826	0 0
Thomas Davies, Frodsham .....	720	0 0
Executors of late John Gleave, Frodsham (accepted) .....	650	0 0
<b>CHESHIRE.—For repairs, &amp;c., on the Acton Grange Estate, near Preston Brook, Cheshire, for the trustees of Kate Talbot, Messrs. C. E. Linaker &amp; S. Davies, architects, Frodsham:—</b>		
Executors of the late John Gleave, Frodsham (accepted) .....	£268	2 0
<b>COVENTRY.—For the erection of a house at Little Heath, Foleshill, near Coventry, for Mr. A. V. Gardner. Mr. T. F. Tucker, architect, Coventry:—</b>		
W. H. Talbot .....	239	0 0
Wright, Foleshill .....	333	2 6
Woodson, Coventry .....	317	0 0
Kate Talbot, Foleshill .....	316	8 0
Isaac, Foleshill .....	290	0 0
Clarks, Foleshill (accepted) .....	269	0 0
<b>CROYDON.—For alterations to No. 31, The Walldons, Croydon. Messrs. Tolley &amp; Son, architects:—</b>		
Waller .....	£167	0 0
Marriage .....	150	0 0
<b>FOREST HILL.—For a detached house, Vancouver-road, Forest Hill, for Mr. E. Brushfield. Messrs. Tolley &amp; Son, architects:—</b>		
Baylis (accepted) .....	£1,120	0 0
<b>HARROW.—For new workshop, for Messrs. Cogswell &amp; Co., Ltd., Mr. C. M. Shiner, architect and surveyor:—</b>		
Webb .....	£780	0 0
Mills .....	680	0 0
Ackermann .....	660	0 0
Stuart & Son .....	623	0 0
Potter .....	579	0 0
<b>HASTINGS.—For alterations and additions at No. 28, Langdon-road, Hastings. Messrs. Ferrari Bros. Mr. T. Ward, architect, Hastings:—</b>		
W. Elliot .....	£450	0 0
Warman .....	540	0 0
Vignall .....	540	0 0
Harniss Bros .....	534	0 6

**HASTINGS.**—For alterations and additions at No. 20, Robertson-street, Hastings, for Messrs. Morgan & Listor, Mr. H. Ward, architect, Hastings:—

Wardman	£348	0	0
Harmann Bros.	240	0	0
Vigor	127	0	0
White	181	10	0

**HASTINGS.**—For new studio, Robertson-street, Hastings, for Mr. J. Blomfield, Mr. H. Ward, architect, Hastings:—

Vigor	£185	0	0
-------	------	---	---

**HASTINGS.**—For alterations and additions at No. 26, Robertson-street, Hastings, for Mr. F. J. Streeter. Mr. H. Ward, architect, Hastings:—

H. A. White	£673	0	0
Wardman	646	0	0
Philips Bros.	636	0	0
Vigor	610	0	0
Harmann Bros.	595	0	0
W. Elliott	583	0	0
	558	0	0

**ISLINGTON.**—For the erection of stables, &c., Windroest-street, Essex-road. Mr. J. B. Wall, architect, Walbrook, E.C.:

H. L. Holloway	£240	0	0
J. Higgs	245	0	0

**LONDON.**—For alterations at No. 2, Fenchurch-building, for Mr. W. W. Baldwin, Mr. W. Seckham-Witherington, architect, Walbrook, E.C.:

Kearley	£595	0	0
Priestley	660	0	0
Patman & Fotheringham	470	0	0
Elkington	449	0	0

**LONDON.**—For constructing pitch-pine flooring, with girds and sleeper walls, to Drill-hall, Victoria Park, for Messrs. Handley & Co., architects, Walbrook, E.C.:

F. Head	£2	1	0 per square.
Croghan & Co. (accepted)	1	1	0 "

**LONDON.**—For additions, alterations, and repairs to No. 28, Wilton-crescent, Bedford-square, for Col. Knox, Mr. Charles Teague, surveyor, Bucksbury:—

E. W. Schofield	£15	10	0
T. Green (accepted)	415	10	0
	387	10	0

**NEW CROSS.**—For the erection of cloak-rooms and additions to Amerham Hall, New Cross, for the Deptford Conservative Club Company, Limited, Mr. J. B. Wall, architect, Walbrook, E.C.:

S. J. Jerrard	£215	0	0
M. Kedman	450	0	0
H. & W. Congdon	430	0	0
	429	0	0



"THE BUILDER" is supplied DIRECT from the Office to residents in any part of the United Kingdom at the rate of 19s. per annum PREPAID. To all parts of Europe, America, Australia, and New Zealand, 26s. per annum. To India, China, Ceylon, &c. 30s. per annum. Remittances payable to DOUGLAS FOURDRINER, Publisher, No. 46, Catherine-street, W.C.

A. & F. Marshall, South Shields .....	125	0	0
W. Kennedy, Jarrow .....	707	0	0
W. O'Connell, South Shields .....	694	0	0
John Moore, South Shields .....	621	8	0
Jas. Young, Tyne Dock .....	614	13	0
Fishburn Bros., North Shields .....	612	0	0
Haggerston & Ormsby, South Shields.....	611	0	0
John Yeales, Jarrow .....	610	6	2
Robt. Allison, Whitburn .....	600	0	0
Jos. Storak, Jarrow .....	585	0	0
Jos. Neal & Sons, South Shields .....	566	0	0
J. O. Atkin, South Shields .....	506	0	0
Kobb, Sammerbell, Tyne Dock .....	500	0	0

Accepted.

And Store-street, London, W.C.  
Telephone No. 3,152, and Private Wire con-  
necting Business Premises.

11, BILLITER SQUARE, LONDON, E.C.



# The Builder.

Vol. L. No. 2248.

SATURDAY, MARCH 6, 1886.

## ILLUSTRATIONS.

Liverpool Cathedral Competition: South East Corner, with St. John's Chapel.—Design by Mr. James Brooks, Architect.....	372-373
Liverpool Cathedral Competition: View in South Choir Aisle.—Design by Mr. James Brooks, Architect .....	376-377
Design for "A Town Mansion."—By Mr. Gerald C. Horsley .....	380-381
Cheltenham Grammar School Competition.—Design by Mr. G. J. Skipper, Architect .....	384
Cheltenham Grammar School Competition.—Design by Mr. F. A. Powell and Mr. J. H. Ince, Architects .....	385

## CONTENTS.

The Trade Guilds of Europe .....	361	Obituary .....	370	Bernini's Staircase at the Vatican .....	389
The Law as to Line of Frontage .....	363	Royal Institute of British Architects: Medals and Prizes, 1885 .....	387	New By-Laws for Concrete Buildings in the Metropolis .....	349
Notes .....	364	The New Buildings of St. John College and the Offices of the London .....	387	New Public Offices, West Hartlepool .....	390
Mouldings.—By George Atchison, A.R.A. ....	365	School Board: Visit of the Architectural Association .....	387	Plumbers' Work .....	390
The Site for the War Office (with Plan) .....	367	Improvements at Milan .....	387	Truro Cathedral .....	390
The Unfinished Sculptures in the British Museum.—III. ....	368	Architectural Societies .....	387	Woodwork: Beaufort Castle, Beaulieu, H.R. ....	390
Brickwork, and the Leaning Towers of Bologna .....	368	Competitions .....	387	The Student's Column: Foundations.—X. ....	390
Liverpool Cathedral Competition.—Design by Mr. James .....	370	Architectural Association: Brickwork and the Towers of .....	387	Recent Patents .....	391
Brooks, Architect .....	370	Bologna .....	388	Recent Sales of Property .....	391
Design for a Town Mansion .....	370	Central Association of Master Builders of London .....	388	Meetings .....	391
Competition Designs for Cheltenham Grammar School (with .....	370	London Sanitary Protection Association .....	389	Miscellaneous .....	391
Plan) .....	370	Sunderland Municipal Buildings Competition .....	389	Prices Current of Building Materials .....	393

### The Trade Guilds of Europe.

**I**N May, last year, a delegation from the Merchant Tailors' Exchange of Washington waited upon the Secretary of the State Department, to solicit its assistance in securing, through the Consular officers, information as to the conditions which prevail, and have prevailed for some time, between employers and employed in the several countries of Europe.

The principal points on which they desired information were, as to the existence of schools where boys may learn their trade, the laws by which they are governed, and if the system was successful; whether there are any guilds connected with the trade, and if so an account of the constitution, and the laws and regulations concerning apprenticeship. Before applying for the information it occurred to the Department that it would be equally valuable to the other trades.

Instructions were then sent to the various consuls to supply the required information, and what they might consider necessary for the full illustration of the conditions and relations which exist between the employers and employed in their districts.

The result is a volume of over 300 pages, containing full information on the various subjects. Taken together with the previous Report on Labour in Europe, which contains the rates of wages in all trades, hours of labour, cost of education, living, &c., and social habits, it presents as good a description of the state of the industrial classes of Europe as can be got. Some of the consuls, judging by the work, have made no reply; others say there are no such institutions in their district; others give very brief description; but these cases are exceptions. Full information is given on guilds, trade-unions, apprenticeship, schools, technical education, customs and laws of trade, social habits, and other topics, and the works should be in the hands of all interested in industrial pursuits.

Among its contents are the trade regulations of the German empire; a valuable description of the Russian *artels*, or associative labouring societies; the rules of ten traditions of Scotland, including the masons, painters and joiners, and plumbers; and the conclusions of the second Report of the English Royal Commission on Technical Instruction, with the recommendations of the Commission. The Report from Leipzig is devoted to the history of guilds, and contains several inte-

resting features. None of the other Reports treat of the historical part of the subject.

According to Walford, trade guilds "existed in England at a very early date. There is good reason for supposing that in the tenth century there was an order of monks in the north of Germany whose chief occupation was commerce, and who probably encouraged and protected the guilds. These were known as the Grand Masters of the Teutonic orders. They founded a branch in London during the reign of Edward the Confessor, under the title of *Gildhalla Teutonicarum*. These merchant guilds are believed in many cases to have arisen quite independently of the towns wherein they were located; but in other cases they seem from the beginning to have been identified with the town and its corporate government. It seems clear that in early times the craftsmen were frequently members of the merchant guilds. The strict separation which at a later date existed between the merchant and the craftsmen did not then prevail, and probably only came about by degrees." But according to Brentano, the craftsmen to be admitted to the merchant guild had to be in possession of the full citizenship of the town, which implied the possession of land.

The men who in towns were citizens by the possession of town land were often also traders, and early formed for their protection a guild *mercatorium*, when the towns obtained charters; by their influence they obtained as one of its conditions that the men of the place should also have their guild merchant. Thus the citizens and the guild became identical, and what was guild law often became the law of the town. In great cities, where there were no merchant guilds, there the craftsmen early asserted their independence. Many craft guilds existed in Italy from the ninth to the twelfth century, the heads of which possessed a share in the government of the community. But in England and the North of Europe the guilds merchant, having become wealthy, excluded the handicraftsmen. From the union of these latter arose the craft guilds who gained the supremacy in the struggle for liberty. On the Continent the struggle was much more severe than in England, because the craft guilds were subject to greater oppression. In England the two guilds usually existed side by side until the increasing importance of the craft guilds and the decay of the merchant guilds led to their union, and so the craft guilds formed part of the constitution of the town.

The constitution of trade guilds was similar to that of others. They appointed a master and other officers, made ordinances and regulations for their government, the maintenance of their craft and its customs, including rules

against fraudulent workmanship, and the punishment of members infringing the rules; they assisted the members in sickness and adversity, settled all disputes, and had entire control of all matters relating to trade. At first craft guilds were voluntary associations; as they gradually increased in importance and power the terms of membership were altered, charters were conferred upon them confirming their privileges and rights, and no one was allowed to practise his trade who was not a member of the guild. The same causes which led to their rise also contributed to their fall. Growing up by their side was a poorer class who were excluded from citizenship; to these were added craftsmen who were not members of the guilds. In course of time they made their influence felt, and as they rose so the craft guilds decayed. The influence of the Reformation, the changed state of society, the growth of capitalists, the admission to the guilds of those who had little or no connexion with trade, slowly but surely led to their fall; and these societies, once so powerful, now where they exist do so only in name and for very different objects.

The consular report from Leipzig consists of a history of trade guilds founded on notes supplied by Mr. Mothes, an eminent Saxon architect, who is preparing an exhaustive work upon the guilds of the world.

It commences with a description of the early societies analogous to guilds, which are described as being founded through the endeavours of the toiling masses to free themselves from the galling yoke of oppression, gives an account of the Roman *collegia officina* down to the fall of the empire, and of the way in which they spread through those countries that were under Roman rule, and in a comparatively brief space gives a history of trade guilds in Germany down to their abolition in 1869, and of which we give some account, commencing with the conquest of Constantinople.

"When Theodoric the Great conquered that city he found some guilds existing there. The *singularium artium magistris* (masters of special arts) are mentioned often during the reign of the Ostrogoths. The title of *magister* was given to every full privileged member of a guild during those days.

In 590, Thudolinde, Queen of Lombardy, gave certain privileges and rights to the *magistri Comacini* (stone-cutters) on the island of Comacina, in the lake of Como. This *magisterium* existed until the fall of Didier, and from 644 to 724 it was regulated by special laws. Besides the *magistri Comasini* there is evidence of the existence of the *magistri casarii* (house builders), and the *magistri Antelami* (carpenters of Antelamo). When Charlemagne invaded Lombardy he con-



firmed the privileges of the Lombard guilds, and gave to the *mauern* (masons) the rights enjoyed by the free Franks. Long before this Lombard artisans had emigrated to France and Holland, and carried the guild system with them, so that under the comparatively liberal government of Charlemagne they flourished better than for centuries. This is a different view to that taken by other writers, who assert that Charlemagne and his successors forbade the existence of guilds and societies, and decreed the severest punishments against those entering into such combinations.

The clericals and monks now began to engage in the various trades, and soon exercised great influence over the different branches. In 738, the *pes publicus* (the royal standard foot measure) of Liutpand did not satisfy the monks, so they established their own measure, which was called *pes de monichis* (monastic standard foot); and from 914 to 946 the Benedictines strove in vain to prohibit the masons of Lombardy from constructing convents and other religious institutions. At this point began an obstinate struggle of the guilds against the clerical workmen, and also against the serfs and bondmen employed by the nobility. The struggle was bitter, and was felt throughout the Continent. The efforts of the clericals to prevent the guilds from obtaining employment on religious structures did not succeed. In 924 Bishop Ulrich, of Liege, could not find enough architects among the clericals, and was, therefore, compelled to employ members of the guilds. Evidently the word "architect" is here used for or synonymous with "builder." In 1090 Manegold, the architect, was compelled to join a monastic order before he could secure the contract for building the convent at Marbeck. In 1099 Bishop Conrad, of Utrecht, prevailed upon the son of the architect Pleber to betray the secrets of a guild. A short time afterwards the son was put to death by the father for his treason.

From this time to the end of the twelfth century various craft guilds were formed, and had increased so much in importance and power, and so strongly supported civil liberty, that from 1200 to 1219 the Emperor Frederick II. endeavoured to suppress them; but they still continued to exist, and in 1232 the Imperial restrictions were removed. During the struggle the guilds were severely treated. At Brunswick, in 1220, six guild-masters were burned alive and six banished.

In 1230 the guilds of Magdeburg, which had grown powerful, were broken up by royal order, but they were soon re-established with greater privileges and rights. A similar case occurred in 1231 at Wurzburg.

In 1272 Rudolph of Hapsburg recognised by decree the rights of the guilds to exist, and gave them the privilege of bearing arms.

During the thirteenth and fourteenth centuries Magdeburg was the scene of the fiercest struggles of the various guilds. In 1330 they secured several seats in the town council, but the next year they were deprived of their recently acquired privileges and the whole of the masters burned alive. After years of oppression they again secured their rights, and took their places in the town council, and the influence thus gained was felt also in other districts, and helped to secure many advantages to the guilds of neighbouring provinces. Several masters of the guilds were admitted to the town council of Zurich in 1335, but only after a severe conflict.

From 1368 to 1372 members of the guilds are found in the town councils of Aix la Chapelle, Cologne, Darmund, and Mayence. With the change in the external condition of the guilds occurred a change in their organisation.

It was not until 1150 that the guilds had any voice in the election of the masters. Previously to this the masters were chosen in the cities by the town councils and in the country by the bishops and princes, and at that time no one was allowed to be a member of the Strasburg guild who was not of free and legitimate birth and could prove his ancestry for four generations. Later, illegitimate persons were admitted to membership.

But in 1150 the members of the Strasburg

guilds had the right to reject the masters imposed upon them. In 1190 members of the guilds elected their own masters. Laws could only be enacted by the majority of the members, and candidates for membership admitted in a similar way.

But towards the end of the fourteenth century had come a change. The increase of prosperity had affected the masters of the guilds. The old Strasburg rule of not admitting illegitimate persons to the guilds was revived. Some of the guilds excluded the children of weavers, barbers, shepherds, millers, revenue and tax collectors, musicians, because they were not free born. The advance from fellow to master was rendered more difficult. The right of suffrage was taken away from the fellow. Formerly the candidate for admission to the guild had to execute a piece of work which had to be submitted to all the members. The rule was altered, and the masters assumed to themselves the right to judge the work submitted and to accept or reject any candidate they pleased. Each fellow who aspired to a mastership had to work one year in the place where he desired the mastership, and upon admission had to pay a certain sum of money. Disputes among either the fellows themselves, or between the fellows and the masters, were decided by the masters alone, and, not as formerly, by a committee of the two. Every member had to submit all his quarrels to the masters before applying to the civil or criminal courts for redress. This court within the guilds existed in some places as late as 1840. At this date in Hamburg the lodges of the masons and stone-cutters could inflict the punishment of death, and could not be interfered with by the criminal courts.

Most of the masons and stone-cutters united their lodges and formed a grand union organisation. This union, under the great lodge of Strasburg, comprised all the mason and stone-cutter guilds of England, France, Germany, Hungary, Italy, the Netherlands, Portugal, and Spain. The chief master, residing at Strasburg, in 1263 was subject to the authority of the Archbishop of Milan and of the Pope. No mention is made of the union of German building lodges in 1452.

At the Reformation, the fellows of the guilds were in a state of semi-serfdom. The troubled times which followed, especially the Thirty Years' War, destroyed, in a measure, the power of the guilds, and debased the standard of German handicraft work. The workmen found employment difficult, and entered the military service. When the Thirty Years' War ended, German handwork had sunk so low as to be the subject of ridicule. In 1520, Francis I. of France was obliged to send to Germany for gunsmiths, locksmiths, &c. One hundred years later, France excelled Germany in all kinds of handwork. After the peace of Westphalia, Germany had to depend upon French models in nearly all the branches of handwork. At this time the guilds had lost all their influence. Those of the masters that had seats in the Town Councils were rich persons, manufacturers and not handworkers. Two guilds only retained their ancient position, the Merchants' Guild and the *Universitas*. The other guilds still clung to the organisation adopted in the beginning of the fourteenth century. The little power they had left was exhausted in disputes with other guilds or with workmen who were not members of any.

The carpenters quarrelled with the joiners who made staircases; the joiners quarrelled with the carpenters who made doors; the glaziers quarrelled with the joiners and carpenters who made sashes out of soft wood; the joiners quarrelled with the glaziers who made sashes out of oak. The plumber was allowed to sell lamps, but not lamp-chimneys, globes, or wicks. The physician could prosecute the barber who prescribed a medicine, but the barber could not bring an action against a physician who bled or applied bandages. The *Universitas* would always sustain its members, among whom were the apothecary and physician. Either of them could prosecute the druggist, but he could not prosecute the apothecary.

In course of time the influence and power of the guilds sank even lower. The master-ships became hereditary, the fellows thus lost hope and energy; the apprentice became mainly a domestic, and learned little of his trade. At the beginning of this century they were entirely demoralised and disorganised.

In 1815 thousands of German artisans had emigrated or gone into other pursuits. Great efforts were made to revive commerce, but nothing was done for handwork, which had deteriorated through the making of furniture, bronze articles, pottery, &c., by machinery.

In 1847 numbers of the members of the guilds joined political societies in the hope of bettering their condition. This naturally weakened what little influence the guilds had left.

When the revolution was suppressed in 1849, the workmen's unions were dissolved, but continued to secretly exist. At the same time, factories began to be extensively built, and seriously affected the condition of the handworker. Both masters and fellows of the guilds objected to the use of machinery. The former tried to compete with the factories by reducing the wages of the latter, who eventually resisted, and much trouble ensued.

The tendency of the age was towards the suppression of the guilds, and the establishment of general free trade. This took place in Saxony in 1860, and in Prussia in 1868. The guilds were partly dissolved, while the rest of them were restricted in such a way that they soon ceased to exist. A number of fellows established themselves as masters, but, being without either ability, education, or capital, they could not succeed, and most of them became bankrupt. The workmen who did not become masters, having lost their guild connexions, gradually became Social Democrats and anarchists. Apprentices who were compelled to pass certain examinations would not study, and deserting their masters before their time was out entered the service of other masters as journeymen, no certificate of proficiency being required. Manufacturers took young boys as apprentices, and instructed them in a careless manner. Thus in a machine factory an apprentice was taught how to make rivets, and received a certificate as a locksmith. The tailor established as a builder, and the mason as a maker of implements.

At the present time there is a movement for the general revival of guilds. Laws to this end were enacted in 1878, 1880, and 1883; but these laws, while they impose certain duties on the guilds, do not give them any rights or privileges. Guilds under such circumstances are of no use, as no one will belong to a guild which is loaded with obligations and restrictions, but enjoys no privileges.

Their history in the remaining part of Europe is very similar. In France they existed from before the twelfth century, were re-arranged in 1673, and suppressed in 1791. They possessed halls, almshouses, and chapels, but not much real property. At their suppression the whole of their property was devoted to State purposes, but compensation was given, in some instances, to existing members.

In Belgium the guilds were suppressed, and their property confiscated in 1794. In the Netherlands the guilds were suppressed in 1798, and their property vested in commissioners. In 1820 this property was sold, and the proceeds applied to the relief of indigent members of the suppressed guilds and of the poor of the commune. In Switzerland some of the guilds have dissolved themselves, and either divided their property among their members or applied it to public purposes, particularly education; others exist under the name of *abbayes*, and possess considerable property. In Austro-Hungary the trade guilds were abolished, and their monopolies repealed in 1859. In their stead local bodies representing the masters and journeymen were established, apparently trade councils and tribunals of arbitration. The halls of the trade guilds were sold, and the proceeds given to the new associations. In Norway and Sweden the old trade corporations were dissolved in



1846. In Italy the ancient guilds were abolished with few exceptions in the present century before the union of the kingdoms. After the union, in 1878 and 1879, acts were passed abolishing all monopolies. In Spain many of the craft guilds still exist as benefit societies and trade councils. In Portugal the craft guilds were suppressed in 1834. In Russia trade guilds were introduced by Peter the Great in imitation of similar institutions in Germany. They had but little success, and after a fitful existence up to 1870, under certain conditions, trade was made free to all. In Turkey there are believed to be many institutions resembling the craft guilds of the Middle Ages.

In England the history of guilds is not so eventful as in many of the Continental nations. They were never much subjected to the tyranny of the ruling powers, and did not concern themselves with affairs of State; their struggle for freedom was for the right to participate in municipal affairs and to possess control of matters relating to their trades. The security against foreign invasion, the absence of power in the sovereign to enforce his decrees, and his having to rely upon the people's not having the means of resistance (for when resistance was arranged it was often successful), the aristocracy not being an exclusive caste, the parliamentary system in which the guilds were represented, all tended to diminish the jealousy between classes, and to give to the individual some sense of security. We meet in English history often complaints of exactions and oppressions, but these are comparative terms. What was termed oppression in England might in other countries be regarded as not deserving the same designation. The numerous contests in England that took place for the throne were in reality contests between a part of the people against the other, or were regarded by them with indifference; and, as a whole, they were pretty equally avoided.

After victories there were the usual punishments, and cruelties were inflicted on the defeated party, but they were confined to those who took part with either side. Whoever succeeded, no change in the institutions of the country was made, and some historians assert that six weeks after the most violent conflict there was not a trace of it.

The history of guilds in England is the history of its municipal life, of which there is no better example than that of London. The earliest information we have of a craft guild in London was that of the weavers, who had a charter from Henry I., and which was confirmed by Henry II. From 1154 to 1189 there are records of eighteen guilds who were fined according to some authorities for existing without a charter, and, according to others, having neglected to pay the tax which all guilds were liable to. From then till the reign of Edward III. their existence is a continued struggle with the merchant guilds and citizens and each other. In the time of Edward II. was issued an ordinance that required every citizen to be a member of some guild or mystery, and another ordinance of Edward III. transferred the right of election of corporate officers and members of Parliament from the ward representatives to the trading companies. Their victory was now secured, and for many years the guilds possessed both the municipal and political power of the city.

What was the precise connexion between the companies or guilds and the corporation is difficult to say. The ordinance of Edward II. required freemen of the City to be members of one or another of the companies. By the ordinance of 49 Edward III. the companies were nominated the members of Common Council, and the persons so nominated alone were to stand at elections. An ordinance of Richard II. restored the election of common councilmen to the wards, but corporate officers and representatives in Parliament were elected by a convention summoned by the Lord Mayor from the nominees of the companies. An Act of Common Council of Edward IV. appointed the election of aldermen, sheriffs, &c., to be in the Common

council, together with the masters and wardens of the companies. By 15 Edward IV. the masters and wardens were ordered to associate themselves with the honest men of their mysteries and come in their best liveries to the elections; that is, the franchise was restricted to the liverymen of the companies. We thus see the two bodies at one time united, at one time the companies electing the corporation, at another the corporation controlling the companies. Well may the City Livery Companies Commission say that it is no part of their duty to dissect this strange and composite constitution.

The view taken by the Commission is "that from about 1314 the guilds were a municipal committee of trade and manufactures. Soon after they became incorporated, and became, while retaining their position under the municipality, an institution in the nature of a State department for the superintendence of the trade and manufactures of London. By the commencement of the Tudor period they had become to a great extent an obsolete institution as regards trade superintendence. For a long time afterwards these bodies were an important element in the City. In the provinces the craft guilds have almost disappeared; the guilds of London have continued in existence and have never been interfered with in any way by the Legislature with the exception of the Charity and Endowed Schools Commission. The condition in which they have existed for the last two centuries is that of societies, the only purposes of which have been benevolence and entertainments."

But the history of guilds, and especially of trade guilds, has yet to be written. The works upon the subject are nearly all for the purpose of supporting some theory, or taking some particular view,—antiquarian, democratic, or political. Attempts have been made to prove trade guilds to be benefit societies, clubs, monopolies, provident institutions, trade unions, &c., and for every page of historical matter or fact there are several of disquisition and speculation. The most complete work on guilds in English is the recent one of Walford, which contains much valuable and interesting information relative to the guilds of London and the provinces. There is much need of a work written from a social point of view, which would give the history of these societies, the nature and amount of the control they exercised over trade, the regulations they made, and their means and modes of enforcing them, and their relative position to the communities where they existed, which should be free from speculations as to their character, and not too much devoted to their municipal and political struggles. This information can now only be acquired by a tedious search through histories, general and local, articles on municipalities, reports of commissions, pamphlets, &c., at a great expenditure of patience and time.

#### THE LAW AS TO LINE OF FRONTAGE.

THE great value of the House of Lords as a Supreme Court of Appeal has been lately well exemplified by the manner in which they have ended the long-existing uncertainty in regard to the fixing of the general line of buildings in a street under Section 75 of the Metropolitan Management Amendment Act, 1862. Without quoting the whole of the section, it is enough to remind our readers that it enacts that no building "shall be erected beyond the general line of building in any street" without the consent of the Metropolitan Board of Works. Further on the same section says that "such general line of buildings is to be decided by the Superintending Architect of the Metropolitan Board of Works." If any one offends against this rule, by building beyond the line, then complaint is to be made to a magistrate, who may order the demolition of so much of the building as is beyond the "general line so fixed as aforesaid." One would have supposed that the enactment had been clear enough, and that all that the magistrate had

to do was to observe the line fixed by the Architect, and see if the building complained of goes beyond it. But by some legal ingenuity the point became confused, and in the last edition of Woolrych's "Metropolitan Building Acts" the law is thus stated:—"The certificate of the Superintending Architect is not absolutely conclusive, but the magistrate is entitled to judge for himself whether the line fixed by such certificate is, in fact, the general line of buildings in the street." Therefore the decision of a person skilled in regard to the superintendence of buildings, and quite impartial, has to be subject to the opinion of a person who, however competent he may be as a lawyer, cannot be considered to be so competent to decide what is the general line of buildings in a street as the Superintending Architect of the Metropolitan Board of Works. In 1864, in the case of St. George's, Hanover-square, v. Sparrow, we find the law as laid down in the above work first enunciated by the Court of Common Pleas. We are not now concerned with the reasons for that judgment, it is sufficient to state the result of it. But in 1867 came the case of Bauman v. The Vestry of St. Pancras, when the Court of Queen's Bench took an opposite view. Here were two directly conflicting decisions; and then in 1871 came Simpson v. Smith, in which the Court of Common Pleas (differently constituted, indeed) adhered to the decision of the same Court in 1864. So matters remained till the case of Spackman v. The Plumstead Board of Works, in which Mr. Marsham, the police magistrate, decided that he himself must settle what was "the general line of buildings," and dismissed the summons, because, though the buildings went beyond the Architect's line, they did not go beyond what was the true line, in his opinion. This decision was reversed by the Queen's Bench Division, and their judgment has since been upheld by the Court of Appeal and by the House of Lords. Therefore, this most important question, which affects so many interests in the metropolis, is now set at rest once and for all. The only reason for astonishment is that the question could ever have been decided otherwise; the reasons in its favour are so overwhelming that it is a kind of puzzle how such able judges as decided to the contrary could have come to the conclusion which they did. "The words of the section," said Lord Watson in the House of Lords, "have one meaning, and one only, and upon these leading words which enact the prohibition, which constitute the offence, and which direct the remedy, there is no ambiguity whatever. They have a plain and ordinary meaning, and, as far as I see, they have no secondary meaning such as that suggested. The suggestion is that in the language which confers on the magistrate jurisdiction to try the complaint, you can find expression which may be amplified so as to override those other words enacting prohibition, defining the complaint and giving the remedy. And what are these words? 'If at the time and place appointed in such summons the said complaint shall be proved to the satisfaction of the justice.' Now, it is said that you may read these words as signifying that the justice is to re-try everything which has been decided before." Lord Watson then proceeded to point out that the previous plain words of the enactment could not be thus controlled. He concluded by the sensible observation that "a decision by a gentleman in the position of the Superintending Architect of the Metropolitan Board of Works is not likely to be less favourable to the interests of all parties concerned, nor is less likely to attain the ends of justice, than a series of decisions by a number of different district magistrates." Such has been the course, and such the conclusion, of this important phase of metropolitan building law.

**Surveyorship.**—On Tuesday last the Exeter Corporation of Guardians met to appoint a surveyor. On the voting being taken, of the nine candidates, Messrs. Wilkinson & Warren, of Exeter, architects and surveyors, received a majority of fourteen votes, and were declared elected.



## NOTES.

**E** print elsewhere the memorial presented by the Institute of Architects to the First Commissioner of Works on Monday last in regard to the treatment of the site of the new War Offices, and the block-plan proposed by the Institute. The deputation made a case for their view which is quite unanswerable, except on the barest grounds of economy, and this seems to be the view taken by those outside the profession who have given attention to the matter. The *Pall Mall Gazette* observes:—

"The rival plan which the Royal Institute of British Architects submitted yesterday to the First Commissioner of Works for the new Admiralty and War Offices will not be adopted,\* but will be interesting as another record of what London might have been if it cared to pay for appearances. The plan of the Architects is better than that of the Government at every possible point; it widens Whitehall, it prolongs the Mall, and it avoids dwarfing the Horse Guards."

As we have repeatedly said, it is unworthy of such a country as England to build a great public building in a restricted and beggarly manner, and to lose an opportunity for permanently beautifying an important site in its capital, on mere monetary considerations. Those who attended the deputation, perhaps, carried away with them certain not very reassuring convictions as to the possible narrowing effect on the Ministerial mind of the interposition of the permanent irresponsible functionaries who have so much power of string-pulling in the direction of their own restricted ideas. We must congratulate the *Times* on showing signs of coming out of Egypt, that journal having actually devoted a leader to the recommendation of an artistic improvement formulated by a body of architects. After this, we may even hope that the *Times* will one day find out the truth about Lord Grimsthorpe and his attainments as an architectural artist.

**T**HE debate on February 25 on the Tenure of Houses (Ireland) Bill cannot be passed over without notice. The object of the Bill was, shortly stated, to introduce fixity of tenure and fair rents to Irish towns. But the debate broadened out into one upon urban tenure in England and Scotland, and resulted in the promise of the Government to appoint a select committee to consider the question of leasehold tenure in towns. Therefore, the committee will certainly consider the question of leasehold enfranchisement. The cause and the result of the debate show that there exists a dissatisfaction with leasehold tenure in towns; we have never supposed that the dweller in towns would be content to see his brother in the country obtain compensation for improvements and not make an effort to obtain it for himself. The debate is a sign of the times; amid much that is unsound and unhealthy agitation, there is visible a wholesome tendency to make the lessee a permanent occupier at a fixed rent. "The certain rent in perpetuity which could never be raised," as Mr. Macdonald, the late Conservative Lord Advocate, described the Scottish system, will, in all probability, be the solution at which we shall arrive in England, combined with a system of yearly tenancies. Be that as it may, this debate is a certain sign that things will not remain as they are.

**L**AST year we commented on the case of *Melliss v. The Shirley Local Board*, in which Mr. Justice Cave decided that the fact that Pym, one of the parties to the contract with the Local Board, was the surveyor of the Board, did not make the contract void, but merely rendered him liable to penalties under section 193 of the Public Health Act, 1873. The unanimous judgment of the Court of Appeal is published in the current month's number of the *Law Reports*. That judgment reverses Mr. Justice Cave's decision, and decides not only that the officer or servant of the local authority is liable to penalties under

\* Our contemporary means that the House of Commons will not vote the money for it; but we hope better things.

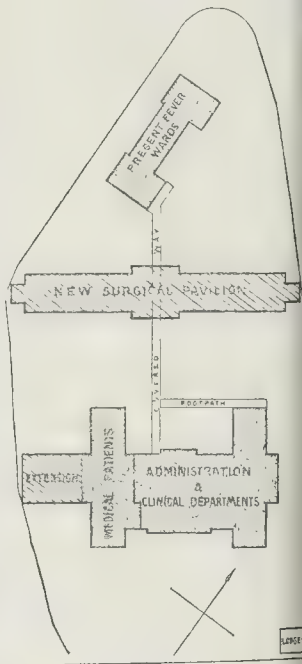
section 193, but that the effect of his being interested in the contract is to render it void. There are no express words in section 193 making such a contract void, but the reasoning on which the Court of Appeal reached their conclusion is easily seen from Lord Esher's judgment. "This rule of interpretation has been laid down, that although a statute contains no express words making void a contract which it prohibits, yet, when it inflicts a penalty for the breach of the prohibition you must consider the whole Act as well as the particular enactment in question, and come to a decision whether the penalty is imposed with intent merely to deter persons from entering into the contract, or whether it is intended that the contract shall not be valid at law. It seems to me that the intention of the Legislature was that such a contract should not be entered into so as to be legally valid." The result of this case, therefore, is a kind of double prohibition against servants of local authorities entering into contracts with their own masters,—firstly, the penalty; secondly, the invalidity of the contract. There can be little question that the judgment is in the right direction, and will put a stop once and for all to such contracts as were the cause of the litigation.

**T**HE complaints of excessive railway charges are so numerous, and practical propositions for reform so few, that it is quite refreshing to have for consideration a suggestion of the latter description. Mr. Jeffers, C.E., an authority on railway matters in America, offers such a suggestion with every confidence in its merits, though he confesses that he does not anticipate a favourable reception for it. Our railway managers always declare that working expenses are at the lowest possible figure, but it is nevertheless in the "operating" department,—as Mr. Jeffers terms it,—that he considers reform is needed. His contention is that we are too conservative in our method of constructing rolling stock, and that the adoption of the "bogge truck" system would cause an immense saving. It is asserted that our carriages and wagons, being stiff and rigid in construction, create an amount of friction which would be greatly lessened by the lighter and more flexible "bogge" system, allowing of a great reduction in the amount of power required for haulage, and consequently in the working expenses. Many of our long passenger coaches are constructed on this principle, which undoubtedly facilitates their running, and lessens the amount of motive power necessary,—the benefit being, of course, principally apparent in traversing curves. The percentage of our working expenses to receipts is less than in America by some 8 per cent., but as they charge lower rates than we do, and pay so much more for labour and fuel, the difference should be greater than it is. The non-adoption of the system advocated is confidently ascribed to simple prejudice, but we can hardly think that there is no other obstacle in the way, as our managers have a reputation for studying economy in every direction, and they would hardly allow prejudice to hinder a beneficial reform. Anything which would allow of a reduction in rates should be hailed with satisfaction, for an increased amount of traffic would result, which would benefit both the shareholders and their customers.

**F**ROM a recent report of the Peabody Trustees it appears that the average cost of the buildings erected by the trustees is 60*l.* 10*s.* 2*d.* per head, so that a family of four persons costs a capital sum of 242*l.* to house, which is a much larger amount than what is ordinarily expended by the speculating builder. As regards the acquisition of land, the trustees have been singularly fortunate, three sites, namely, those in Glasshouse-street, Bedfordbury, and Wild-street, having been sold to them by the Metropolitan Board of Works for a sum which leaves a clear loss of 235,808*l.* or more than a quarter of a million, to the ratepayers. Taking land and buildings together, a family of four persons costs 510*l.* to house. A warning note is struck in the statistics of the mortality among the inhabitants of these dwellings. In the year

1884 the deaths per thousand of the total population of the Peabody Buildings were 19.10, as compared with 20.34, which was the London rate; but in 1885 the death-rate in the dwellings was actually one decimal point above the general rate of mortality in London, the figures being 19.60 in the Peabody Buildings and 19.50 for the whole of the metropolis. It would seem from these facts that, while the death-rate of London has declined steadily since 1876, the death-rate in these model dwellings has increased since 1881, from 17.22 to 19.60 per thousand. It will be probably found that this increase is due to increased density of population, a point upon which we have frequently insisted.

**T**HE Aberdeen Royal Infirmary, having been reported on by medical experts as structurally defective, and not at all equal to modern ideas, the managers recently employed Mr. H. Saxon Snell to suggest a scheme for remodelling and extending the present buildings. Mr. Snell, having visited Aberdeen, now recommends as the most economical method of utilising the present site and buildings to the best advantage:—(1) The erection of a new pavilion of four floors for surgical cases; the extension of the west wing of main building (three floors) for medical cases; and (3) an alteration of the present typhus-fever house, so as to adapt it as a post-mortem room, mortuary, pathological museum, and erysipelas wards. All other zymotic diseases are to be excluded from the Infirmary, and the accommodation after reconstruction would, besides



Plan of the Hospital.

the administrative department, be as follows:—Surgical cases, 100 beds; medical cases, 80 eye diseases, 16; venereal diseases, 16; erysipelas, 8; spare ward, 16,—total number of beds, 236. Mr. Snell estimates the total cost of these proposals (including other details which we cannot enter on) at 25,000*l.* The managers have no surplus funds for building, there being an adverse balance last year, and in fact, generally a deficit on each year account,—a very unusual circumstance with institutions depending on voluntary contributions. Mr. Snell's scheme is, we understand, likely to be objected to on medical grounds, and the proposal to construct an entirely new hospital on modern principles on a less



stricted site in the suburbs urged. The only objection seriously preferred against this is the difficulty of obtaining funds.

THE site for the erection of the new War Office and Admiralty buildings has been begun to be cleared, in spite of Lord Stratheden's appeal to the Government that nothing should be done until the result of the interview between the Royal Institute of British Architects and the First Commissioner of Works had been reported to the House of Commons. The houses in Spring Gardens Terrace facing the park have been partly demolished, and the quaint little gunner's house at the north-west angle of the Horse Guards Parade has been entirely removed. The other houses in Spring Gardens will shortly follow.

THE new western façade of the cathedral of St. Maria del Fiore, at Florence, is proposed to be further adorned by three bronze doors, and designs are invited, and three premiums are offered, viz., one of 4,000 francs (160*l.*) for the central door and two of 3,000 francs (120*l.*) for each of the two lateral doors. It is not stated whether the successful competitors will be entrusted with the carrying out of the work, nor what amount of money is proposed to be expended; and in default of this information foreign artists will perhaps do well to abstain from competing. The designs are to be sent in by the end of October next, and the premiated designs are to become the property of the promoters of the competition.

IN last week's *Athenæum* Mr. Magnússon suggests a very clever scheme for the planning of a library capable of indefinite extension of capacity, as required by the gradual increase in the number of books. His idea is to have a central circular reading-room with a dome and lighted by clear-story windows, and around this a range of book galleries in the form of a spiral, with lower halls, and lighted from above. The spiral gallery could be carried out as far as necessary for the requirements of storage when the library is first founded, and could be increased by the continuation of the spiral outwards as often as it might be found necessary to enlarge the space, without any more interference with the existing building than would be involved in pulling down the terminating cross wall of the spiral and rebuilding it at the end of the new extension. Communication between the spiral galleries and the central reading-room would be provided by eight passages radiating from the centre and piercing the spiral. Architecturally speaking, the termination of the spiral by a "blunt end" would always remain an awkward feature to the eye; but in every other respect the appearance of a whole externally might be made pleasing enough; and on practical grounds the idea is well worth attention, providing a simple and expensive means of enlarging the book galleries *ad libitum*, in proportion to the increase of the contents of the library. Architects ought to be grateful to Mr. Magnússon for a new idea.

ONE of the most difficult forms of thinking is to make a plan," said Mr. Goschen, in his admirable address at the session House on "Hearing, Reading, and Writing." His remarks were not addressed specially to architects, but no doubt architects among his audience, and they would recognise the truth and force of the dictum. I am, it is true, assisted by the "pen and ink" which Mr. Goschen himself finds such valuable aids to the process of thinking, and great statesman finds indispensable. But fact remains that the effort of thinking out a good plan, one "with a backbone," as Mr. Goschen happily expresses it, addressed to a given end, and unswayed by accidental circumstances of detail, is an intellectual effort of no mean order, to which the public attach quite insufficient weight.

FROM a letter we print in another column, addressed by the Leeds and Yorkshire Architectural Society to the Town Clerk of Sunderland in reference to the proposed Municipal Offices competition, it will be seen that there was ample reason for the criticism we have already made as to the arrangement of charging 5*l.* for the conditions without giving a word of information as to their probable nature. The Leeds and Yorkshire Architectural Society have paid the fee, or one of them has, and have found that architects have been invited to pay 5*l.* for ascertaining that they are to be mulcted of ten per cent. of their proper profit on the work, that no professional referee has been appointed, and that the time is too short. The Corporation may reconsider all these points; but unless they do, some men who may have been foolish enough to comply with the terms of the advertisement will unquestionably have "spent their money for that which is not bread."

#### MOULDINGS.\*

BY GEORGE AITCHISON, A.R.A.

GRACEFUL, well-designed, and effective mouldings give the same distinction to a building that proper and well-chosen words do to language.

In grouping mouldings together care must be taken to make the divisions in harmonic proportions, to contrast the great with the small, the strongly-curved with flat surfaces, or with other mouldings whose curves are nearly flat, so that the group may be like a well-balanced and harmonious sentence.

A sentence is but a small piece of the whole work, and only helps to make up the impression to be conveyed, or the emotion to be raised; it is only a humble minister to the whole plot; but you may have noticed in reading a story that, if the plot is the only excellent thing in it, you probably read it but once,—certainly but a few times; while, if the language be terse, harmonious, and expressive, though you may have learned the plot in your childhood, you read the work again and again with increasing zest.

In the poets, where rhythm, as well as choice words, always exist, we occasionally get those—

"Jewels five words long  
That on the street: 'd forefinger of old Time  
Sparkle for ever."

So in architecture we sometimes get a group of exquisite mouldings. We even now sometimes see a cast of Greek mouldings treated as one of the treasures of a house. Architects should feel the beauty of a moulding, as a master of language feels the beauty of a word.

R. Hall said, "I could think of that word 'tear' till I wept"; and when this sentence from his sermons was read to him, "Grace penetrates the soul as the sun penetrates the clouds," he said, "That is not mine; I never used a word in three syllables when there was a more expressive one in two; the word I used was 'pierces.'"

The only architects I know who must have had this feeling towards their mouldings are the Greeks.

If you consider the long continuance of the Doric order; that the only changes made in it were by delicate variations of the echinus, and in the proportion of the order, you must feel the love for exquisiteness that animated the architects and charmed the people of Greece. You feel that the Greek architects had the same admiration for their predecessors' master-pieces as Michelangelo had for the dome at Florence. "I will not make one like you, and better than you I cannot." We picture to ourselves Iotinus, who hoped to get the next temple to design, watching from dawn to eve the light come and go on the capitals of the Theseum, and lying awake at night picturing to himself how he could improve the proportions, and get a more exquisite curve in the echinus.

If we want to excel the Greeks,—and I hope we do,—we must at least take the same pains. Dante tells us that "Excellence is not to be got by lying on a bed of down." Thanks to Professor Cockerell, Mr. Penrose, and John Pennethorne, we have the exact sections of some of the Greek mouldings, and they have shown us that when the architect had designed his mould-

ing, he took the trouble of getting the exact conic sections to make his mouldings perfect. Nothing can better show the difference of mental attitude between the Roman and Greek architects than their treatment of their mouldings; the latter felt that no trouble was too great to make their mouldings approach perfection; the Roman architects thought this striving for perfection not worth the trouble, and made their mouldings of segments of circles, determining to cover them with carved ornament if they were too faulty. The English architect is too apt to follow this bad example, or even to do worse; he sometimes boasts of being able to draw mouldings with his eyes shut, or as fast as he can write, or he makes his youngest pupil or his office boy copy them from a book.

I have had one or two Greek, Roman, and Gothic mouldings run, to let you see the difference between them. You will notice, besides the shape, the extremely subtle methods by which the Greeks obtained their effects, and which are utterly wanting in Roman mouldings. The capital and necking of the Greek Doric are perhaps the best-known instances, and are certainly the most appreciated; the deep square abacus looks thick enough to bear the weight of the entablature, contrasts well with the large smooth convex surface of the circular echinus beneath, from which it is divided by the shadow of the re-entering curve, while the abacus makes the curved shadow that contrasts so well with the bright light beneath, gradually deepening into shade; the shade of the echinus is contrasted with the bright lines of the fillets below, intensified by the shadows between them, against which the elliptical flutings die; and a little below this juncture, one thin horizontal line of deep shadow repeats, and enforces those from the fillets above, and contrasts with the delicate shading of the vertical flutings.

In the use of the hawk's-bill moulding the bottom of the cyma, forming the lower part of it, is often brought in just beyond the upright face of the next member, so as to make a delicately-graduated shade finished by a sharp black line; sometimes it is continued by a similar ogee below,—its section is then like a bracket in writing { . Beneath the hawk's-bill there is sometimes a fillet; sometimes this fillet is bevelled outwards; sometimes there are two fillets; sometimes there is a bead beneath; but, whether this bead be bold or delicate, the whole group bears the mark of deep study.

The ogee may be found with a square or with a bevelled fillet under it; sometimes its lower half is sunk in beyond the upright face of the surface below; sometimes it has a bead below it; but you can rarely find two of these mouldings alike. In short, no device was too slight, too eccentric, or too trivial, for a Greek architect to employ, if he thought it would contribute to the desired effect.

In the Doric entablature there is an absence of what we call mouldings,—the cymatium belongs to the pediment, and not to the cornice. In the cornice, frieze, and architrave the whole effect is got by flat surfaces, whose soffits are sometimes at right angles, are sometimes bevelled, and sometimes curved. At the Parthenon the only horizontal mouldings in the entablature are a little hawk's-bill moulding, and one sculptured bead; but in all temples the entablature was but a framework for sculpture, in that there was plenty of curved surface; and the Greeks felt the need of severity to set off the sculpture; and they also felt how the curved outline and undulating surfaces of the sculpture set off the formal lines of the architecture.

The Doric temple is undoubtedly the most perfect piece of æsthetic architecture man has yet achieved; every device of architectural composition was lavished upon it. The outside of the building, too, was pure white, enriched by brilliant painting, and adorned with the highest forms of sculpture. Temples, too, were always placed on high ground when it was possible, and expedients were used to prevent the first near view from being directly in the front.

In the entablatures of the Ionic temples we get but little more moulding than in the Doric, and much less variety; for we have no mutules with their caps, guttæ, and bevelled soffits. In both varieties of temple the same aim is apparent, that is, to get a broad band of considerable projection to cast a deep shadow; this band is just softened under the top fillet by a

\* A lecture delivered at the Royal Academy on the 28th ult.



little moulding to join it to the corona. In the Ionic the corona is crowned with an ovolo, or an ovolo and bead. The bed mould in the Doric is but the square mutule band; while in the Ionic it is an ogee and bead. The crowning member of the architrave in the Doric is but a wide fillet, while in the Ionic there is an ovolo and bead beneath a narrow fillet, and sometimes the fillet itself is crowned by a small ogée.

In Doric temples, except that of Jupiter Olympius at Agrigento, there are no bases to the columns; but in the Ionic there are not only beautiful bases of great variety of shape, but these base-mouldings are often carried round the cella of the temples, so that we see their effect on the straight as well as on the round.

In many instances the mouldings of the Ionic entablature and capitals are sculptured. Though this has been of advantage to us in showing the form of the ornament, which has perished in the Doric, where it was only painted, the sculpture breaks up the surface, and makes perfection of form in the mouldings less necessary than when the ornament was painted; but it appears that the Greeks were no less careful in the design of the original shapes of the mouldings, and in perfecting them by conic sections.

We once professed to admire Greek art, and even its most deadly opponents have never denied its perfection. Yet no one ever ventured to publish a full-sized section of a moulding until 1850, when Professor Cockerell gave two or three in his work on Egina, although J. Penethorne had taken them full-sized in wax, and Mr. Penrose had most elaborately measured them. Yet we have full-sized Gothic mouldings by the score, if not by the hundred, though no sane person could ever compare them, for perfection, with the Greek. Greek mouldings were designed for bright sunshine, and the most brilliant people who ever lived have spared no pains, and no study, to bring them to perfection; besides, in the mouldings of the best buildings we have the accumulated experience of ages, for the Greeks would not sacrifice perfection to novelty.

Before speaking of Roman mouldings, I may mention that, in certain small buildings of peculiar design, the Greeks deviated completely from the proportions they allowed for regular temples; in short, they thought and felt. They did what was structurally and aesthetically necessary for the particular work they had in hand. In the Erechtheum, the entablature is about one-fourth of the height of the column above the base; while in the temple of Pandrosus, the little attached temple with the caryatides, the entablature was about two-fifths of the whole height of the figures. A certain thickness was wanted for the architrave, and a certain æsthetic weight, to compare well with the caryatides, so in this temple they omitted the frieze and made the cornice and architrave nearly equal in depth. To deepen the cornice they put below the ordinary bed-mould a deep dentil band and cap, below that a cavetto and bead, and then repeated the ogée and bead of the bed-mould at the bottom; thus you have a depth of two-thirds of what may be called the original cornice below it.

In the circular monument of Lysikrates, the only specimen we have of Greek Corinthian, the architrave had to be made deep, as it was on the circle; the frieze wanted to be narrow, on æsthetic grounds, to display a proportionate length of sculpture; so the cornice, instead of being one-fifth of the height of the entablature, is nearly the depth of the architrave; to eke out the cornice, a fillet and cyma are added under the bed-mould, then a dentil band and cap, and an ovolo and bead. These heavy cornices, designed for special purposes, commended themselves to the vulgar taste of the Romans, who generally had overpowering cornices, but they had no figure sculpture to consider.

Let me draw your attention to one particular instance of the barbarous taste of the Romans. They knew that the Greeks had sculpture in the metopes of their Doric temples; so in theirs they nailed up the skulls of the slaughtered bullocks with a fillet round the horns. Nature did not make bones to be seen, so they are always ghastly. What are we to think of people who chose bones as an ornament? Nothing can better show the blind reverence the urbane and beauty-loving Italians had for Roman antiquity than their copying this atrocity; nay, I have seen bullocks' skulls on the jambs of an Italian chimney-piece. I

have seen them, too, on the front of an English bank, but with more reason, as I suppose they were the monogram or rebus of the architect.

We criticise Roman mouldings under peculiar circumstances; they are the mouldings with which we are most familiar from constantly seeing them on buildings at home and abroad.

These mouldings were spread through Europe by the Italian architects of the Renaissance and their imitators. We cannot even greatly blame these architects, for they came when mankind had just been freed from their ascetic and ecclesiastic chains, mainly through the study of the Roman writers.

The human mind began to feel itself free, and its gratitude was overflowing towards those by whom its fetters had been removed, and through whose means man could roam over new fields of study and delight. The tradition, too, of Rome's power and extent, and of Roman peace, must always have existed, and must have deeply impressed the citizens of the small Italian republics, always troubled by internal feuds, and dreading conquest by more powerful states.

The ruins of Rome's gigantic buildings were almost as impressive as its literature: that was not then known to be a feeble paraphrase of the Greek, and the remains of Greek sculpture that were constantly being found, added to the general respect. Mankind, overwhelmed at once by gratitude, by the traditions of greatness, and by finding in every branch of knowledge works they could not equal, are to be forgiven the enthusiasm they felt. Probably mankind were not then far wrong in thinking that their highest aspiration was to study and emulate the Romans for the time being, in spite of their gratitude being misplaced; but they little thought it would end, as far as learning and architecture are concerned, in binding them with worse fetters than those they were released from. Luckily we have just outlived this mistake of confounding the conduit-pipe with the cool and refreshing water it brings to our lips; and are beginning to doubt if the worship of the brazen wolf of Rome is the highest form of religion.

About Roman mouldings nothing need be said; they may mostly serve as a warning of what to avoid. We may safely say of anything purely Roman connected with the fine arts, that when they are not copies of Greek they are worthless, or worse. In anything connected with constancy and courage, with war and discipline, tactics and strategy; with those arts of diplomacy by which nations may be set by the ears; with those laws by which conquered nations may be kept down, the Roman works may be studied with advantage. The art of planning, by which known wants can be best provided for, and the science of construction, were never carried out better than by the Romans, and we may devote our time usefully to their consideration. Rome, too, was the emporium of the world, and much that would otherwise have been lost was in this way preserved; but the fine arts, that demand a high ideal, noble sentiments, and refined taste, could not possibly flourish amongst them. You might as well expect a man to be a judge of fine claret, who drank a quart of raw spirits every day. The amusement of the Romans was looking on butchery, and they justified it as the proper means of perpetuating their ferocity. At the best they were ferocious peasants, and to the last this was their ideal type; at their worst they were voluptuaries, who had lost every virtue, even their courage.

The Mediævals began a new epoch in architecture, as the Romans had begun a new epoch in construction. On the subject of construction the Romans began to ask themselves what was the use of the lintel, and eventually discarded it. The Mediævals began to ask themselves why they should use mouldings that did not show in their misty climates, and eventually took care that they should show, by deep cuttings and undercuttings.

As the climates in which they worked were so deficient in sunshine, there was too little distinction between the bright streak of light on shafts and their half shade, so they marked it with a projecting fillet, or curved the shaft to an arris.

In both cases the Romans and Mediævals made a great advance,—in fact, a double advance; they began new styles, and they tasted the charm of thinking to the point. This habit of thinking was not exhausted by the

solution of the one problem in hand, but remained with each man through life, and was constantly urging him on to make fresh advancement and new discoveries.

Here, at least, one may see an opportunity for the present generation of architects. They may think about their mouldings; they may make them as beautiful as Greek mouldings; and they may learn how to make them as effective in this misty climate as they were in sunny Greece. When once architects begin to think, there is no knowing where they may stop. We might even develop a new style.

In the present day, where invention is extinct in the civilised nations of the world, or we are pursuing a wrong method. If it be extinct, we cannot help ourselves, but we cannot be sure of it until we have tried a new method. Instead of saying "the Greeks were the most brilliant people the world has known, and had beautiful mouldings," or that "the Mediævals were the most logical and had effective mouldings, so I cannot do better than follow them," let each one say, "I want my mouldings to be beautiful; I do not want them to be copies of Greek or Mediæval, and I want them to tell their tale in my building. The Greeks had a sunny climate, and marble to work with. I have a misty climate, and stone or brick, how can I make my mouldings look as beautiful as theirs, and show as well as the Gothic mouldings?" Neither of these desires can be gratified at once. We must study the proportions we want, the curvatures of the mouldings, and the way of properly contrasting them; and then, from actual observation on the spot, try to learn by what devices we can make them tell the tale we want. Properly speaking, this is the art of the architect. A man may be a good planner, a good designer, and a good constructor, but he can hardly be an architect until he knows how to get the effects he wants, at the height or in the situation they occur.

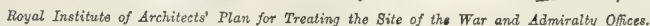
Pheidias was a monumental sculptor, and competed for filling the pediment of the Parthenon. Pheidias's model was not chosen, but he demurred to the judge's award, on this ground, that the models were put on the ground while the sculpture was to be placed 50 ft. above it. His objection was allowed, and when all the models were placed at the proper height, his model was adjudged to be the best.

Viollet-le-Duc makes a distinction between mouldings, viz. those which arise from a vague desire of man to ornament his dwellings or monuments, and those which have a definite signification, and are based on thought and logic. He says,—“The ancient Greeks were the first people who knew how to give to their mouldings a form derived from reasoning, applied to the object.” Two elements have to be considered in mouldings, their utility, and the sentiment their shape will produce. That which marks the mouldings of the five epochs of architecture, is the proper expression of the need they satisfy, and a distinction in their shape which attracts attention, which should engrave them on the memory. This distinction is derived from the sobriety of the means employed, in the choice of their curves, and a keen observation of the effect of light upon them. One may say of mouldings what has been said of style, “mouldings are architecture.”

**The Female School of Art.**—The Marchioness of Salisbury distributed the annual prizes to the students of the Female School of Art in the Freemasons' Hall, Great Queen-street, on Tuesday afternoon. The Honorary Secretary read the report, in which it was stated that during the past year 196 students received instruction in the various branches of art taught in the school. In 1885, 2,263 works were forwarded to South Kensington for examination and rewards; of these, 957 were in the advanced section, and 1,306 in the elementary. The Marchioness of Salisbury then distributed the prizes. The Queen's Scholarship was awarded to Marion Ryder Henn; the Clothworkers' to Emma Ada Newcomb; the Atkinson to Hilda Lucy Bell; the Duchesse of Westminster to Bertha Jeffreys; the Bright men to Helen Louise Condor; the Queen's Medal to Mary Harriett Fores; the Queen's Burdett-Conti's Scholarships to Ruth Harman and Charlotte Maria Alston; and the Gilchrist Scholarship to Catherine Maria Howard.

\* In our next we will give the remainder of the lecture together with a number of sections of mouldings & illustration of





Your Lordship may not be aware that in June, 182, when a Select Committee of the House of Commons was engaged in considering the scheme of the Spring-gardens site, the Council of the Royal

2. The continuation and opening up of The Mall to Charing-cross, with an architectural screen and gates, as at Hyde Park Corner, arranged on a central axis, terminating with the centre of Charles I.'s statue, and affording a vista both of the Strand and of St. James's Park, would be an improvement, the attractions of which are apparent to any one who studies the matter on the spot; so much so, that it is, to say the least, extraordinary that any scheme for the utilisation of Spring-

Bearing this in view, we venture to point out that the internal courts, as shown on the official block-plan, appear to be inadequate in point of width in relation to the lofty buildings which are to surround them, and we would therefore suggest that a redistribution of the space allocated to open areas might be advantageously adopted, such as, with a slight increase of space, would admit of the courts



in question being made, as on the block-plan we submit, 50 ft. in width in place of only 25 ft., as on the official block-plan, and of an addition of 15 ft. being also made to the width of the quadrangle. About 6,000 square feet would remain available for increased accommodation upon each floor, and we would suggest that this additional space should be so disposed as to dispense with the necessity of erecting a lofty building immediately contiguous to the Horse Guards. Aesthetically, the gain would be immense to the Horse Guards, as well as to the general effect, were the wing of the new offices which would adjoin the former restricted to a moderate height. On the plan we submit we have projected the frontage of the building further to the west than was proposed by the official scheme, and to this we can see no objection, as the proposed building need not necessarily encroach upon the Park, nor occupy more than the space which is now enclosed as garden-ground attached to existing houses in Spring-gardens.

The scheme we promulgate involves the removal of the whole of the existing buildings between the present Admiralty and Drummond's Bank, and our block-plan of the new offices is so arranged as to admit of their completion without necessitating the dislodgment of Messrs. Drummond's, at least till such a time as other suitable premises can be provided for the accommodation of the latter.

In view of the circumstance that the Government are pledged, as we understand, not to disturb Messrs. Drummond in the possession of their present banking premises, and seeing that the area of 10,000 square feet, already referred to as being available for future erection in the nature of a wing to the north, is as nearly as possible identical with the area now occupied by Drummond's Bank, it would seem not unreasonable to suggest whether the area referred to might not be appropriated for the erection of new premises for Messrs. Drummond, which might be erected concurrently with the new offices, and be completed and ready for occupation before they were asked to vacate their present house. Such an arrangement would, we conceive, obviate all difficulty in regard to the acquisition and removal of Messrs. Drummond's present banking premises.

We respectfully beg leave to submit this scheme, in the interests of the general public as well as of the world of art, for the consideration of Her Majesty's Government, with the conviction that, while satisfactorily providing for two great and much-needed public improvements, namely, the widening of Whitehall and the opening-up of The Mall, it will secure a site worthy of the important buildings that are to occupy it, will provide an increased area available for the new offices, and afford the architects who have been already employed a better opportunity than they now possess of producing a national monument, such as may bear comparison with similar structures in foreign capitals.

We have the honour to remain, on behalf of the general body of members of the Royal Institute of British Architects,

Your Lordship's most obedient servants,

EWAN CHRISTIAN, President.  
ALFRED WATERHOUSE, } Vice-Presidents.  
THOMAS WORTHINGTON, }  
J. MACVicar ANDERSON, Hon. Secretary.  
WILLIAM H. WHITE, Secretary.

Royal Institute of British Architects,  
9, Conduit-street, Hanover-square, London, W.,  
22nd February, 1886.\*

In the course of some conversation which followed, Lord Morley said he gathered from the memorial that the two points to which the Institute specially directed attention were the opportunity for widening Whitehall at that point (and the advisability of doing so on architectural grounds as well as those of public convenience, in order to enable the new building to be better seen), and for securing an opening from the Mall into Charing-cross. Mr. Charles Barry pointed out that the widening of the small internal courts of the proposed building, from 25 ft. to 50 ft., was considered by the deputation as a most important point on sanitary grounds. Room for doing this, without lessening the accommodation within the building, was obtained by the proposal to extend the limits of the site slightly westward into the Park, which would have little practical effect as an encroachment on the Park, but would add a considerable space to the internal area of the building. In regard to the question of lowering the new building towards the Horse Guards, Mr. Mitford observed that the architects had not been aware originally of the interest which Londoners felt in the Horse Guards building, but that on being made aware of this, they had themselves moved their lofty tower from the position contiguous to the Horse Guards, which it occupied in the first design, to the position which it occupied in the amended design. A member of the deputation pointed out that one effect of leaving Drummond's Bank and other buildings

in front of a portion of the new buildings, which would be considerably higher, would be that the smoke from the chimneys of the lower buildings would be liable to enter the upper windows of the War Offices, as the perspective view exhibited in the room clearly showed. Mr. Anderson observed that Mr. Beresford Hope would have been present had he not been prevented by an important engagement, but he sent a letter supporting the views of the deputation, observing:—"The plan that you propose is unquestionably a better one than that of the Government. Should the latter one be proceeded with I can prophesy for it an eternity of unfavourable criticism and of regrets for a thoroughly bungled opportunity."

Mr. Christian recommended the First Commissioner to notice the bad effect of the lofty buildings crowded close to the street in Northumberland-avenue, which was apparent to every one, yet it was now proposed to erect buildings still more lofty close up to a thoroughfare not so wide as Northumberland-avenue.

The First Commissioner assured the deputation that, while necessarily unprepared to give any positive undertaking at the moment, the points which they had brought before him would have his very best consideration. Mr. Christian having expressed the thanks of the party to Lord Morley for his courteous reception of them, the deputation withdrew.

#### THE UNEXHIBITED SCULPTURES IN THE BRITISH MUSEUM.—III.

PROFESSOR NEWTON's third and concluding lecture\* on this subject was mainly devoted to the inscriptions contained on some of the numerous Roman sepulchral monuments stowed away in the basement of the Museum; but before describing and reading some of these inscriptions he referred to one or two specimens of sculptured sarcophagi, of which he exhibited drawings. One of these drawings represented the end of a sarcophagus found at Cyrene, on the north coast of Africa. He instanced this specimen as being a very suitable model for the decoration, by carving, of articles of furniture, &c. The design consisted of Cupids bearing festoons of flowers. These festoons, he had no doubt, were copies of the actual festoons which were used to deck the Roman tombs. The inscriptions on some of these sepulchral monuments were very curious, most of them relating to endowments left in trust to the survivors of the deceased on condition that they observed certain religious ceremonies at stated times. An interesting portion of the lecture was devoted to a description of the *columbaria*, or "pigeon-holes," which were formed in large numbers by co-operation between all sections of the people as the future resting-places of their ashes, which were enclosed in urns or small marble boxes. The management of these *columbaria* was described, the proprietary being analogous to the members of a modern provident burial club or society. After describing one or two more sculptured sarcophagi, one of which afforded a very interesting representation of the marriage of Cupid and Psyche, with evident attempts to portray the incidents described by Apuleius, the lecturer referred to the light which ancient cut gems were capable of throwing on the study of the myths and sculpture of the ancients, and in conclusion he said:—"Now I have said what I had to say about these buried remains. In the vaults of the British Museum are all these things, which have been buried since the year 1852, and which are defaced and begrimed with dirt. They are utterly useless to anybody in their present position, and they cannot be seen without the aid of a lantern. Now, of course, I am bound to accept the decision of my generation, and, if it is the pleasure of the British public to leave these things where they are until the advent of another generation more sympathetic with regard to archaeology, I have nothing more to say. As you are aware I have ceased to be in any degree responsible for the present condition of these unhappy monuments, or for the exhibition of any other part of the magnificent collection of which I had the honour to take charge up to a very short time ago. The responsibility has entirely passed from me, but, if I may venture to say so, the responsibility has not passed from

the British public, and never will as long as the British Museum is national property. It is now some twenty-five years ago since I had the honour of giving a lecture on the Sculptures of the Mausoleum in this very theatre. Those sculptures were then in an unsightly shed, very much exposed to the weather. I made an appeal then, and pointed out that this is one of those things which is nobody's fault, because it is everybody's. Many years passed before my appeal was attended to, but by degrees we succeeded in absorbing into the Museum itself those sculptures and many others at that time in the sheds. Little by little we have received instalments of room for our national collection of sculptures, but this final act of bringing up the sculptures I have described from the darkness of the basement to the light of day, remains to be done. Those sculptures are texts on which we may preach. They are themselves dumb except in so far as they appeal to the eye of the intelligent beholder. I feel convinced that if they could speak they would say, in plaintive tones,—

"Perhaps it was right to dissemble your love,  
But why did you kick us downstairs?"

I would, then, earnestly entreat you to remember this: Governments in these days promise a good deal, and promise a good deal that they never fulfil; but if they are thoroughly convinced that the British public want a thing, they give it. I regret that I do not see at present any outward manifestation on the part of the British public that they care about what I consider to be a national disgrace so much as I think they ought to care about it.

#### BRICKWORK, AND THE LEANING TOWERS OF BOLOGNA\*.

FROM letters which I have received with reference to my lecture I fear that its title may have misled some of you to look for an illustrated history or description of Italian brickwork in general, and of the "Leaning Towers of Bologna" in particular. I must, however, ask you to listen to a much more humble and unpretending discourse, which aims merely at putting into intelligible form a few notes which some years ago I made of these towers, as bearing upon the treatment of our own brickwork at the present day.

If I should repeat anything which you already know I hope, at any rate, it may not be altogether without some fresh feature of interest. If lessons are worth learning they are worth being brought forward in various forms and from various points of view.

Finding myself, then, at Bologna one fine September morning in the full enjoyment of a most enviable and acceptable holiday, I strolled away before breakfast towards those celebrated towers, and I thought I could not do better than take a "constitutional" to the top of the higher one and enjoy the view from such an isolated and commanding position at the height of some 300 ft. from the ground. I had, moreover, a desire to acquaint myself with the arrangements and construction of its interior, especially with reference to its staircase, the thickness of its walls, the diminution of its exterior dimensions, the description of bricks used, and the nature of the mortar and of the construction. I had no intention of making any special use of my investigations, but, having taken a few notes, I was urged by a friend to put them into shape, as likely to afford some little interest, if not instruction, to others also.

The Architectural Association immediately arose to my view in the long perspective, and having taken sketches of a few details, carefully to scale, I felt that I might be able the better to come before you. Most unfortunately on reaching Florence I irremediably lost my sketch-book, and together with it my hopes of being able to prepare anything worth producing. Nevertheless, on my return journey, the interval of an hour and a half between my trains afforded me the opportunity of renewing some of my notes of this tower, and taking again some dimensions of its sectional treatment. From the hurried nature of my second visit I am a little doubtful on one or two points, but I shall still venture to give you the leading features of this interesting structure, together with a few practical hints with reference to modern brickwork which its study suggested to me.

\* For detailed reports of the first two lectures see *Builder*, pp. 298, 352, ante.

\* A paper by Mr. William White, F.S.A., read before the Architectural Association on the 26th ult.



This tower,—the completed one,—was built in the year 1109, by Gherardo Asinelli, from whom it derives its name. The adjoining tower, built by the family of the Garisenda in the following year, probably never was completed. Intended to out-top the other, it is now but half its height, whilst its declination is between  $19^{\circ}$  and  $20^{\circ}$ , that of the other being only  $13^{\circ}$ . There were formerly endless doubts and disputes among tourists and guide-books, and the question is very often still asked at the present day, as to whether the towers were purposely built in this way, or whether they had subsided through defective foundations. Baderer says the tower of the Garisenda was built thus,—purposely on the slant. But their appearance, no less than contemporary history, seems conclusively to point to their subsidence taking place immediately after, and partly during the course of their erection. This certainly was the case at Pisa. In this campanile the declination is the greatest at the lower part, and thence to about two-thirds of its height it is gradually led back by a gentle curve towards the perpendicular. I say "towards" the perpendicular, for the upper part is still out of the line, so far as the eye can judge.

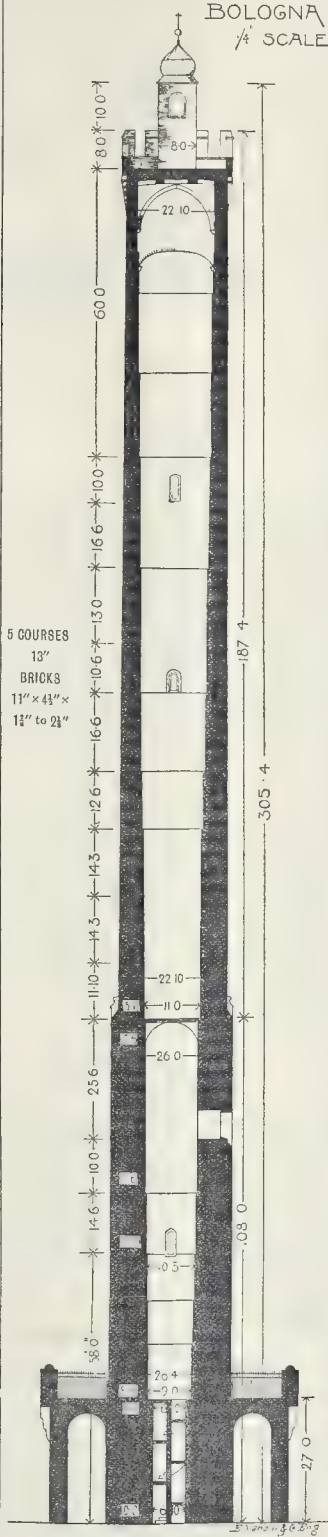
Signor Filopante, of Bologna, took accurate observations of the tower at Pisa, as well as of those of Bologna, and assumed himself that a sufficient subsidence was still taking place to make it probable that they must eventually fall in a certain number of years, if it should still continue as he maintained it did. To my mind the probability is wholly against their falling, inasmuch as they must have fallen long ago had not the ratio of the subsidence been one of diminution rather than of increase, or even of a regular fixed quantity. The greater the divergence from the centre of gravity the more rapid would be the subsidence, other causes being equal, but here the ratio of subsidence seems to be less, at any rate so far as it has gone, and, therefore, it must be diminishing, and unless it had long ago nearly reached its bearings, it is not likely that more than its name would have now come down to posterity. It would not be surprising to hear that the tower of Pisa is still sinking, considering the way in which the water has been allowed to stand, from time to time, from 6 in. to 1 ft. in depth round the base on the lower side, and to soak away into the foundations.

It appears, indeed, like the Chapel of the Spinelli, to have sunk bodily into the earth, for its lowest stage stands now in a deep area sunk around it. In confirmation of the theory that their declination is from subsidence, rather than from intention, is the fact that a considerable part of the Tower of the Garisenda was taken down from fear of its declination becoming dangerous. Gally Knight says that the Asinelli Tower also was reduced in height by 156 ft. after the earthquake in 1446. Then, again, the idea of an intended inclination seems wholly improbable from the mere difficulty there must be in building safely to such a great height, with inclined and diminishing perpendics or plumbings, and on an inclined bed, to say nothing of the absurdity of supposing that the men of that day would not start the walling in level beds, even if they really had an intention of building out of the upright, which is an almost equal absurdity, although there may have been then, as now, remarkable men who would set aside common sense to strain after an affectation of originality. The name Asinelli may be interpreted as meaning "little asses." And if the theory of an intended inclination as attributed to them had proved to be the true one, the diminutive ought rather to be changed into the opposite. But this certainly would not be appropriate to the constructors of this interesting and remarkable monument. The experience of the builders of the Asinelli Tower appears to have been lost upon their successors in the following year as to the treatment of the foundation of the Tower of the Garisenda. They altogether failed to complete their work. There it stands, a crude and forlorn monument of honourable rivalry, we will hope, between the two families.

There is but little attempt in these towers at the ornamental treatment of detail in brick-work which characterises so much of the Italian work, and adds so greatly to its beauty and interest. There is, however, in the Asinelli good and careful design and construction about the several parts, giving it an effect of satisfactory harmony and completeness.

We must now proceed to a short description of the building itself. The base of the tower is

Y<sup>e</sup> ASINELLI TOWER  
BOLOGNA  
1/4 SCALE



about 51 ft. square, but nearly half of this is formed by an enclosing wall carrying a terrace at forty-three steps, or about 27 ft., from the ground, with a parapet hung out some feet over it, upon a deep moulded corbel course. At about 80 ft. above this is a battlemented set-off externally, and a paved floor. The tower then rises some 220 ft., diminishing upwards to the corbel course carrying the parapet, at the paved platform on which the cupola stands. The cupola is a bell-tower. It is about 8 ft. square, and is covered with an ogee roof. It has a large plain semicircular-headed belfry window, on each of its four sides. So much for its general aspect. We must now look a little more closely into the details of its construction.

We enter at the base by a narrow door, the head of which is formed partly by arching and partly by stone lintels, on massive corbels, through a wall 10 ft. thick, into a circular staircase of 6 ft. 10 in. diameter. Very few of the original steps of this staircase remain. There were about fifteen steps in the circuit, giving 17 in. in width next the wall, with a 12 in. newel and 7 1/4 in. rise. The newel staircase ceases at about the ninety-third step, or in about six circuits. The inside is then set off square, 9 ft. 3 in. each way, with walls reduced internally to 8 ft. 8 in. thick, the walls having been already reduced externally from 10 ft. at the base to 9 ft. 8 in. at the top of the newel staircase. This external reduction is by a set-off at the height of the forty-third step already spoken of. There is a small opening out on to the parapeted terrace. This terrace is carried on a small barrel vaulting and external wall, which does not seem to be otherwise connected with the main structure, to which it forms a subbase, and around which rude sheds were built early in the fifteenth century, in such a way as effectually to disguise the original design. Just below the cessation of the newel staircase comes the first window in the west front, and from its position with relation to the stairs, and to the windows over, in the north front, I concluded that the newel staircase was to have been carried up, but was abandoned. Remains of ten or twelve steps are still visible, broken off at the wall, where the well-hole begins. At about two-fifths of the height there is a plain groined vaulting, and paved floor opposite, the embattled exterior set-off seen in the perspective. At the top of the tower is a vault, with a twofold system of ribs, to carry the paved terrace and cupola over. To this I must recur presently. There must be some error in the height of this cupola as given by Murray at 38 ft. The portion rising behind the parapet cannot be more than 17 ft. or 18 ft., i.e., nearly three times the height of the 6-ft. door, from the terrace up to the spring of the copper-covered ogee roof with which it is capped, and this roof cannot be more than 9 ft. This would make it but 27 ft. at the most, and only 19 ft. above the 8 ft. parapet. Possibly the height may be taken to the top of the finial.

From the landing where the newel ceases, the ascent is now made by a rickety wooden staircase, in short flights against each wall of the square, with insufficient supports; the outer string having sunk some 3 in. below the wall-string all the way up. These steps rise about 7 in. I name this chiefly as affording a check,—very slight, it must be admitted,—to the respective heights of the stages and offsets by which I measured my section. But I cannot give accurately even the number of the steps. There is an old saying that "some people cannot count," and Murray numbers them at 429. This, at all events, cannot be correct. There is, however, a difficulty in counting these steps, there being a number of low quasi-steps, varying from 1 1/4 in. to 3 in. in height, which one hardly knows whether to count or not. And I had not the opportunity of checking my counting a second time. I lost my dinner as it was, and very nearly my train, which would have been almost as bad. But, in ascending, by adding together the number of steps in the stages, or points at which I made note of them, they come to 452, besides the cupola, which was locked. Whereas in descending I counted them through, to the vaulted stage 271, and to the ground 174, making in all 445, which is probably the more correct number, though still 16 more than given by Murray. Then as to the height in feet authorities differ. Of course, I could not measure this. But Murray gives it at 293 ft., and at 331 ft. to the top of the

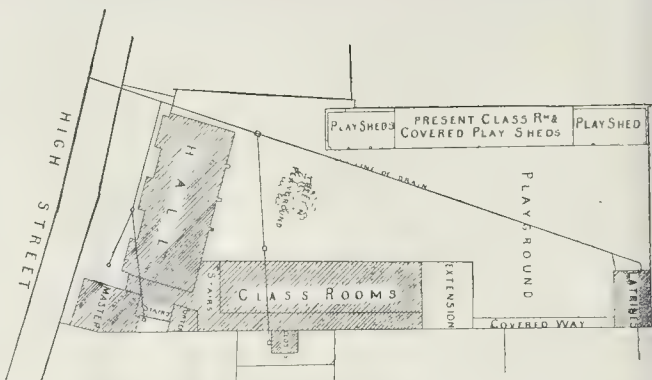


lantern. I ought to say that, excepting the cupola, so far as I can calculate approximately by the steps, and also by the distance apart of the putlog holes, my dimensions work out to the same result within a few feet, although with such small units it is very easy to be a long way out. But it is only on this basis that I have been able to go, for the accompanying section. There are, in addition to the stages, but two material offsets on the inside. The manner in which they are made suggests the possibility of intermediate vaulted floors having been contemplated at these points. The others are only from 1 in. to 3 in. and at very irregular intervals from 10 ft. to 15 ft. apart. There are recesses left for large beams at most of them. There is nothing to show whether these were ever provided or not, but they were probably used for stages or landings for the steps or ladders. The heights of the stages of scaffolding outside seem to have been very regular. Above the set-off these were 4 ft. 9 in. apart, and below it 4 ft. 6 in. These holes were not filled up. Indeed in Italy they generally built from the interiors with scaffolding only hung out from the wall, and the holes were still left perhaps to facilitate further repairs. Their appearance is not so objectionable, as one might suppose, and in this case especially. I think they add a favourable feature to the work which would otherwise have nothing to relieve its massive plainness and monotony. It also affords to the eye better means of taking in the real height and scale of the building. The windows are small, being 17 in. wide and 4 ft. 3 in. high to the spring. The interior opening is 2 ft. 4 in. wide. The sills are weathered a little outwards and stepped to throw out the wet.

We come now to the vaulting of the flat roof. There are first two main ribs across laterally one and half brick wide by one brick deep; i.e., 16 in. by 11 in., and over these resting on them are diagonal ribs 11 in. by 11 in., filled in with brick vaulting, and covered with a paving of brick flat. The walls are, as we have seen, 5 ft. 11 in. thick above the battlement set-off, and at the top they are 3 ft. 2 in., so that they diminish above the extreme set-off to nearly one-half their thickness, and to less than one half of their thickness from above the basement. The 10 ft. wall at bottom is ten bricks thick, and the wall is three bricks at the top,—not of our 9 in. brick, but about 12 in., when laid as they are, with a wide mortar joint. Both quoins and faces are wonderfully true. The bricks are hard and the mortar sound, and though it has endured the beat of the storm for nearly 800 years, it would still put to shame most of the brickwork of the present day. I did not observe any system of bond in the work. So far as I could see, little or no attention seems to have been paid to it. Perhaps some one can enlighten us presently on this point. The irregularity in the size of the bricks would not be conducive of regularity in this respect. They are very irregular in form. But the average size would be 11 in. long and 11 in. to 2½ in. thick. Five courses of bricks, with an equal number of joints, measure 1 ft. 1 in. Thus the mortar beds are ¾ in. thick, and the side joints are frequently much larger. Consequently every brick is wholly surrounded by mortar, which forms a compact mass throughout the structure, contrasting strongly with the fine thin joint with which bricks are lodged together at their edges after the fashionable mode now in use in England. Sooner or later we shall have to come to specifying our mortar joints to be not less than half or three quarters of an inch in thickness, instead of not more than one quarter. I have, indeed, for a long while specified the side joints to be wide enough to allow of their being fully filled with mortar. It necessitates good mortar and good construction. But of this we will speak further presently.\*

**Free Lectures at Carpenters' Hall.**—The third of the present series of free lectures to artisans, under the auspices of the Carpenters' Company, was delivered on Wednesday evening last. The lecturer was professor Kerr, F.R.S.E., who chose as his subject, "A Gossip on the Philosophy of Building Materials," and impressed upon his hearers the great scope there was for the invention of artificial materials to correspond with the artificial purposes of building. A report of the lecture will appear in our next issue.

\* The remainder in our next. A report of the discussion will be found on p. 388.



Block plan of Mr. Skipper's design for Cheltenham Grammar School.

## Illustrations.

### LIVERPOOL CATHEDRAL COMPETITION.

DESIGN BY MR. JAMES BROOKS.

THE two reproductions from Mr. Brooks's drawings which we give this week, showing the interior of the south choir aisle and the exterior of the south-east angle of the building, are very fine examples of the manner in which their designer has caught the true spirit of Gothic architecture. The broad masses of masonry in the buttresses of the exterior are especially fine and striking in effect, and recall Ruskin's expression about the characteristics of Mediaeval architecture:—"Solid stone, broad sunshine, starless shade." The interior view shows on a larger scale than in the other drawings the manner of connecting the vaulting of the aisles with the main piers which rise past the springing of the aisle vaults.

### DESIGN FOR A TOWN MANSION.

THIS design, the work of Mr. Gerald C. Horsley, was submitted in competition for the Gold Medal and Travelling Studentship at the Royal Academy schools last December, and we are informed upon the best authority that it only failed of success by a single vote. The author has been singularly successful, though at some sacrifice, we think, of external effect, in grappling with the real theme of the competition, namely, the thorough lighting of the interior for the display of works of art. The sculptured frieze is beautifully drawn, but is worthy of a more important place in the composition.

### COMPETITION DESIGNS FOR CHELTENHAM GRAMMAR SCHOOL.

DESIGN BY F. A. POWELL AND J. HOWARD INCE, JOINT ARCHITECTS.

In this scheme the class-rooms, &c., are placed well away from the High-street, the school-hall being in front and of easy access either from the street, class-rooms, head-master's, or board-room. It, therefore, becomes the principal feature in the design, which is, as far as possible, in harmony with the old buildings and the traditions of the school.

The exterior is faced with Painswick stone, and relies for effect on simplicity and breadth of wall space.

It gives accommodation for 230 boys at an estimated cost of 5,328*l*.

DESIGN BY GEORGE J. SKIPPER, ARCHITECT, NORWICH.

The conditions of this competition prevented competitors from corresponding with the hon. secretary to ascertain, if needed, any explanation on the conditions or further knowledge of the Governors' views with regard to the proposed building, but the head-master at the present school very courteously gave any information in his power. The following were ruling points in preparing the design:—(a) A large assembly-hall set back at least 24 ft. from High-street; (b) the elevation to High-street to be specially considered; (c) so long as the

class-rooms, &c., at rear provided the necessary and proper provisions throughout for the various purposes their distribution would be capable of readjustment; (d) the caretaker's house quite an unimportant adjunct.

The accompanying plan shows the accommodation on the principal floor, and on the floor beneath are the lavatories, hat and cloak room, coal stores, heating apparatus and caretaker's house, which latter is located under the head-master's rooms, &c. On the first floor, over head-master's room, is the Governors' board room, which is lighted partly by the semi-circular oriel window shown in the perspective view.

The buildings on either side of school shown in the perspective are from a sketch made at the spot, and in the grouping of the building special care was taken not to form a "gap" in the principal street of the town.

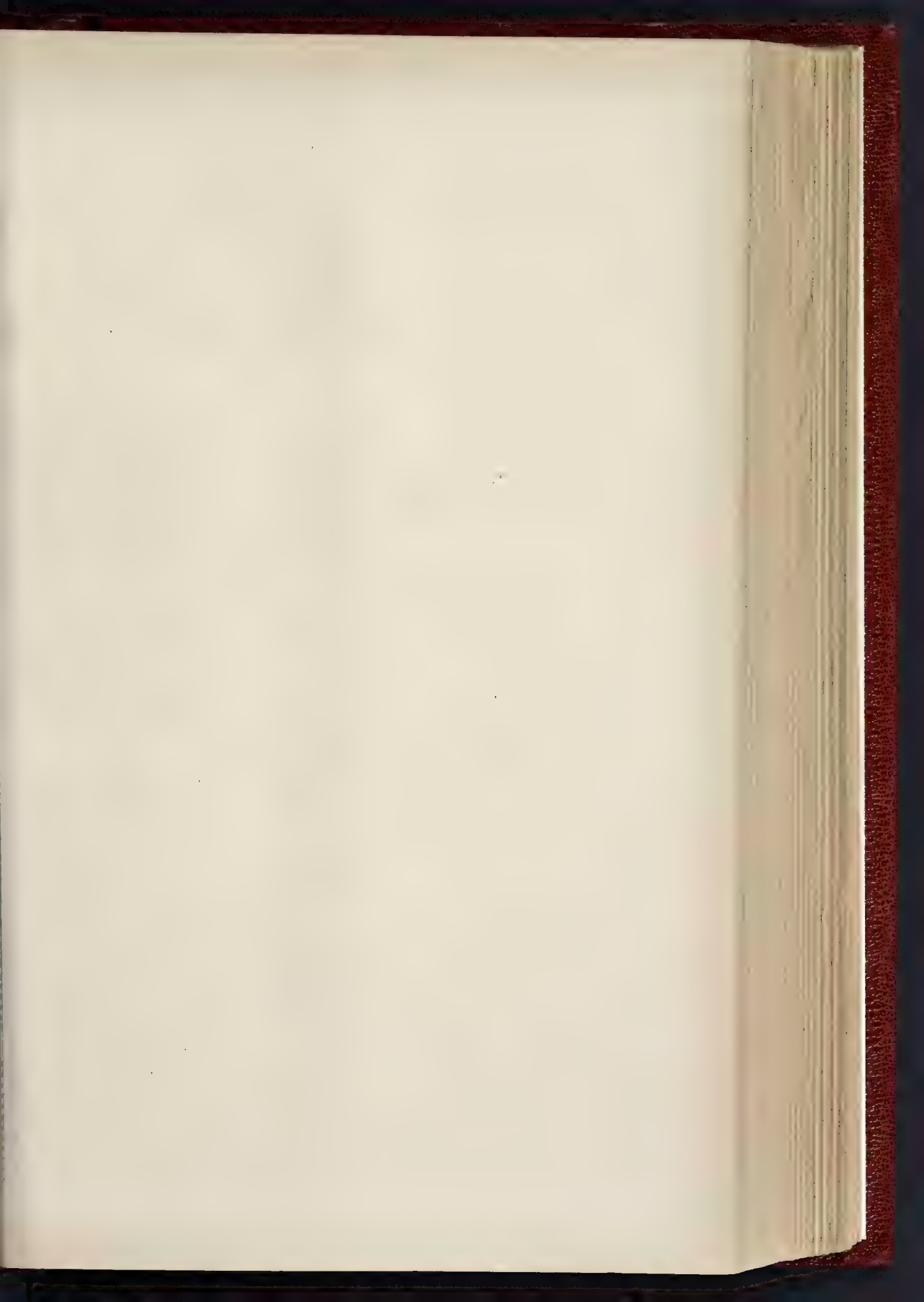
\* We had added an elevation of the accepted design by Mr. H. Hall, but deference to the wish of Mr. Hall, who thought his design would not be fairly judged by being shown in elevation along with others in perspective, we defer the illustration of it till the completion of the perspective view which Mr. Hall has in preparation.

### OBITUARY.

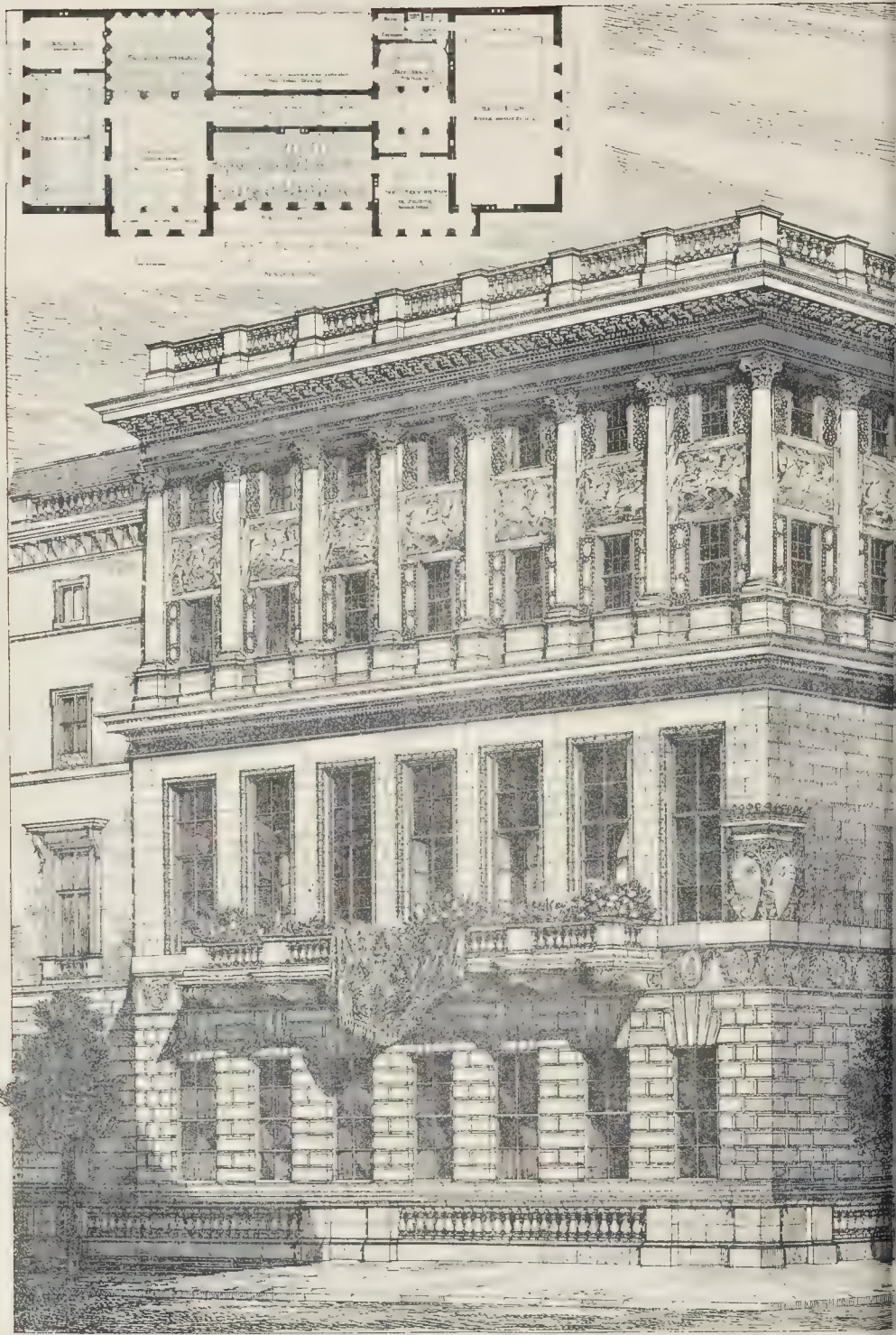
The late Mr. E. E. Cronk.—We regret to hear of the death of Mr. E. E. Cronk, surveyor and land agent, of Sevenoaks, which occurred on the 18th ult. Mr. Cronk, who was sixty-five years of age at the time of his death, was Fellow of the Surveyors' Institution.

Herr Johann von Unruh, the well-known German railway contractor, died recently in Berlin, at the advanced age of 80. He was born at Tilsit, studied architecture at the Berlin Academy, and subsequently became a Governmental inspector in Breslau, as well as councillor at Gumbinnen and Potsdam. He was elected director of several important industrial and manufacturing associations, and was the chief builder of the Upper Silesia railroads and the lines running from Potsdam to Wittenberg. He sat as deputy for Magdeburg in the two first Diets of the North German Confederation and in the Reichstag of the German Empire. Herr von Unruh was likewise the author of works on other subjects amongst them being "Sketches of the Modern History of Prussia" and "Experiences of the Last Three Years," the former of which appeared in 1849, and the latter in 1851.

**Fire Protection of the Metropolitan Suburbs.**—Owing to the imperative need increased fire protection for the suburban districts of the metropolis, and the pressure brought to bear by the vestries concerned, the Metropolitan Board of Works, at their meeting on Friday last, decided to order three additional steam fire-engines from Messrs. Shand, McAlister & Co. It is hoped that when the Bill before Parliament to provide for a higher fire brigade rate becomes law, an increase will be made in the number of fire-escapes in the suburban districts.



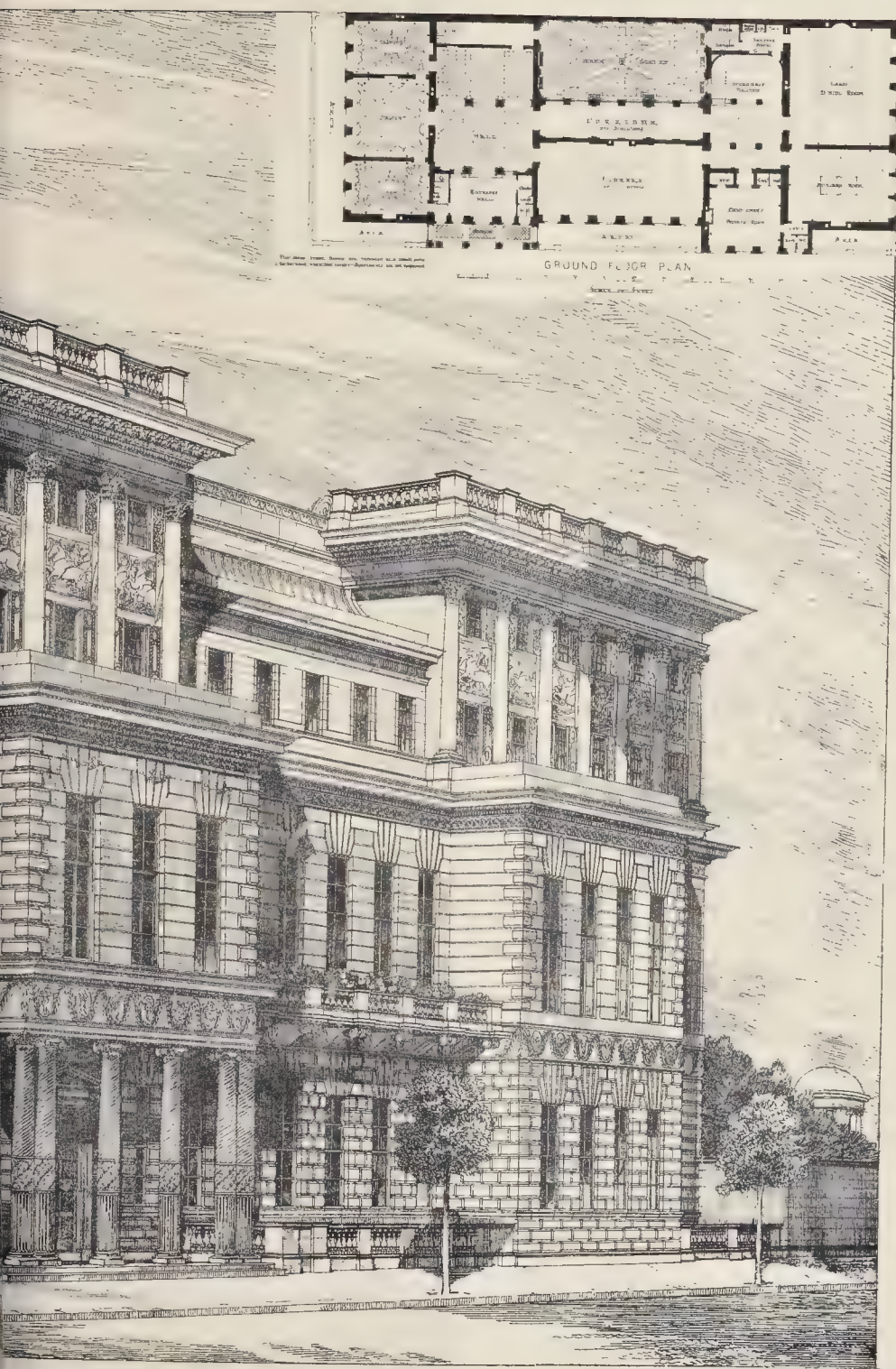




GRAND ACADEMIC HALL, METAL COMPOSITION, 1885

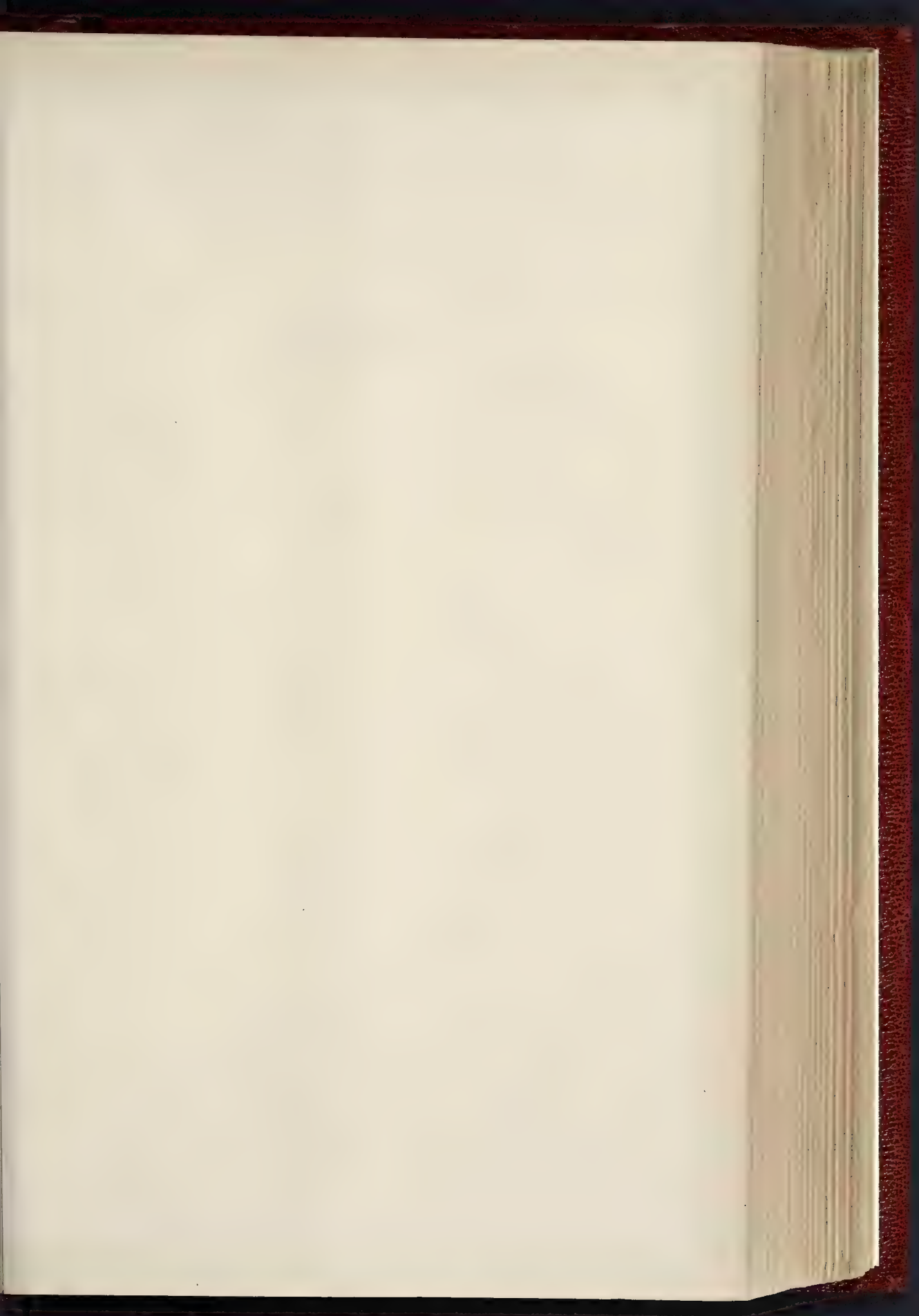
DESIGN FOR "A TOWN



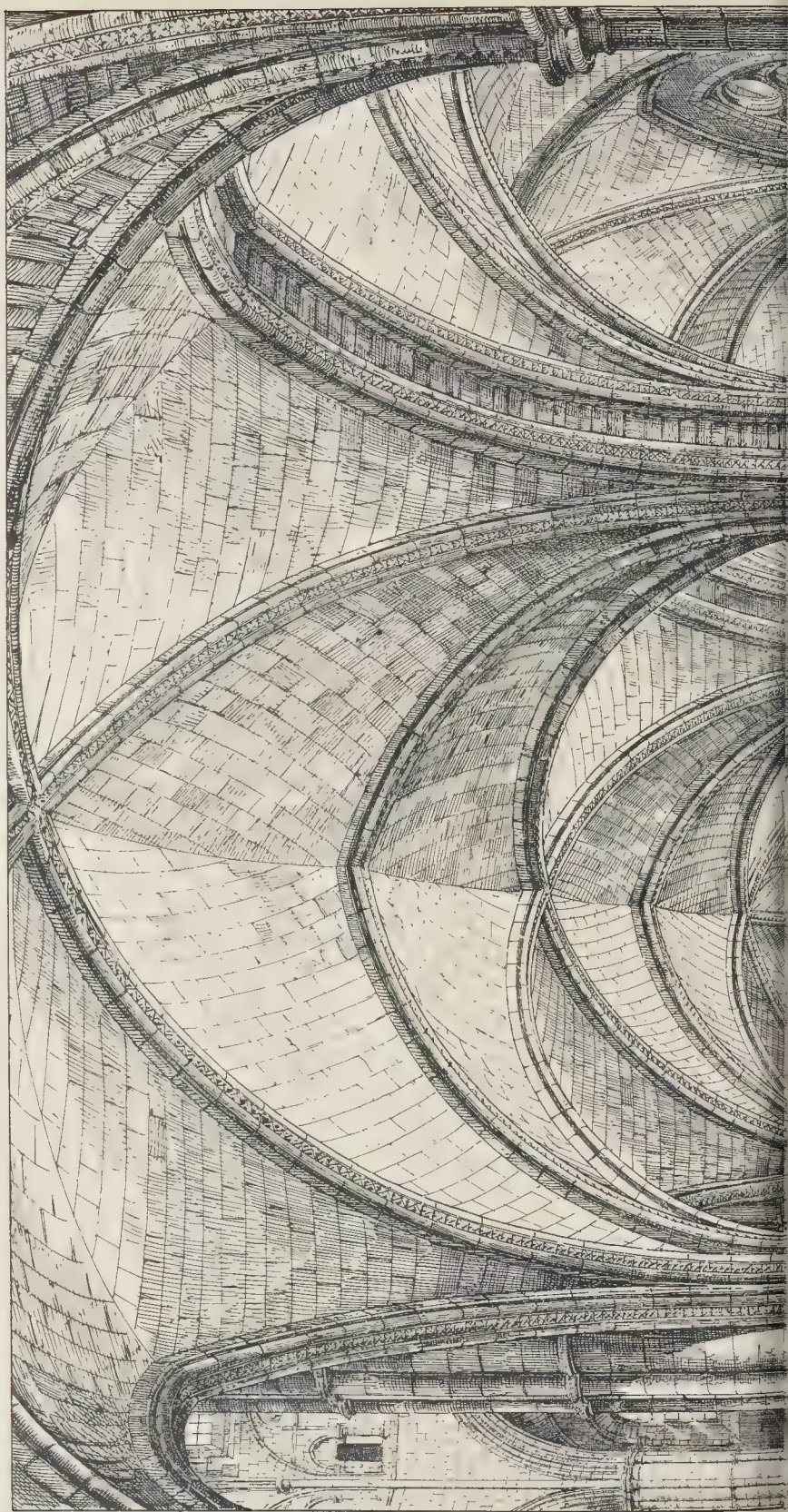














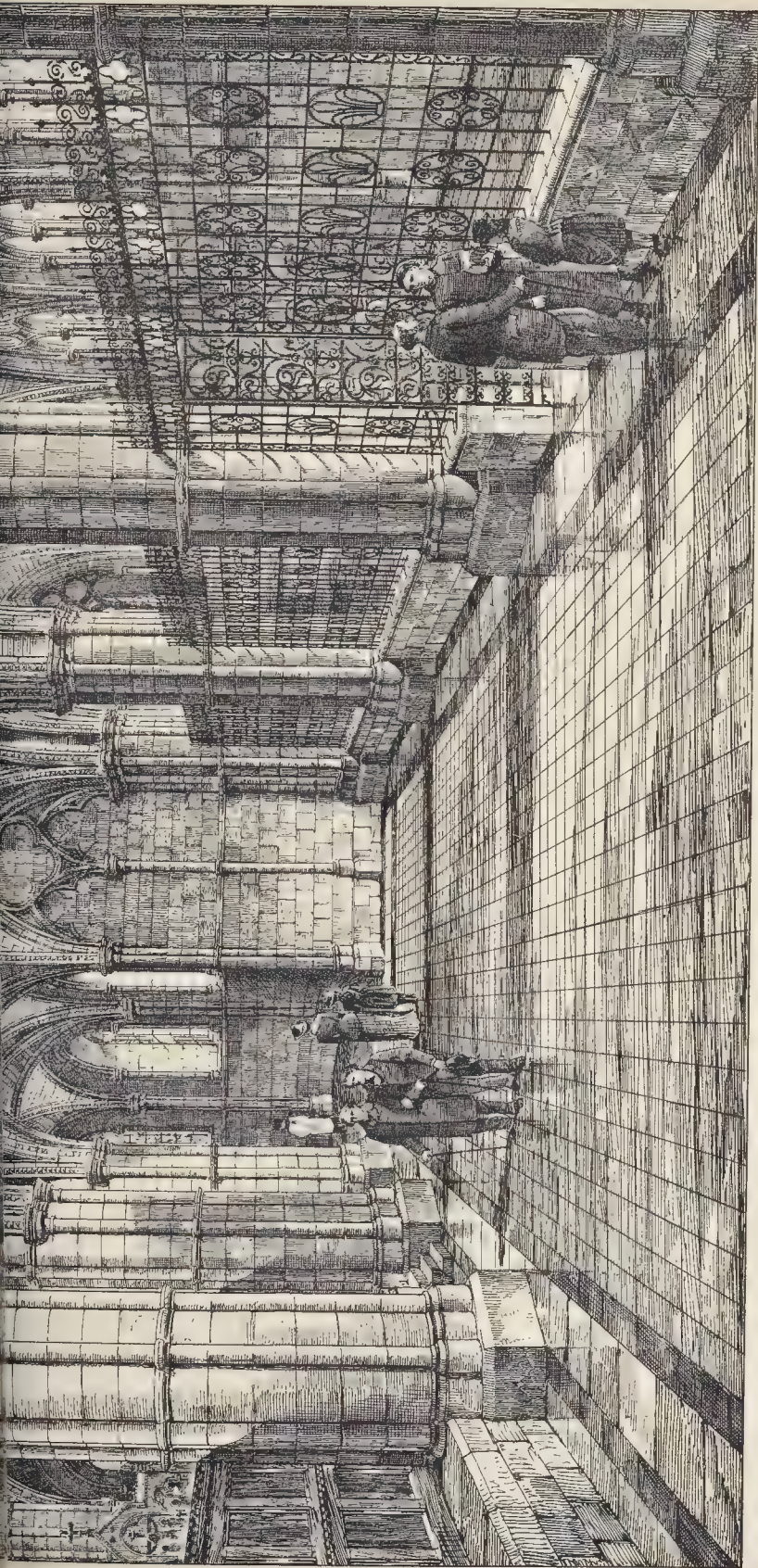


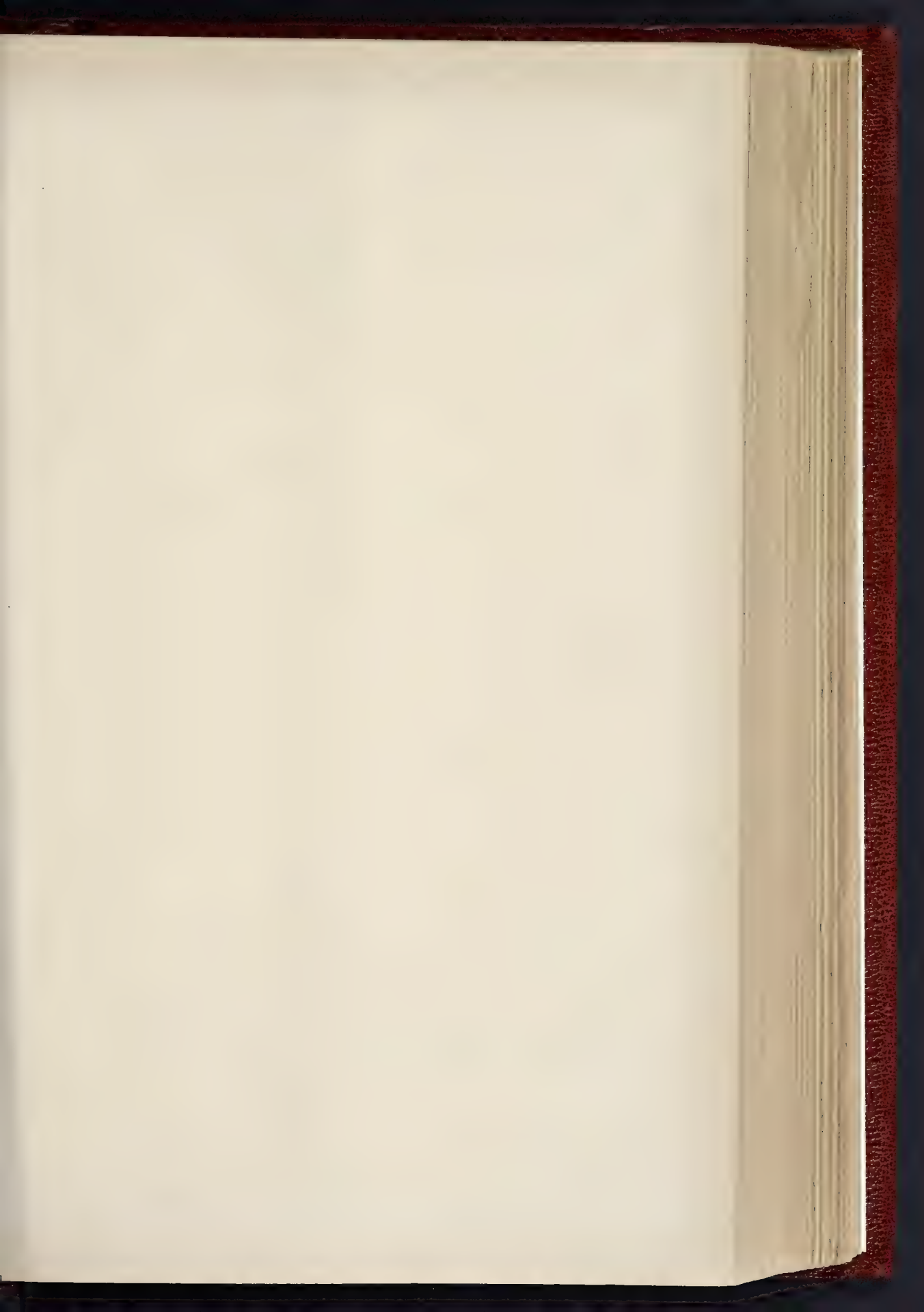
PHOTO LITHO. SARGENT & CO. LONDON

LIVERPOOL CATHEDRAL COMPETITION DESIGN BY MR JAS BROOKS, F.R.I.B.A.

VIEW IN SOUTH CHOIR AISLE

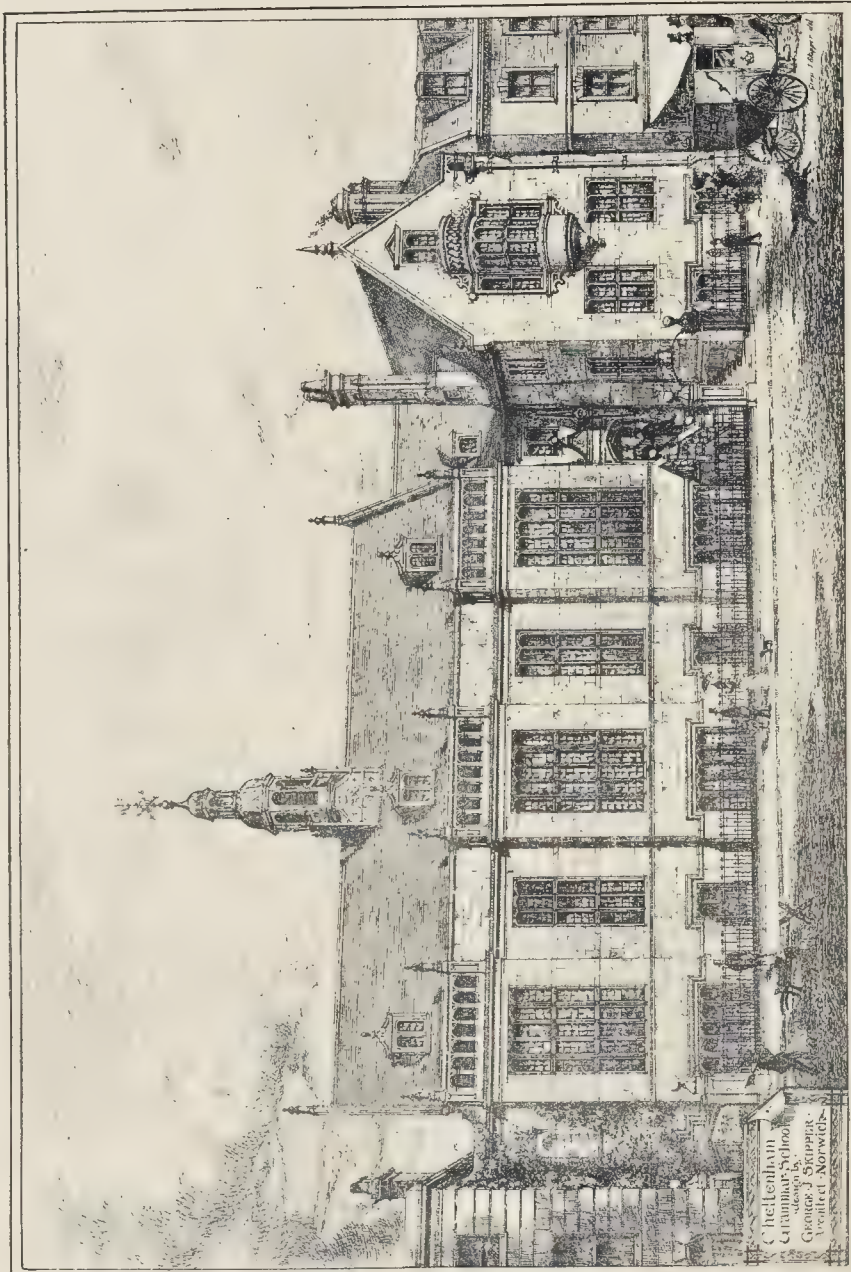




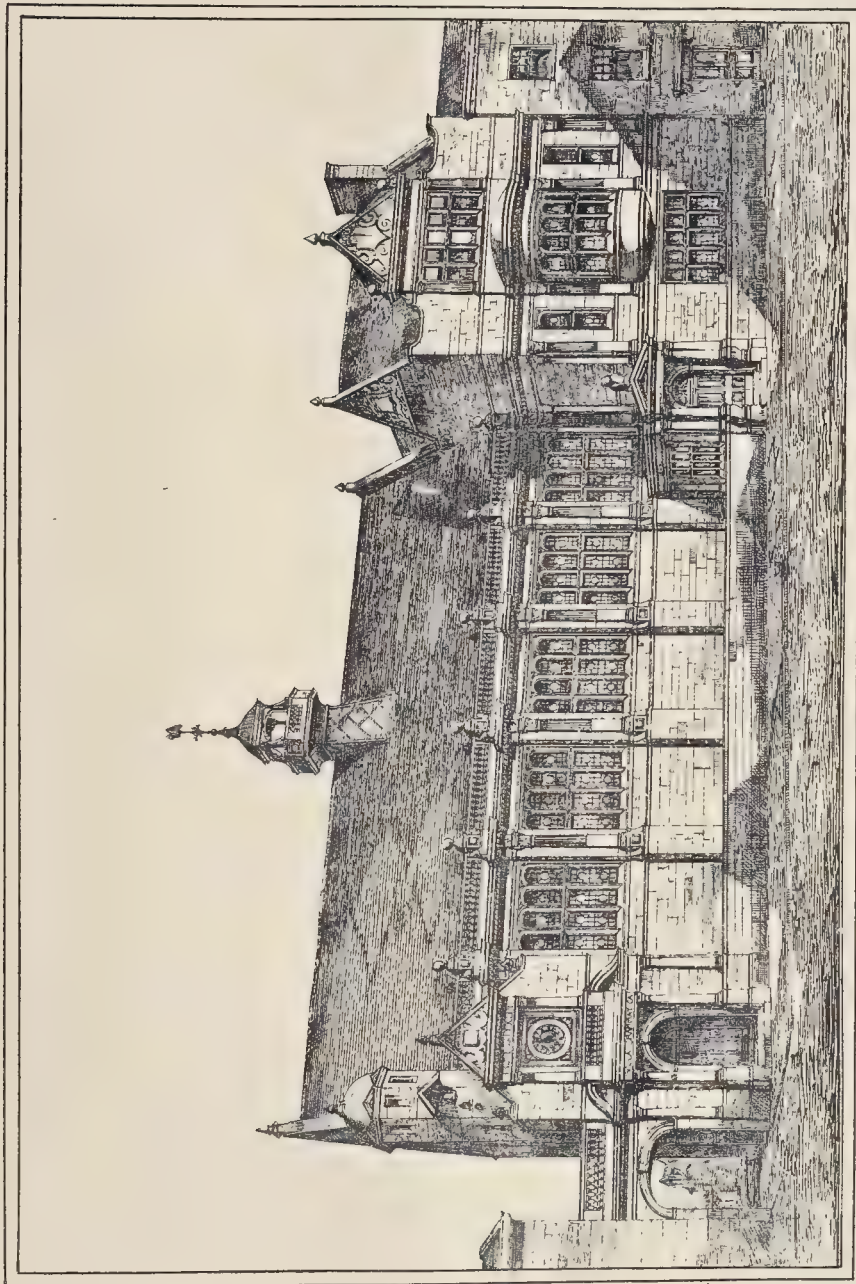




THE BUILDER, MARCH 6, 1886.



CHELTENHAM GRAMMAR SCHOOL COMPETITION.—Design by Mr. G. J. SKIPPER, ARCHITECT.



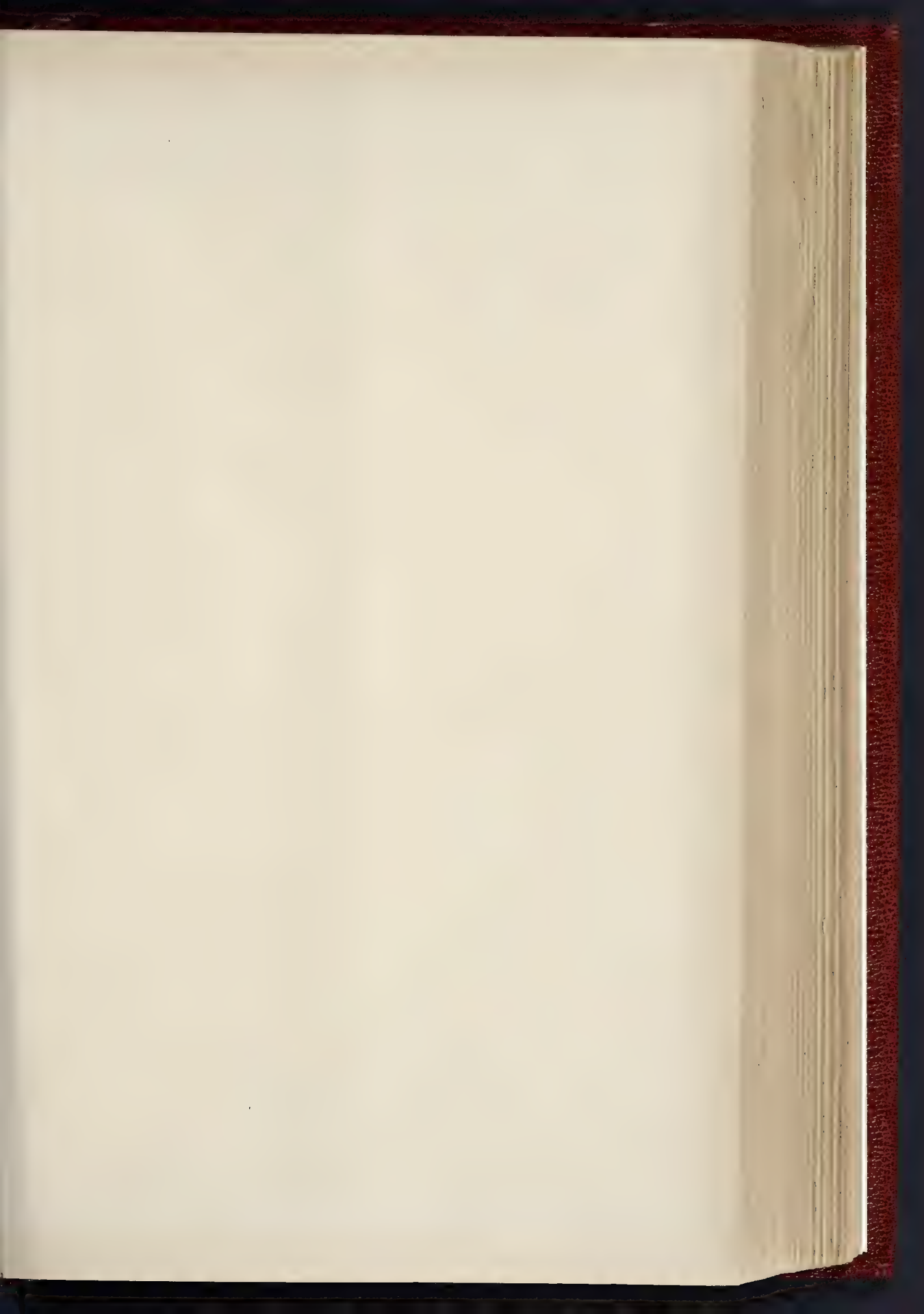
CHELTEMHAM GRAMMAR SCHOOL COMPETITION.—DESIGN BY MR. F. A. POWELL AND MR. J. H. INCE, ARCHITECTS.

Wernick & Sons, Photo-Litho

O'Quinn St London W.C.

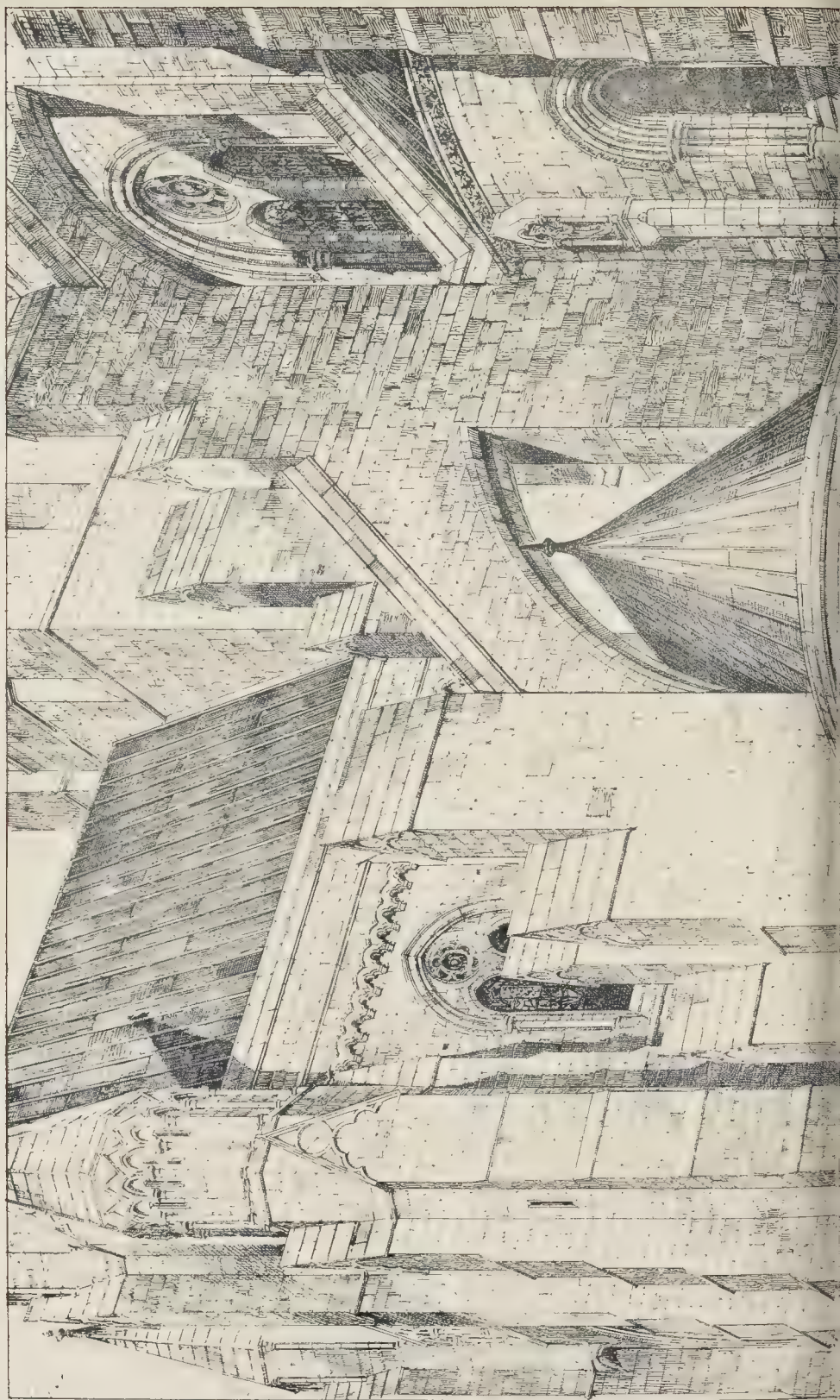




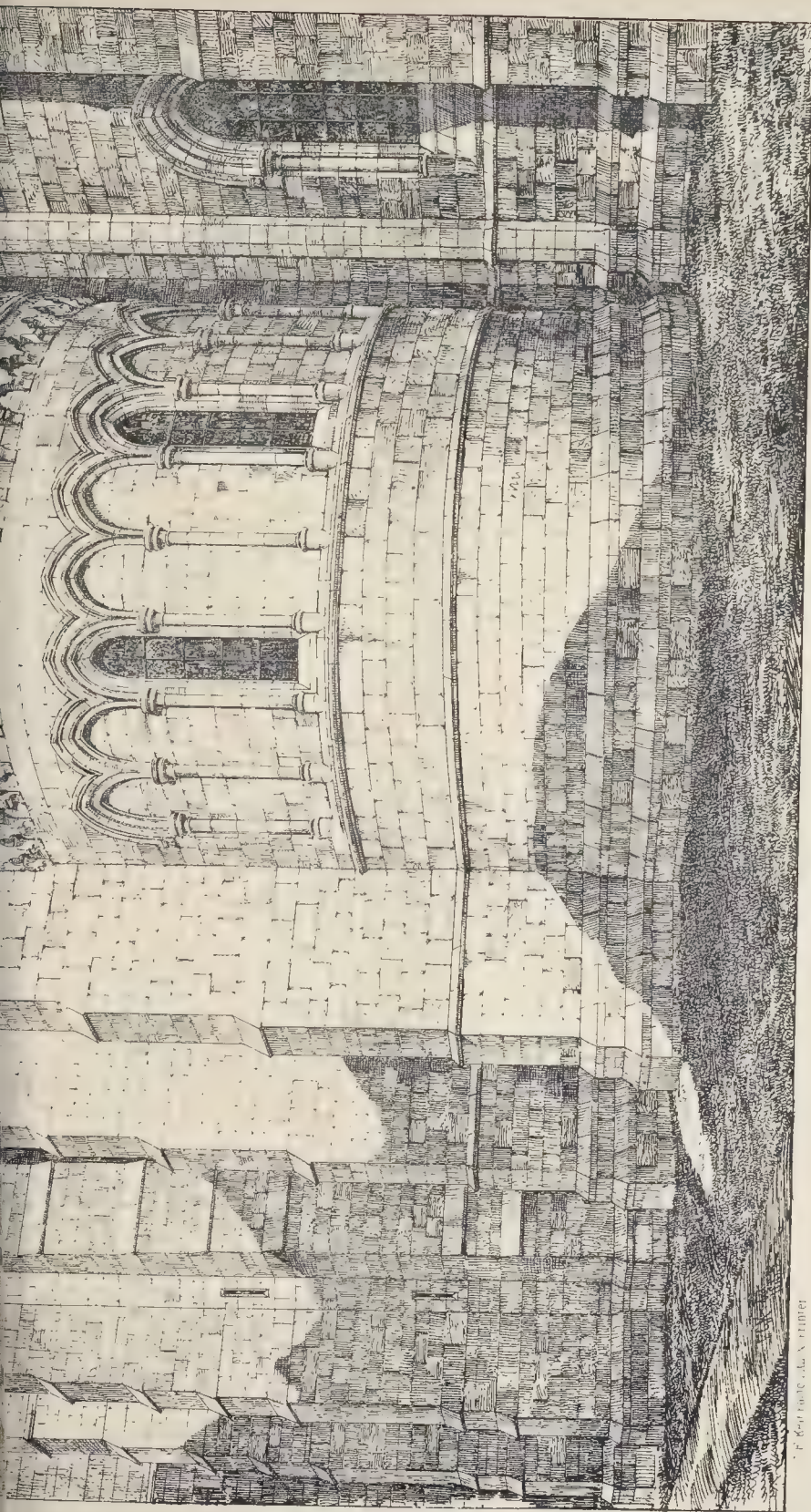




THE BUILDER, MARCH 6, 1886







LIVERPOOL CATHEDRAL COMPETITION.

DESIGN BY MR. JAMES BROOKS, F.R.I.B.A.

THE SOUTH EAST CORNER WITH ST. JOHN'S CHAPEL.





ROYAL INSTITUTE OF BRITISH ARCHITECTS.  
MEDALS AND PRIZES, 1886.

At the meeting of the Royal Institute of British Architects on Monday evening last, consideration was given to the Council's recommendations as to the medals and prizes for the present year.

*The Royal Gold Medal.*—It was agreed to propose the Council's nomination of M. Charles Garnier, of Paris, as the recipient of this year's Royal Gold Medal.

*The Soane Medallion* (and, subject to the usual conditions, 50*l.*), for a design for a town church, was awarded to Mr. A. Needham Wilson, "Le temps mène tout à bien." In the same competition the following awards were made:—*Medal of Merit* and 10*l.* to Mr. J. H. Curry, "Ora et Labora"; a *Medal of Merit* to Mr. H. Bidlake, M.A.; and a *Certificate of Honour* to Mr. R. W. Schultz.

*The Tate Prize* of 30*l.*, for a design for a School Medicine, was awarded to Mr. B. Priestley (sires "Medicine"). In the same competition *Medal of Merit* was awarded to Mr. Alexander Paterson ("Doric"); and a *Certificate of Honour* to Mr. E. R. W. Leeson ("Spee").

*The Grissell Gold Medal*, for a design for a central octagon to a market, in iron, was awarded to Mr. A. E. Cox ("Student"), the only competitor.

*The Institute Silver Medal and 25*l.* for assured Drawings.*—1st, Mr. E. H. Sedding (Now or Never);—2nd, Magnus the Martyr, London Bridge, and Grantham Church, Lincolnshire. *Medal of Merit*, Mr. Arnold B. Tchell (The Marney Arms);—3rd, Layer Marney, Essex. Another *Medal of Merit* to Mr. E. L. Conder ("Ars longa, vita brevis");—4th, Long Melford Church, Suffolk. *Certificate of Honour* to Mr. S. H. Barnsley (Vale of Flowers);—5th, Old Clave Abbey.

*Institute Silver Medal and 25*l.* for an Essay on "Pediments and Gables"* awarded to Mr. L. Waterhouse ("Summa sequor fastigia"). *Medal of Merit* to "More Majorum."

Next week we will offer a few observations on one of the drawings submitted in the various competitions.

THE NEW BUILDINGS OF  
ION COLLEGE AND THE OFFICES OF  
THE LONDON SCHOOL BOARD.

VISIT OF THE ARCHITECTURAL ASSOCIATION.

The third Saturday afternoon visit of the Architectural Association was made on the 1st of February to the buildings of Sion College now being erected from the designs of J. Blomfield on the Thames Embankment.

The underground railway passing between the building and the edge of the pathway, the projecting porch, which is two stories in height, is tied across it by a bold elliptical brick arch, filling in of the arch being carried on iron rollers which bear on walls on either side of it away, independent of the railway walls. This arch contains on the ground-floor the entrance way and porter's room, and on the first floor a room.

The plan of the ground-floor is arranged with a large T-shaped room, which can be divided into screens, which are arranged to slide into a low wall, the top over the screen being closed by a revolving-shutter; beyond this room is a council-room. The first floor contains the library, which is a very lofty room, with arched openings into two aisles, and with a large library-room over the council-chamber. There are large book-stores in the basement, and several other rooms on the mezzanine floors for the room and caretaker's residence.

The work is perpendicular in style, the tracery external dressings being of Douling stone, the facing bricks being red, the columns and pilasters to the arches are Portland stone. The base is formed of granolithic concrete. The walls are all of fireproof construction, and the work of the library roof has been treated with cyanite to render it fireproof. This is of a hammer-beam construction. It is proposed to panel the walls of the lower hall with panelling from the old building in London. The ceiling of this room will be formed of panelling. The walls above the old panelling will be hung with Lincrusta, the walls of the council-room will be covered with Lincrusta, and any panelling. The walls of the passage and offices are faced with Burmantofts

glazed bricks. The heating is by means of hot-watercoils placed under the windows in recesses, with gratings opening to the air for the admission of fresh air.

The members passed from Sion College to the new offices of the London School Board. Mr. Bailey, the architect to the Board, kindly attended, and conducted the party over the building. The extension of the premises was carried out from the designs of Mr. Robson. The additions designed by Mr. Robson consist of six committee-rooms and other offices, approached by a new staircase, but in communication with the old building at every floor. The principal committee-room is decorated with a high dado of teak, the upper part of the walls being divided with plaster pilasters, the space between being papered with a dark red paper. The contrast between the teak and the white plaster looks somewhat abrupt, but the general effect of the room is good. The other committee-rooms are panelled, but the woodwork is mostly painted white. The furniture has been designed for each room.

IMPROVEMENTS AT MILAN.

The enlargement of the city of Milan by the proposed addition of a new suburb between the Piazzas d'Armi and the Porta Magenta has been for some time under the consideration of the authorities, and several schemes have been proposed for laying out the ground beyond the terminus of the Milano-Erba Railway.

The Society of Architects of Milan appointed a sub-committee to consider the various plans suggested, and the report of the committee, together with a plan for the arrangement of the new suburb, and the proposed streets in connexion therewith, is published in the December number of the *Politecnico*, the official journal of the Society. The following are the conclusions arrived at by the committee:—

"The Society is of opinion that the Municipality should purchase from Government the Castle and the Parade Ground (Piazza d'Armi) for the purpose of forming a grand public garden in this locality, crowned by the Arena, the Castle, and the Arch of Peace, surrounded by a fringe of buildings, public and residential, in extension of the contiguous Foro Bonaparte, which buildings should be the subject of special regulations in the interests of art."

That the largest possible space should be assigned to the garden, and that it should be laid out in such a manner as to show the three monuments to the best advantage, it being understood that the Castle shall be respected from an artistic and archaeological point of view.

That a new suburb be laid out to the west end of the present parade-ground, in direct communication with the public-garden, and that the *accolli* barrier be extended to the railway junction (Stazione di Sismamento).

That a communication between the before-mentioned suburbs (i.e., the new suburb and the public garden), one to the east and the other to the west of the railway, with the central part of the city, be formed by means of two streets passing through the midst of each suburb, and converging in a piazza or open space, out of the south side of which two main streets conduct to the Piazza del Duomo, on the site of Via Mercanti and Via degli Orefici, this last street being straightened and widened.

That a grand avenue be formed through the western suburb, and be continued up to the railway station.

That in accordance with the Municipal plan the secondary streets in the western suburb should be arranged visually in line with the arena and the Arch of Peace, with symmetrically-arranged openings into the garden, and terminating in the Piazza Magenta, it being understood that the levels of these streets shall be so contrived as to pass over the North Milan Railway, which should be sufficiently lowered for that purpose."

ARCHITECTURAL SOCIETIES.

*Birmingham Architectural Association.*—The fifth ordinary meeting of the present session was held at Queen's College on Monday evening last. The Vice-President (Mr. John Cotton) was in the chair. Messrs. T. H. Nowell-Park and T. W. Baker were elected members of the Association. A paper was read by Mr. J. W. Tonks on "Mayoral Chains and Civic Insignia." The subject was treated historically, and the lecturer pointed out that the knowledge of heraldry and designing in gold and silver was not to be undervalued by the modern architect,—architects in Medieval times being goldsmiths in addition to their other vocations. At the close of the meeting a series of executed designs for

mayoral chains were exhibited. A vote of thanks, proposed by Mr. J. K. James, and supported by Messrs. H. H. McConna, T. W. F. Newton, J. Cotton, and Victor Scruton (hon. secretary), was unanimously accorded to Mr. Tonks, and after a response from that gentleman the meeting terminated.

*Edinburgh Architectural Association.*—The members of this Association paid a visit on Saturday last to Fettes College, and were conducted over the buildings by Dr. Rowand Anderson, architect to the Trustees. Dr. Rowand Anderson read a few notes on the founder and the college. The buildings, he said, formed the latest and most extensive buildings devoted to education by private bequest in that city of education; and now that the State was doing so much for education, they would probably be the last of their kind. The founder, Sir William Fettes, died in 1836. The trust funds at his death amounted to 166,000*l.* The funds were allowed to accumulate for some years, and in 1864 the contracts for the erection of the college were entered into, the architect being the late Mr. David Bryce. The college was opened for the reception of boys in 1870, and at intervals since then the various boarding-house and other buildings were erected. The buildings on the ground could accommodate two hundred pupils, fifty being foundationers. The architecture of the building is late French Gothic, as seen at the Royal Château of Blois on the Loire. In treating the interior no attempt had been made to be consistent with the art of the exterior. The drainage of the college, which it appeared is on a very complete system, was also described.

COMPETITIONS.

*Cardiff Unitarian Church.*—In a limited competition for the above church, which it is proposed to erect in Tredegarville, the designs of Mr. Edward H. Bruton, architect, Cardiff, were unanimously selected. The church will provide for 200 persons, and a Sunday school for about 100 children.

*New Chapel and Mortuary, &c., at Armsley (Yorks).*—On February 1st, forty-three designs were submitted to the Burial Board for a new chapel and mortuary, lodge, and board-room, together with plans for laying out the site as a cemetery. Two premiums were offered of 20*l.* and 10*l.* respectively for the two best sets of plans. On the 27th ult. the Board made selection of the design under motto "Labor et Spes," by Mr. J. P. Pritchett, of Darlington, for the first premium; and "In Perpetuum," by Mr. Thos. Winn, of Leeds, for the second premium. It is expected that the chapel and lodge will cost about 1,600*l.*

*The Tilbury Docks Arbitration Case.*—The Court of Queen's Bench on Wednesday gave judgment in the matter of the arbitration between Messrs. Kirk & Randall, contractors, and the East and West India Dock Company, in reference to the contract for construction of a tidal basin and dock at Tilbury. Sir R. Webster, Q.C., Mr. Moulton, Q.C., and Mr. Cripps appeared as counsel for the contractors, to show cause against a rule obtained by the Company to revoke the submission to arbitration, or to give directions to the arbitrator, Sir Frederick Bramwell; while Sir Henry James, Q.C., Mr. Pollard, and Mr. K. Digby appeared for the Company, in support of the rule. The contract was entered into in July, 1882, and the works were stopped by the Company in July, 1884. Differences had arisen between the parties, and the arbitration clause of the contract was put in force. The contractors, after some 400,000*l.* had been spent on the works, made a claim for payments in excess of the contract price on the ground that in the deeper part of the excavations they had to deal with mud, instead of clay, indicated by certain borings by the company before the date of the contract. The Company, on the other hand, complained that the contractors did not put in the stipulated quantity of concrete per day, and the contractors replied that this could not be done in the altered circumstances. The Company objected to the reception of certain evidence by the arbitrator as going to an alteration of the contract, which would give the contractors about 150,000*l.* more than the contract price. The Court gave judgment for the contractors, but the learned Judges reserved their reasons.



# ARCHITECTURAL ASSOCIATION. BRICKWORK AND THE TOWERS OF BOLOGNA.

The tenth ordinary meeting of this Association for the present session was held on the 26th ult. at 9, Conduit-street, Mr. C. R. Pink (President) in the chair.

The following gentlemen were elected members, viz.:—Messrs. D. Geddes, A. H. Goodman, R. P. Sharp, F. E. Faithful, and H. E. Mallet. It was announced that arrangements had been made with Mr. Weedon, the water-colour artist, for a course of lessons, viz.,—two indoor lessons with copies, and six outdoor lessons on Saturday afternoons, to commence in the beginning of May. Applications to be made to Mr. Hilton Nash.

A vote of thanks was accorded to Messrs. George & Peto for permitting the members to visit the houses now being erected in Collingham-road, South Kensington.

Mr. William White, F.S.A., then read a paper entitled "Brickwork and the Towers of Bologna," of which we print the first portion on another page.

The Chairman, in inviting discussion, said that Mr. White had referred to the irregular shape of bricks, but it would be found that nearly all ancient brickwork was built of such bricks, not only in Italy but also in England. As an excellent example, he would mention the Holy Ghost Chapel at Basingstoke, where the bricks used were of varying widths, and tapered often  $\frac{1}{2}$  in. at least in their lengths. There would be found, also, the thick joint which Mr. White had justly recommended. Doubtless many of those present had seen this chapel in passing through Basingstoke, but it would well repay any one who could alight at the station, and spend a short time in its inspection. The detail was of an excellent and remarkable character, reminding one of the French work of the time of Francis I., and was a good type of the development of Renaissance brick, although its general lines were Medieval. In the present day, although of paramount importance, it was almost impossible to get perpendis flushed up. Mr. White had referred to the introduction of stucco at the beginning of the century. It was then fashionable to have houses treated in that way, and he thought people were often gulled into believing that stucco was as good as or better than stonework. He knew a stucco house in the South of England on which, it was said, 170,000*l.* had been spent, though even in the present day, he believed, it could have been built with Portland stone dressings, &c., for the money.

Mr. T. H. Watson said that a good many years ago he saw these towers, but at the time they did not suggest to his mind much of what Mr. White had laid before them. Indeed, he passed them by, and went on to see other buildings. Mr. White's paper had, however, interested him very much, and he would like to propose a vote of thanks. He (the speaker) had been somewhat surprised to find that the system adopted by the Romans in the use of brick was something quite different from what he at one time supposed. It was now found that the Roman construction was a concrete one, and where they used brick apparently structurally in arches, the bricks were about 2 ft. long,  $\frac{1}{2}$  in. thick, and 5 in. broad, and were very veneered on the surface. Although one might see an arch running down with a deep soffit, the soffit was a mere veneer with a concrete mass cast in. Why they should have used bricks to such an extent was a matter for curious inquiry. The only solution that occurred to his mind was that the bricks were used to keep the concrete in place until it had set, and was able to support itself. It was evident that the Romans filled up the surface of the walls with bricks, put on much as tiles were now applied, and because it allowed them to carry up their walls in concrete more rapidly.

Mr. John Slater, B.A., remarked that a few years ago he spent a pleasant time at Bologna, the strongest impression left on his mind being the existence there of these two leaning towers, the effect of which from one point of view was most startling. After reading Mr. Street's book on the "Brick and Marble Architecture of Italy," he always felt inclined to keep to the windward of such towers. He was unable to go into the structural question of the towers, but as far as their appearance went, he did not think very much of them. They were, no doubt, very wonderful, but still the amount of

labour and expense might have been bestowed with much better effect in some other way. Mr. Watson, he believed, was wrong about the brick facing on the Roman walls. No doubt Roman walls were built of concrete, but many of them were not faced at all. In cases where the brick had been cut away, the remains of the marks of the boards forming the casing were still perfectly visible. Those gentlemen who a couple of years ago went through the tunnel of the District Railway, would remember that they could hardly believe the planks were not in position, the concrete having taken their impress to such an extent. An illustration in Palladio's first edition doubtless showed the manner in which the Romans built these concrete walls; and he believed it was entirely for appearance that these brick facings were given to them. The high position which brickwork occupied in Northern Italy was due to the very fine mortar, and the way in which it had been used. Those who could spend a few days in Bologna would see what could be done with carefully prepared brickwork, and he was never more surprised than when he saw the beautiful effects produced by the rubbed brickwork in the Bolognese palaces and churches. The cornices in some of the houses, too, were cut in the most delicate manner out of brickwork, and the bond was carefully preserved. The effect produced by brick cornices was extremely striking, and worked out in all sorts of ways. Mr. Slater also touched upon the variety of colours in the brickwork of Northern Italy, and mentioned the cloisters of the Church of San Zenone, at Verona, as one of the most beautiful examples of brickwork. He seconded the vote of thanks.

Mr. Stannus, in supporting the vote of thanks to Mr. White, said that he had a theory as to these towers. In the century in which they were built, each man who had his plot of ground within the walls of a town was anxious to exalt his own tower. There were many feuds; and towns and families were riven by dissensions; it was, therefore, easy to understand each man's desire to have his tower higher than his neighbour's, which permitted him to treat his enemies to the polite attentions of boiling oil or melted lead. This sort of building went on to such an extent in Florence that the Republic passed a law that all towers should be regulated and cut down to a certain height, excepting, of course, that of the Palazzo Pubblico. With respect to the inclination of these two towers he believed that the foundations were more compressed between them, and that, the ground outside being free, they had settled outward.

Mr. H. D. Appleton (hon. sec.) could not agree with Mr. Stannus's last remark. At the mouths of rivers the strata were often depressed by the weight of the *debris*, and heavy buildings were believed to act in the same way. Would not the strata, then, if pressed down by the weight of the two towers, have caused them rather to lean together?

Mr. Randolph drew attention to the fine brick towers of the Netherlands, which he believed were at one time used for purposes of defence, and also as points of observation to see the arriving and departing ships. He did not agree that these towers were unornamental; they rather showed a breadth of treatment characteristic of the material used. The brickwork of towers like Lubek was also very extraordinary.

Mr. H. W. Pratt said that his recollection of the tower was its effectiveness. One striking feature was that its outside dimensions were the same at the bottom as at the top. Barker considered that the smaller tower was the only one in Italy built with the intention of making it overhang. Brickwork should not be treated as joinery.

Mr. Slater recommended any one interested in the question of brickwork towers to refer to Runge's "Backstein-Architektur des Italiens," in the library of the Institute of Architects.

The vote of thanks was then put, and was cordially received.

Mr. White, in his reply, remarked that the facing by the Romans might have been partly for a little bit of show construction, a little sham in the facing of arches and jambs, so as to make them appear solid and deep, when they were merely filled with concrete. They were doubtless also introduced for the effect of the colour which these little bits of brick would suggest. There was a good deal in what Mr. Stannus had said as to the origin of these towers.

# CENTRAL ASSOCIATION OF MASTER BUILDERS OF LONDON.

THE fourteenth annual general meeting of the Central Association of Master Builders of London was held at the Offices, 31, Bedford-street, Strand, on the 24th ultimo, Mr. F. J. Dove in the chair.

The secretary, Mr. E. S. Henshaw, read the balance-sheet as audited, and it was resolved:—

"That the balance-sheet as audited and read be adopted."

The secretary next read the following report:—

"The Committee have to state that during the past year, as anticipated in their previous report, a Bill to amend the Employers' Liability Act, 1850, was introduced in Parliament, against which this Association presented a petition so far as it affected the building trade, but its supporters not being able to obtain a second reading, about to renew their efforts during the present Session, Two Bills have been introduced, one by Messrs. Burt, Broadhurst, and others, having amongst its objects the doing away with the term 'workman' or 'servant' in case of injury—the other introduced by Messrs. O'Connor, Commis, and others, having, in addition to the doing away with notice, many very important alterations, and the putting upon the employer the term 'workman,' which it is proposed shall include, besides the persons included in the definition in the principal Act, seamen and all persons, including omnibus and tramway servants, who are employed by the employer, either verbal or in writing, and whether the work be performed in the employers' workshops or elsewhere, and whether involving manual labour or not, and also repeating so much of the eighth section of the Act as defines the expression, 'a person who has superintendence entrusted to him' as 'a person whose sole or principal duty is that of superintendence and who is not ordinarily engaged in manual labour.' Your Committee will continue, as heretofore, to watch and oppose generally, the passing of these objectionable Bills. Your Committee represented to the Metropolitan Board of Works the inconvenience to builders arising from tenders for their work not being opened in the presence of competitors, and were favoured with a very courteous reply, granting the concession asked for in the case of Fire Brigade Stations, and this, your Committee believe, has since been extended to Police Stations; they, however, regret to say that their representations to the Great Northern Railway Company were not attended with satisfactory results, but they will from time to time put pressure on all public bodies to adopt this system. The Committee, however, desire to point out to the members of the Association the importance of protecting themselves against this objectionable system, and all the apparatus which the Association can judiciously afford will be given whenever a cause of complaint is brought to their notice by members.

The subject of the rejection of the lowest in favour of higher tenders had the careful consideration of your Committee, and amongst others the case of Mr. Kraus, whose tender for the construction of the Cardiff Corporation Waterworks, although the lowest, having been rejected, that your Committee, was specially considered, and your Committee expressed to Mr. Kraus their willingness to bear half the expense of obtaining the highest Counsel's opinion, if he thought it desirable. He, however, after the decision, gave the opinion of Mr. Jas. Chitty Hammen and Mr. Maton, decided not to put the Association to the expense. Under these circumstances your Committee have thought it desirable to draw the attention of the Council of the Institute of Builders to the growing practice of non-acceptance of the lowest tender, and have asked them to take such measures in connexion with the Institutes of Architects and Engineers as they may deem advisable to prevent, if possible, a recurrence of such practices in future. They also brought pressure to bear on the White-chapel Board of Works, which, although not successful in obtaining redress in the particular case brought to their notice by Mr. G. S. Pritchard, was satisfactory, inasmuch as an apologetic letter was received for the action they had taken.

Your Committee, on the requisition of a member, held two meetings to consider the practicability of carrying out clause E of Rule 2 as to the keeping a register of forecasts and others; a great diversity of opinion was expressed on the question, and it was thought desirable to abandon the subject for the present.

During the past year the action taken by the Plumbers' Company in granting certificates to qualified plumbers, has been under the consideration of the Committee, and the Company were communicated with, but up to the present no beneficial results have accrued. The Committee will be glad to have the benefit of your views on the subject as to what course may be thought best to adopt to enable the building trade to carry out similar arrangements, as they may not be dependent on the Plumbers' Company. The Committee feel that it is a subject beset with great difficulties, and requires much thought and consideration, the movement being, in fact, the commencement of giving the use of Money to every trade connected with building operations, and they are of opinion that the question is a very proper one for the Institute of Builders to deal with.

The Secretary, by order of the Committee, issued on the 18th January a circular asking for a Guarantee Fund to be raised for the purpose of assisting a member to prosecute an appeal, and as the Committee were advised by Mr. Maton, and through him Mr. Edwin Jones the Council, that the case ought to be appealed against in the interest of the trade generally, it was decided to assist this member.

Having regard to the insufficiency of the accommodation at the offices in King-street, your Committee, after a conference held with the Builders' Association, determined to relinquish their offices in King-street, and take furnished offices (consisting of a clerks' office, and the joint occupation of the secretary's office, the Board-room, and the use of the Institute-room for general meetings) of the Builders' Accident Insurance, Limited, at a rental of 2*l.* per ann. m., including all rates and taxes of office expenses. They need not point out the advantages arising from having carried out an arrangement which will enable all those who are members of the several societies to have easy and convenient access to their respective



ices, which are all handsomely and comfortably furnished.

The Committee think it right again to ask your support for the Builders' Accident Insurance, Limited, a strictly mutual company started, as you are aware, in the interest of the trade, to protect employers against accidents to their workmen. During the past year the company has extended the risks undertaken to cover within certain limits accidents caused to or by employers' workmen, by or to sub-contractors' workmen engaged with them without extra premium, and also to the public for an extra premium of 1s. per 100l. expended in wages, as defined in the company's policy."

The Chairman having addressed the meeting upon the several matters referred to in the report, moved that the report as read be adopted.

The motion, having been seconded, was carried unanimously.

The secretary reported that the balloting list had been prepared in accordance with Rules xv. and xvi., and it was resolved:—

"That the Officers and Committee, as printed on the balloting list forwarded to members, be elected for the ensuing year."

Moved by Mr. F. Adamson, and seconded by Mr. G. Williams:—

"That the thanks of this meeting be accorded to Mr. F. J. Dove for his services as President during the period he had been in office."

Carried unanimously.

The newly-elected members having taken place, the President, Mr. George Burt, J.P., took the chair, and introduced several matters of interest to the trade to the notice of the meeting, which having been fully discussed by several members from various points of view, the meeting was concluded by a vote of thanks to the chairman.

## LONDON SANITARY PROTECTION ASSOCIATION.

At the fifth annual general meeting of this association, held last Saturday in their Offices, Adlam-street, Adelphi, Mr. E. C. Robins, R.I.B.A., one of the vice-presidents, took the chair, in the unavoidable absence of the Duke of Argyll.

Mr. Robins read the report of the Council, which showed that the number of members on December 31st was 1,050,—an increase of 167 on the number on December 31st, 1884.

His report went on to give a long list of country mansions inspected by the engineers during the year, including Wynward Park and Seaham Hall, Durham; Saumarez Hall, Guernsey; Medon, Dorset, and many others. Also a list of important buildings in London and neighbourhood, including the London Lock Hospital, Thomas's Hospital (part of), Grove Hall, Plymouth, Bow; Bethnal House Asylum, Bethnal Green; St. Catherine's Training College, Tottenham; Cooper's Hill College, Staines; and in College, and all the masters' houses there.

In regard to this last, the report stated that had been inspected now for the second time, that it was a source of gratification to the Council that so important a public body as the governing Body of Eton College had accepted the principle of periodic sanitary inspection, which the Council considered so necessary.

Fortunately the general character of the premises inspected was as insanitary as ever, only one per cent. being found in perfect order, and one per cent. (in addition) in fairly good order.

1. moving the adoption of the report the Chairman said he wished to impress upon members, and through them upon intending members, that their system was one of practical progress.

2. Timothy Holmes, hon. treasurer, read his report showing receipts (including balance brought forward), 2,422l., and expenditure, 9l., leaving a balance of 473l., against which there were outstanding claims to the amount of about 200l.

3. Payne, of St. George's Hospital, in addressing the meeting upon the report, alluded to the death of Prof. Fleeming Jenkin, the founder of this Association, and it might be said the inventor of this and all similar associations. He was a good engineer, and all his inventions were not only ingenious and scientific, but they worked.

4. Loch, of the Charity Organisation Society, in endorsing the adoption of the report, said he was hopeless for them to try and persuade the labouring classes of the importance of having their houses in a good sanitary state, as the class above them showed the way, by putting their houses in such a state and leaving them in it.

The report having been unanimously adopted, the meeting proceeded to the business of electing the Council for 1886, and the result of the ballot was declared to be that all the outgoing Members of Council were unanimously re-elected, with the addition to their number of Sir F. Bramwell, F.R.S., President of the Institution of Civil Engineers. Gen. Lord Chelmsford, who had previously been a member of Council, was elected a Vice-President.

## SUNDERLAND MUNICIPAL BUILDINGS COMPETITION.

IN reference to this competition, the Leeds and Yorkshire Architectural Society have addressed the following letter to the Town Clerk of Sunderland:—

"PROPOSED MUNICIPAL BUILDINGS, SUNDERLAND.

Dear Sir,—I desire to acknowledge the receipt of particulars, 'Instructions to Competitors,' which have been laid before a general meeting of practising members of the above Society, when I was instructed to communicate to your Corporation the substance of the resolutions passed by the meeting, as follows:—

1. That the promoters of the competition be asked to state definitely if they will appoint a referee, as many competent architects, failing that provision, will be unable to compete, and, in the event of their deciding to do so, to publish at once the name of the selected assessor.

2. That the attention of the promoters be drawn to the advertisements in the papers, the terms of which require 5l. to be deposited with the Corporation by any architect who may apply for the terms of the competition, and who must consequently forfeit that sum in case he decides not to enter the competition.

3. That the promoters be asked if their wishes are correctly expressed in the paragraph which states (1) a half per cent. will be deducted from the architect's commission; and (2) that they will themselves undertake the quantities. With regard to the first point, the meeting expressed the opinion that the successful architect will be underpaid by a remuneration of 4½ per cent. for all services to be rendered in carrying into execution a building of public importance, requiring so much study in detail.

4. That, in the opinion of the meeting, four sections are quite unnecessary for the purposes of the competition, a longitudinal and a transverse section often being sufficient, even for contract purposes.

5. That the short period between this and the 10th of April is insufficient to give proper study to the subject, and to prepare the necessary drawings, and that the promoters be asked to extend the time to a later date.

In conclusion, the members of this Society have been successful in obtaining nearly a dozen prizes for town-hall designs, and the above resolutions are the result of long experience of the subject referred to.—I have the honour to remain, your obedient servant,

GEO. BENETRAM BULMER, Hon. Sec.  
To Fras. M. Bowey, esq., Town Clerk,  
Corporation Offices, Sunderland."

## BERNINI'S STAIRCASE AT THE VATICAN.

SIR,—In your note to my first Royal Academy lecture [p. 332] you treat the tapering staircase of the Vatican as a device of Bernini's for getting a greater perspective effect. He, no doubt, availed himself of it: a strong proof, in my opinion, of his genius, for thousands look up to it to one who looks down.

Hemmed in as he was between the wall of the Vatican and St. Peter's, with only a truncated triangle to work on, his only alternative was to make a parallel staircase, with a wall thin at one end and thick at the other, wasting material and losing effect.

I used it as an illustration of how a man of genius could make a beauty out of a difficulty.

GEORGE AITCHISON.

## NEW BYE-LAWS FOR CONCRETE BUILDINGS IN THE METROPOLIS.

SIR,—Mr. Goodwin's letter in your issue of the 13th ult. [p. 257], is so exhaustive on the conduct of the Metropolitan Board that little is left to say without referring back to letters published in your valuable journal of Nov. 16th, 1887, which some of your older readers will remember. I think it advisable, with your kind permission, to refresh their memory, and for the instruction of younger men to publish again, simply to show that the Board condemn now what they not only granted, but

admitted, that Portland cement concrete is superior in strength to brickwork, &c.

[Letter from the "Builder," Nov. 16, 1887.]

## "STRENGTH OF CONCRETE WALLS.

Determined to see for myself what had been accomplished with concrete, I visited the concrete houses at Gravesend, and, fortunately for my conviction, I arrived at the time of the examination by the Committee of the Metropolitan Board. I saw a 9-in. concrete wall battered with a 14 lb. sledge hammer. Mr. Vulliamy, the Architect of the Board, said that with about three such blows a hole would have been made through a 14-in. brick wall. I cannot say what number of blows were inflicted, but certainly the blows were struck vigorously, the only perceptible effect being a slight crushing of the stones on the surface of the concrete on the side hammered. Mr. Vulliamy tested the wall on the other side with a straight-edge, and declared that not the slightest effect was produced.

ROBERT WHITELEY,  
Builder, Huddersfield."

My motive in asking your kind indulgence is to show by facts that a rubble masonry wall in mortar is quite a different thing from a rubble masonry wall in Portland cement, and I think, after thirty years' practical experience in superintending buildings in concrete or (more properly) Portland cement concrete and boulders of stone in all parts of the United Kingdom, also in Paris, Vienna, and Belgium, that, by this time I ought to be well acquainted with the adhesive qualities and tenacity of Portland cement. If two bricks or two rough bits of stone are joined together with Portland cement, you cannot separate them without breaking the stone or brick. The Board might as well say two deal boards jointed and glued together are not properly bonded or connected together. I have been summoned three times at the Southwark Police Court for not complying with the Building Act, at a great cost, and in every case beat the Board, on which point I think the following recommendations, agreed to by the Board, must be, or ought to have been, conclusive.

[The "Builder," August 17th, 1873.]

## "CONCRETE AND THE METROPOLITAN BOARD OF WORKS.

At the last meeting of the Board it was agreed that with reference to the two cases now before the committee of the erection, by Messrs. Tall & Co., of buildings in East-lane, Bermondsey, and Overhill-road, Dulwich, with walls of Portland cement concrete, without having obtained the licence of the Board for the use of that material, that Messrs. Tall & Co. be not pressed to accept a licence for the buildings erected under their patent, and further recommended that a printed circular be forwarded to the District Surveyors, informing them that the Board considered the buildings under this patent to be within the rules of the Building Act."

In conclusion, may I ask, after the Board agreed to this, where was the necessity of a licence? I was summoned before the magistrate at the Southwark Police-court because the walls were not properly bonded and put together. Mr. Biron, the present magistrate at Lambeth Police-court, was counsel for the Board; and, in examining the District Surveyor for Bermondsey, Mr. Biron asked him if the walls were properly bonded and put together. His answer was, they were all bonded. After many years the District Surveyors are of the same opinion: but why should I be exempt all these years from taking a licence more than Mr. Goodwin or other builders? I have never asked for any favour, and did not want any. I have built and superintended buildings of small and large dimensions, and never yet had any accident, and shall continue to construct the walls as I have always done. As to building to the Board from licence or the new by-laws, it is a matter of impossibility to erect a wall of moderate dimensions to remain sound. Mr. Goodwin has, he states, built warehouses and workmen's dwellings to the amount of 100,000l.; but the only one he built according to the licence granted is a failure; in fact, he has for years built his walls according to my plan. I think the Board would be better employed in framing by-laws for brickwork, and give the District Surveyors more power over jerry buildings.

I will only add that Portland cement concrete dwellings can be built for the housing of the poor at 25 per cent. cheaper than brickwork, leaving a good profit for the builder. And further, if the Board pass their absurd by-laws to strangle concrete, it is my intention to trouble them to summon me again in a short time. With the assistance of kind friends I intend to bring the question of housing the poor so prominently before the public that there can be but one opinion as to the conduct of the Board, viz., that they are the main obstruction in solving the problem how to house the poor and find employment for the working classes.

Feb. 24, 1886.

J. TALL.

**The Proposed Tower Bridge.**—As will be seen by an advertisement in another column, the Bridge House Estates Committee of the Corporation of London invite tenders for the construction of the lower portions of the abutments and two piers of the proposed bridge across the Thames at the Tower.



NEW PUBLIC OFFICES, WEST  
HARTLEPOOL.

SIR,—In your issue of last week [p. 351], you give the result of this competition, and I observe by a local journal that the author of the selected plans adopted "F.R.I.B.A." as his motto. Now, I do not believe for a moment that the assessor in this case was influenced one iota by the motto, but, unfortunately, professional assessors are not always engaged, and such a motto may, or may not, influence unprofessional judges; at all events, I feel pretty sure that the use of the initials in question as a motto in competitions will be condemned by the profession generally, and a very large majority of members of the R.I.B.A.; and I hope we may not see them used again for such a purpose.

A FELLOW.  
\* \* \* We entirely concur with our correspondent.

## PLUMBERS' WORK.

SIR,—I shall feel obliged if you will favour me with a short space in your columns with respect to the registered plumber.

If we are qualified as such, I think there is need of a little alteration relating to builders' general foremen. In nine cases out of ten the foreman is a carpenter, who knows little or nothing of the art of plumbing. The plumber has to work under his instructions, often against his own better skill and abilities, or, as an alternative, lose his job, which does not pay us in these times. Now, if the architect or surveyor were to give his instructions to the plumber, I, and many of my fellow-workmen, know that many a job would be carried out cheaper and more satisfactorily to all concerned.

Take an instance: a job is ready for the plumbers, two or three are set on another fortnight, two or three more to different jobs in the building. No one is responsible except the general foreman, who is not a practical plumber; consequently the work goes wrong. We are all in a muddle, and the plumbing costs a great deal more than it ought to do.

What is the use of our being R.P.'s (registered plumbers) if we cannot exercise our abilities in the craft? If builders would think of it, they could not fail to see the bad arrangement, and would try to remedy it to their own interest and to the satisfaction of  
A PRACTICAL PLUMBER.

## TRURO CATHEDRAL.

SIR,—Would you allow me to make an appeal in your paper for a special fund for the above buildings?

The work we are now doing, comprises the choir and retro-choir, with their aisles; the restored portions of the old St. Mary's Church, the lower stage of the clock tower, the two great transepts. The south porch and the baptistry are already contracted for, but unfortunately (on account of want of funds) the contract does not include the lower portion of the great central tower, which should properly come into this division of the work, to make the whole complete. It was hoped that before we reached this portion, the necessary funds would come in, but our walls are now up ready for the great transept roof; and at the meeting of the committee held last week, it was decided not to attempt the tower, but to carry the roof of the great transept and choir through. This is much to be deplored, as the architectural appearance of the present portion will be entirely spoiled, and the effect intended by the original design lost sight of, and also because the cost of erecting this portion of the tower hereafter will be greatly increased, besides the discomfort and annoyance which must be caused (however carefully the operation is performed) by removing the roof over the heads of the congregation, and erecting the permanent tower.

The Committee cannot appeal for funds for this work, as their hands are tied in the matter by their arrangements with the guarantors of the funds for the present contracts. I have therefore determined to make an appeal on my own responsibility, and entirely without the knowledge of the committee, trusting that surely there must be a sufficient number of persons interested in the work of the first English cathedral commenced since the Reformation to soon furnish the necessary amount when it is known that it is so urgently required.

The amount necessary to finish this portion of the Great Tower up to the level of the ridge of roofs of choir and transepts is 2,374*l.*; and this should be forthcoming at once, or otherwise the works will soon be too far advanced.

I shall be most happy to receive promises and subscriptions towards this; or, if preferred, I should think (though I have no authority for saying so) that they might be forwarded direct to the treasurer, Mr. A. T. Nix, Miners' Bank, Truro, if marked as specially for Great Central Tower.

ROBERT SWAIN,  
Clerk of the Works, Cathedral, Truro.

A Pulpit of Caen stone and marble, with Portland steps, has been erected in Lillingston Church by Messrs. Jones & Willis.

WOODWORK: BEAUFORT CASTLE,  
BEAULY, N.B.

SIR,—It may interest Mr. Blashill and others to know that some of his suggestions in a recent lecture [p. 302, ante] have been carried out here at the erection of this castle.

When commencing, Lord Lovat (the proprietor) wished to use as much of the home-grown Scotch woods as practicable. Some of the doors are entirely of elm, panels 2 ft. 5 in. wide, both sides raised and fielded, the edge of the fielding moulded, and to form the centre of the panel it was then veneered with elm-rod veneer cut ten to the inch; not only the doors, but the jambs of window and door openings have been treated in the same way; the effect is very good. This work has been finished about twelve months, and not any symptoms of shrinkage have yet appeared.

When the trees were cut down they were left in log for some months, then cut into plank, carefully stacked in the open air for three years, then converted into their present shape. Age of trees about 130 years.

The kitchen and servants' hall have open roofs of larch; the boarding (larch), 1½ in. thick, is wrought and V-jointed, is in 3 in. widths, and has been up three years with very little shrinkage. The entrance hall and corridor have panelled ceilings of larch; the chapel has a plain dado and doors; the main staircase, 31 ft. span, has hammer-beam roof; the gallery, 32 ft. span, has a flat ceiling, showing tie-beams (filled in between with plaster to form panels) with timber brackets at the wall, —size of tie-beam, 35 ft. 14 in. by 14 in., without sap. All three are of larch. Age of trees used, between sixty and seventy years.

As soon as possible after the larch trees were cut down, they were taken at once to the saw-mills, cut to size, and plunged direct into water, for six weeks attended to daily, then taken out and stacked ready for use, and up to the present time there is no perceptible shrinkage.

The floor of the gallery, and the door, staircase, and dado of the entrance-hall, which have been prepared from Scotch oak, are scarcely so successful. Lord Lovat wishes me to mention that the whole of this work, and all the carpentering (but not the joinery) has been carried out by the craftsmen of the estate under my direction. I may safely say the workmanship can scarcely be excelled.

A. CRUICKSHANK, M.C.W.A.,  
Clerk of the Works.

## The Student's Column.

## FOUNDATIONS.—X.

## IRON SCREW PILING.

THIS description of piling, which was introduced several years since for use in engineering works, and particularly for getting foundations in sand or loose earth, is capable of being made useful in the foundations of large buildings, but does not seem to have been much employed for that purpose. The screw, which forms the foot of the pile, consists of a blade from 2 ft. 6 in. to 3 ft. in diameter, and when fixed this blade has sufficient resistance to enable it to carry a very great load. Originally these piles were screwed into the ground by the use of long levers of tough wood, working in a capstan-head fixed on the pile itself, and turned by horse power; but it is better to work the levers by means of capstans fixed at a short distance and acting on levers fixed to the pile. The screw-piles may be sunk to a depth of 15 ft.



without much difficulty, unless they should meet with large stones, which greatly impede their action. A pile having a diameter of 9 in. or 10 in., with a screw measuring 2 ft. 6 in. across, will carry sixty or seventy tons. There are many cases in which it is not desirable to make extensive excavations in the ground on which a building is to be erected, where the soil would be troublesome or full of water, or where the building projects into a stream. In such cases screw-piles may be used, girders

being placed from pile to pile to carry the walls; or iron columns may be fixed on each pile so as to carry the upper parts of the building. Upon the whole, it seems likely that this method of providing foundations in an unsatisfactory soil may be made extensively useful both in diminishing the cost of the groundwork and in saving of time.

In pile foundations, more than in foundations of any other kind, it is important that there should be no settlement beyond what can be amply provided for beforehand. We have seen that in buildings of moderate size, such as the ordinary town houses of the Low Countries, the walls are so completely tied to the internal construction, that settlements may happen almost with impunity. But this will not be satisfactory in buildings of considerable magnitude or of an important architectural character. If through any want of care or judgment one pile fails to reach the solid stratum in which the rest are well fixed, it will yield to the weight, and a very serious fracture in the wall of the building, or in the masonry of a pier will be the result. This mischief cannot be repaired; it can only be guarded against by the most careful observation of the effect of the blows of the ram upon each pile, so as to be sure that each has been so driven that it will safely carry its share of the load. The safe load must not be exceeded, and in making the calculation of the weight of the building, it must not be forgotten that, in such buildings as warehouses, which, more than any other, are likely to be built on piles, the loads placed on the floors are limited by nothing but the extent to which it is possible to pack the merchandise which they may be required to contain.

The preparation of foundations, otherwise than by simple piling, in the water of the sea and of rivers, is a subject quite distinct from that of foundations which may be executed by working above the level of the water. It involves the construction of coffer-dams, which are usually piled and puddled enclosures of the space in which the work is to be done, caissons or boxes in which the actual materials of the foundations are placed and sunk to the position which they are intended to occupy, and a great variety of cylinders and other contrivances for executing work exposed to the pressure of water and to the action of floods and tempests. Works of this kind have come to be considered as almost wholly in the province of the engineer, while the great bulk of the foundation works that have been dealt with in these papers are such as fall to the architect. They may, therefore, be properly kept distinct, and studied together with the special classes of superstructure which such foundations are intended to support.

There is no branch of the art of building that has made such beneficial progress during recent times as that of the making of foundations. Indeed, it may be said that in almost every other branch the tendency has been retrogressive. In the period of about half a century during which an enormous impetus has been given to building, all available ingenuity has been exercised in many quarters to make the other departments of construction as unsatisfactory in regard of workmanship and materials as was possible, physically or legally. But the provision of a fairly good foundation is not only amply sufficient to preserve from failure the structures which are built with the care that was formerly more common than now, it will actually preserve the work of the indifferent builder from the fate that would have undertaken it in days before concrete foundations were known.

The student who has followed this subject carefully with a view to its practical and legitimate application, will not have failed to see how he may benefit by it. It is on the site, and beside the trench, and in the company of those whose life is spent in this work, and in the presence of failures which are the most instructive teachers, that he will find the best illustrations of true principles, and the most effectual corrections of false notions on this important department of his art.

A Cabmen's Shelter.—The thirty-eighth shelter of the "Cabmen's Shelter Fund," the gift of Lady Charlotte Schreiber, placed on the cab-rank at Langham-place, will be formally declared open on Saturday next, the 6th inst. at 3 p.m., by the Right Hon. Sir Henry Layard, G.C.B.



RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.  
3,847, Sanitary Trap. J. S. Truss.

The body of the trap is box-like and provided with a cover and an outlet-pipe at the bottom. The inlet-pipe enters at the side and turns upward and the box, terminating in a valve-seat, on which a spindle-valve closes, the spindle being seated in a fitting in the cover. The trap is cast in one piece with the inlet and outlet pipes. The form the core is also described in the specification.

8,175, Flooring Cramp. A. Dobbing.  
The cramping-slide is pushed forward by an electric lever; a catch, which falls into notches, on the side of the lever, and the slide. Two holding catches support the slide also.

13,101, Fireproof Partitions. J. Rogers.  
For temporarily closing the openings in fireproof partitions, hollow fireclay blocks with sunk handles, plain or corrugated, are employed. These blocks are carried and stacked in such positions as required, as, for instance, between double iron doors. They may have holes to permit the escape of enclosed air on subjection to heat.

13,890, Drying Bricks, &c. Barclay, Allison, and Barclay.

The bricks are burned by gas which passes from one kiln to another, and thence by flues to a shed for drying bricks before burning. The gases pass from a gas-chamber into a regenerator along the side of the kiln, which is arranged in a parallel series, thence to a chamber at the bottom of the kiln into which they are discharged in horizontal jets through suitable apertures. The products of combustion pass out at the bottom to a flue leading to the top of a second kiln, and so on being led to a young-chamber before finally passing to the stack. Each kiln is provided with an air-gas-chamber and an adjoining kiln, there being suitable valves and dampers so that the kiln or set of kilns may be cut off from the gas supply, while air may be used through to cool the contents. The drying-chambers may also be heated by gas brought directly from the producers.

14,514, Raising and Lowering Builders' materials, &c. W. Heatley and G. Hutchins.

A rope passes over a large grooved pulley at the rear part of the building, and under a smaller pulley below. The large pulley is on a shaft carried on bearings on suitable standards, and rotated usually by a worm-and-worm wheel. The worm wheel is provided with a ratchet to prevent running back, and the worm is provided at the ends with rollers, in which are rollers to reduce the end motion. The small pulley at the bottom can be raised or fixed in any position. In use, the articles to be raised are taken up by the rope at any point, the attachment being made by clutch pieces. These clutch pieces have inclined eyes, which grip the rope between their opposite edges, when a weight hangs on the hook.

15,160, Flooring or Staging for Greenhouses. Treoron.

Perforated slabs, with V or circular grooves, are arranged side by side, and communicating with one another. They receive the water from the plants, and are provided at intervals with drain pipes.

16,918, Handles, Knockers, &c. J. Gordon.

Door-handles, knockers, &c., are made of cast or wrought metal, in two concave parts, with internal junctions. The edges are placed together, and iron metal is poured inside, to connect them, and a solid handle.

NEW APPLICATIONS FOR PATENTS.

Feb. 19.—2,419, J. Hicken, Fixing Door and other articles by Spindles.—2,427, W. Sanderson, Door and Latch Furniture.

Feb. 20.—2,482, W. Crow and W. Coley, Compound for Coating Wood, Stone, and other Materials.—2,483, T. Gray, Door Lock Handles.—2,489, Openwash, Fastening Rain-water and other articles.—2,491, J. Simpson, Gullies.—2,497, R. Cole, Coating Cook or Tap.—2,498, W. Howie and R. Anderson, Window Frames and Sashes.—2,500, Kinell and Another, Opening Casements, Sashes, shutters, &c.—2,512, A. Boulton, Fastenings for windows, gates, &c.—2,518, A. Pocock and H. Colley, Metal Floorings or Horizontal Partitions Buildings, &c.

Feb. 22.—2,580, W. Welch, Hydraulic Cements.—2,581, J. W. Watson, Water-closets.—2,583, E. B. Machine for Cutting or Punching Tiles, &c.—2,587, J. Sample and W. Ward, crimping Knobs or Handles to Spindles.—2,551, A. Portable Dust-bins.—2,553, B. Hawes, new, Automatic Feeding Apparatus for Sewing Machines.—2,559, A. Flint, Indicating the Condition of a Machine.

Feb. 23.—2,601, S. Pardoe and F. Biggs, Sash Tension.—2,639, J. Ritzdorf, Imitation of Inlaid Cedar.

Feb. 24.—2,659, C. Spackman, Portland Cement.—2,662, W. Shearer, sen., and Others, Brick Setting and Moulding Machine.—2,671, C. Swin and W. Clifford, Ventilating Caps.—2,687, W. Johnson, Cupboard and Door Catches.—2,696,

J. Williams, Double Argand Shop-window Lamp.—2,701, W. Stanley, Chandeliers and Pendants.—2,707, E. Hurley, Mounting Gutters or Troughs for Buildings.—2,708.—J. Woodard, Grip for Sash-lines.  
Feb. 25.—2,786, A. Jones, Pressing Hip and Valley Tiles.—2,742, H. Coleclough, Rendering Tape Proof against Frost.—2,755, J. & A. Duckett, Water-closets and Urinals.—2,758, J. Bale, Automatic Ventilation of Buildings.

PROVISIONAL SPECIFICATIONS ACCEPTED.

15,820, E. Pither, Door Shield or Finger Plate.—54, W. Hilder, Lowering and Raising Sliding Window Sashes.—440, S. Jenner, Chimney or Ventilating Shaft Top.—561, J. Stanley, Smoke-consuming Fireplaces.—794, A. Thomas, Automatic Flushing-tank.—829, J. Stidder, Flushing Water-closet Pans.—1,496, T. Crampton, Electric Bells.—1,534, A. Clark, Combination Locks.—142, J. Brown, Transverse Ventilation of Sewers.—502, J. Jex Long, Open Fire Grates.—560, J. Wragge, Fastener for Window Shutters and Doors.—858, W. Fowler, Cisterns for Water-closets, &c.—883, S. Phillips and S. Wile, Indicator Lock.—923, H. Buchan, Water-closets.—990, J. Green and Others, Kitchen Ranges.—1,016, G. Wilkinson, Bakers' Ovens.—1,325, R. Hunter and W. Moffatt, Cooking Ranges.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to opposition for two months.

4,573, W. Leggett, Window and Door-Fastening Bars.—5,213, T. Fawcett and J. Fawcett, Pressing Bricks, Bricks, and Tiles.—5,354, J. Evans, Union Joints or Couplings for Pipes.—10,168, W. Duffy, Wood Block Flooring.—12,525, W. Scrymgeour, Construction of Floorings, Roofs, &c.—13,769, H. Meisner, Water Meters.—1,039, C. Velt, Door Locks.—4,164, W. Stobbs and E. White, Preventing Down-draught in Chimneys.—4,521, H. Yull, Waste Water Preventer.—5,027, J. Smith, Stench Traps.—5,638, S. Combs, Door Check.—5,544, T. Halliwell, Grazier.—5,956, W. Lester, Astragals for Roofs, Windows, &c.—1,138, A. Bergmann, Looks.—1,184, A. Boulton, Water Meters.

RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

Feb. 19.  
By BRANCH & LEECH and WALKER & RUNZ.  
Liverpool, Walton.—The Liverpool Zoological Gardens, freehold area, 7½ a. 3r. 3p. £19,500

Feb. 22.  
By RYNGOLD & EASON.  
Borough, Penning-street.—Ground-rent, 110½ a year, reversion in 72 years 2,825  
Blackfriars—50, Stamford-street, freehold 1,530  
66½, 67, 67A, and 68, Hatfield-street, freehold 3,640

Feb. 23.  
By DEBENTHAM, TOWNSON, & CO.  
City, Bevis Marks.—Ground-rent of 76½ a year, reversion in 77 years 1,620  
19, Bevis Marks, freehold 1,680

By B. BROWN.  
Leyton—Eight houses in Percroft-road, 98 years, ground-rent 58½ 1,230  
Leytonstone—3 and 4, Alvin-street, 95 years, ground-rent 6½ 220

By HAMNETT & CO.  
Poplar—42 to 56, even, High-street, freehold 3,160  
By FRANKS, FAIRCH, & FURBER.  
Poplar—22, Crisp-street, freehold 200  
14 to 26, even, Bygrove-street, 38 years, ground-rent 40½ 460  
Haston Garden—No. 23, Freehold 2,950

By CHALMERS, GATZERT, & CO.  
Bermondsey—Ground-rent of 10½ a year, reversion in 78 years 200  
South Belgravia—53, Claverton-street, 47 years, ground-rent 10½ 650  
Warwick-square—7 and 9, Warwick-gardens, 62 years, ground-rent 16½ 1,885

By DRYDEN & CO.  
Vaughall Bridge-road—Nos. 258 to 270 even, freehold 7,940  
Eaton-square—40, Lower Belgrave-street, 35 years, ground-rent 7½ 3,000  
Harington—1 to 6, Harington-row, freehold 430  
Cranford—A block of copyhold property 790

By DOLMAN & FRASER.  
Haverstock Hill—1 and 3, Queen's-crescent, 74 years, ground-rent 16½ 1,010  
By CHALMERS, GATZERT, & CO.  
Bermondsey—Ground-rent of 38½ 15s. reversion in about 62 to 66 years 6,630

Feb. 24.  
By DALL & SON.  
Hammer-smith—49 to 56, even, Chancery-lane-road; and 19 to 18, St. James's-street, 43 years, ground-rent 69½ 2,600  
Mile End—123 and 125, Skidmore-street, 31 years, ground-rent 7½ 475  
71, Hatford-street, 22 years, ground-rent 2½ 10s. 200  
Kensington—100, Harmond-street, 19 years, ground-rent 4½ 10s. 150

By F. J. BAX.  
Deptford—75, High-street, freehold 1,000  
Rotherhithe—10, 12, and 14, Faustina-place, freehold 260  
38, Albion-street, freehold 405  
5 to 8, Canute-street, 6½ years, ground-rent 6½ 410

Feb. 25.  
By FAREBROTHER, ELLIS, CLARK, & CO.  
Stratford—Freehold ground-rent, 50½, reversion in 28 years 1,020  
North Kensington—3, Cambridge-gardens, 77 years, ground-rent 8½ 1,070  
Edgware-road—6 and 8, Praed-street, freehold 2,400  
Pentonville-road—No. 262, term 18 years, ground-rent 62½ 10s. 420

By F. ELLEN & SON.  
Andover, near to—Freehold cottage, and 3a. 2r. 39p. £280  
Binley, near St. Mary Bourne—Freehold residence, and 5a. 2r. 30p. 600

By G. C. & T. MOORE.  
Dalston—81 and 83, Middleton-road, 36 years, ground-rent 10½ 320  
21, Fasset-square, 6½ years, ground-rent 6½ 380  
Stepney—45, Perth-street, 7½ years, ground-rent 6½ 350  
Mile End—3, St. Peter's-street, 4½ years, ground-rent 3½ 240

By E. SIMMON.  
Camberwell—52 and 54, Harold-street, 81 years, ground-rent 10½ 410  
Southwark—3 to 6, Hayles-lane, and a ground-rent of 5½ a year, term 27 years, ground-rent 25½ 770  
Peckham—28, 30, and 32, Costa-street, 79 years, ground-rent 12½ 490  
47 and 49 Peckham-rye, 40 years, ground-rent 12½ 580  
Kingsland-road—10 to 13, Wellington-street, 12 years, ground-rent 52½ 10s. 100  
16, 17, and 19, Wellington-street, 12 years, ground-rent 8½ 65  
19 to 27, Wellington-street, 12 years, ground-rent 117½ 215  
Hackney-road—9 and 92, Scawell-street, 3 years, ground-rent 8½ 68  
95 and 97, Scawell-street, 31 years, ground-rent 7½ 93

By HERRING, SON, & DAV.  
Brixton—69, Wiltshire-road, 78 years, ground-rent 1½ 960

Feb. 26.  
By MESSRS. CHONK.  
Sevenoaks—The residence called "Heathfield," and 1½ acre, 52 years, ground-rent 40½ £9,100

By R. RUD.  
Baywater, Monmouth-road—The St. Stephen's Mansions, freehold 10,500  
Piccadilly—The lease of No. 216, term 1½ years, 1,360

By HANCOCK & TAYLOR.  
Camden-road—1 and 11, Castelow-road, 64 years, ground-rent 14½ 980  
Nine Elms—20 to 36 even, Ponton-road, and 18 to 28 even, Currie-street, 61 years, ground-rent 47½ 1,800

By BAKER & SON.  
Kensington, Baron's Court Estate—Three plots of freehold land, 7a. 0r. 25p. 20,800

MEETINGS.

SATURDAY, MARCH 6.  
Royal Institution.—The Rev. C. Taylor, D.D., on "The History of Geometry." 11. 3 p.m.  
Association of Public Sanitary Inspectors.—Mr. W. Warner on "The Disposal of Sewage Sludge." 6.30 p.m.

MONDAY, MARCH 8.

Royal Academy of Arts.—Lectures in Architecture: Mr. W. Watkins Lloyd will give "An Exposition of the Theory of Proportion in Architecture as understood and applied in detail by the Architect of the Parthenon." 8 p.m.  
Surveyors' Institution.—Adjourned Discussion on Mr. Woodward's Paper on "London Remodelled." 8 p.m.  
Society of Arts (Cantor Lectures).—Mr. Boverton Redwood on "Petroleum and its Products." 1. 8 p.m.

Leeds and Yorkshire Architectural Society.—Paper by Mr. G. Atchison, A.R.A.  
Society of Antiquaries of Scotland (Edinburgh).—Five papers. 3 p.m.

TUESDAY, MARCH 9.

Institution of Civil Engineers.—Mr. Donald Clerk, F.C.S., "On the Explosion of Homogeneous Gaseous Mixtures." 8 p.m.

WEDNESDAY, MARCH 10.

Architects' Benevolent Society.—Annual General Meeting. 8 p.m.  
Civil and Mechanical Engineers' Society.—Mr. George Simonds on "The Erection of Colonial Statues." 7 p.m.  
Curriers' Hall, London Wall.—Mr. T. Chaffield Clarke, F.R.I.B.A., on "The Architecture of City Buildings." 8 p.m.

Society of Arts.—Mr. E. Price-Edwards on "The Experiments with Lighthouse Illuminants at the South Foreland." 8 p.m.  
Liverpool Engineering Society.—Mr. A. G. Lyster, M.Inst.C.E., on "The Manchester Ship Canal." 8 p.m.

THURSDAY, MARCH 11.

Society of Antiquaries.—Mr. T. F. Kirby on "Excavations at Winchester Cathedral Church"; and the Rev. H. M. Search "On a Sculptured Roman Stone recently found at Bath." 6.30 p.m.  
Society of Telegraph-Engineers and Electricians.—(1) Prof. W. E. Ayrton, F.R.S., on "Economy in Electrical Conductions"; (2) Prof. John Perry, F.R.S., on "Magnetic Resistance." 8 p.m.

FRIDAY, MARCH 12.

Architectural Association.—Mr. S. Flint Clarkson on "Architectural Photographs by J. L. Robinson and other Amateurs." 7.30 p.m.  
Royal Institution.—Dr. Reginald Stuart Poole on "The Discovery of the Biblical Cities of Egypt." 9 p.m.

SATURDAY, MARCH 13.

Architectural Association.—Visit to Houses now being erected in Kensington Court. Members to assemble at 3 p.m.

Miscellaneous.

Architects' Benevolent Society.—The annual general meeting of the subscribers and donors of this Society will be held, at the above address, on Wednesday next, the 10th of March, at five o'clock.

Steam Laundries.—Messrs. Scrivener & Co. have received instructions to proceed with the erection of the boundary walls of the second laundry of the London and Provincial Steam Laundry Company. The site is close to the Queen's Park Station, Kilburn. The buildings will be very extensive, and are to be commenced at once. The architect is Mr. Ernest Turner.



**The Liverpool "Gordon" Working Lads' Institute.**—The foundation-stone of this building, which will occupy a site a little to the north of the Stanley Hospital, has been laid by Mrs. Cliff. The building is being erected at the expense of Mr. William Cliff, in memory of his eldest son. The object of the institution is to provide a continuance of the Board School teaching of industrial training in the interest of boys who, having left school, are apprenticed to different trades and are in receipt of daily wages. Besides the educational advantages to be derived from it, social pleasures, gymnastic and other exercises, to elevate and train the mind and body will be provided. The institution will be conducted upon lines similar to the Whitechapel (London) Working Lads' Institute and other similar institutions. The principal entrance is from Stanley-road, and leads into a spacious vestibule, from which the main corridor leads, on the right to the social-room, 44 ft. by 20 ft., with kitchen opening therefrom, and a committee and secretary's room, and on the left to four large class-rooms for industrial and technical training, fitted with stoves, forges, benches, &c. From the main staircase or central hall access is gained to the gymnasium, 60 ft. by 13 ft., and a corridor leads therefrom to the bath-rooms, lavatories, &c., the heating of the building, as also for the baths, being arranged upon the basement-floor. The first floor contains a large lecture-hall and concert-hall, 79 ft. by 42 ft., and 31 ft. in height, with a polygonally-formed panelled roof. Chair accommodation is provided in this hall for 800 persons, exclusive of the orchestra, which will accommodate eighty more. The hall has also been arranged with a view to division into class-rooms, with light movable screens. The exterior elevations of the building, which is Flemish Renaissance in style, are broken with side and central bays, with stepped gables, parapets, and piers, the windows having tympana filled in with interlacing tracery, confined within variously shaped arches. The building will be constructed of red brick and terra cotta, interspersed with red sandstone dressings, the slates being Westmoreland greens. The entire works are being executed by Messrs. Morrison & Sons, of Wavertree, at a cost of about 5,000*l.*, from designs by Mr. Walker, Dale-street.

**The National Liberal Land Company (Limited).**—The report and balance-sheet for the year 1885, to be presented to the sixth annual general meeting of the shareholders, at the Charing-cross Hotel, London, to-day (Friday, March 5), states that notwithstanding the continued severe difficulties experienced by all sellers of land in finding purchasers, the directors have been able, during the year, to realise from sales the sum of 40,487*l.* 11*s.* 6*d.* The purchases comprise a seaside estate at Rhyll, North Wales, and a valuable and important property at Highbury, a considerable portion of which latter has been re-sold at a handsome profit. The profit and loss account shows an available balance of 2,657*l.* 9*s.* 8*d.*, and the directors recommend that, in addition to the interim dividend already paid for the half-year ending the 30th of June last, at the rate of 5 per cent. per annum, free of income-tax, a dividend at the same rate for the remaining half-year be declared and paid, and that the balance, subject to payment of directors' fees, be carried forward.

**Guildford.**—A memorial window has been placed in the west end of Christ Church, Waterden-road, presented by the late Mr. Pagan, of Oak Lodge, and commemorative of his wife and two children. It is in stained glass, and it illustrates the 11th chapter of Isaiah. The figure of Jesse is placed at the bottom of three centre compartments, and from it start the root and stem referred to. The outer lights contain figures of angels. The genealogy of Christ is shown by the figures of David, Solomon, and others mentioned in the first chapter of St. Matthew, culminating in the figure of St. Mary and our Lord (the Incarnation), and His subsequent death. In the two pieces of tracery are figures of SS. Joseph and Joachim. The general treatment is after the style which prevailed in the latter part of the fourteenth century. The window has been designed and produced by Messrs. Lavers & Westlake, of London.

**Brampton.**—By an obvious misprint in our last issue, Mr. Bignell's Church, at Walthamstow, was described as having cost 800*l.* It should have been 8,000*l.*

**Society of Engineers.**—At a meeting of the Society of Engineers, held on Monday evening last in the Town-hall, Caxton-street, Westminster, Mr. Perry F. Nurse, President, in the chair, a paper was read on "The Roorkee Hydraulic Experiments," by Mr. E. S. Bellasis, A.M. Inst. C.E. The paper was an examination and criticism of an extensive series of experiments on the flow of water in the Ganges Canal, made by Captain (now Major) Allan Cunningham, R.E., in the years 1874-79. The author, after stating that there were many important questions connected with the experiments to which attention had not yet been directed, proceeded to consider the method of velocity measurement. He enumerated the faults which the double float possesses, explained how it should be designed so as to minimise them, and argued that with the patterns of float used at Roorkee the amount of error must in many cases have been large, and that much better results would have been obtained by using floats of a different pattern, and probably better still by using current meters. Double floats were unsuited to very rapid streams, but the idea that they were not suited to deep streams was shown to be erroneous. The rods used for measuring the mean velocity between the surface and the bed did not reach to the bed, and, therefore, would give results slightly in excess of the true mean velocities. He contended that rods and floats were not generally so good as current-meters. Referring to the distribution of the velocities in the cross-section of the stream, the author, after showing that the depression of the maximum velocity below the surface could not be due to the resistance of the air, adduced further evidence in support of the law discovered by the experimenter, that the ratios of the different velocities to one another are independent of the mean velocity in the stream. Another law propounded by the experimenter, namely, that the form of the transverse curve of velocities is independent of the depth of water, held good only in a rectangular channel.

**Sounding by Potassium.**—A very ingenious scheme for detecting the presence of sub-soil water has lately been devised by an American engineer, and is described by our Transatlantic contemporary the American *Engineering News*. In connection with some large public works at Boston it was desirable to test the effect that certain pumping operations would have on underground water. A number of small pipes were, therefore, driven into the ground into which the water would rise. The problem was to gauge the height of the water in the pipes in a simple and effective manner. A spring steel tape had attached to its extremity by a wire hook a small leaden weight. In the top of this there was a hole in which a cork was forced, and in the cork was fixed, in a vertical position, a needle, the point being upwards. The distances were so arranged that the point of the needle would be just on a level with the zero mark on the tape when the whole was allowed to hang in a vertical position. A small piece of metallic potassium was placed on the point of the needle, which would then be lowered by means of the tape into the pipe. Directly the potassium came in contact with the water it would ignite with a slight explosion, at which time the depth the tape had descended would be noted, thus giving the height the water had reached.

**The Metals Exhibition at Rome.**—The principal attraction just now at Rome is the Metals Exhibition, which is being held at the Palazzo di Belle Arti, situated in the Via Nazionale. Amongst the most important exhibits are two bronze statues, discovered in the Italian capital in the course of last year's explorations, one of these being the bronze Bacchus which was recovered from the bed of the river Tiber in September last. There is also an ancient lantern on view, brought from Venice, where it had been preserved. A magnificent pedestal, dating from the fifteenth century, with three steps supporting a column, is placed in a prominent position, and attracts much attention. The pedestal is encircled with carved leaves, chiselled in the metal, whilst a bird, representing an eagle with its wings spread out, is perched upon the extremity of the column, clasping a book. A figure, which is intended to represent Emanuel Philibert of Savoy, is standing in the centre of the hall. It is attired in armour, consisting of polished steel inlaid with gold. The above are only a few of the many interesting works which this exhibition contains.

**Royal School of Mines.**—Professor Warington Smyth, F.R.S., in continuing his lectures upon mining, in the theatre of the Geological Museum, Jermyn-street, considered the various systems adopted in the working of building stone. The pillar and bord or gallery is the most common, and dates from a very early period. It may be seen in the quarries of Egypt and Hindostan. The pillars there are rectangular, and sometimes, if the ground is not very firm, the openings are arched. The catacombs of Paris and Rome, and the caverns of Maestricht, have been wrought on a system not unlike this. Another remarkable instance, to be seen in our own country, is that of the quarries at Box, near Bath. In this case, the stone being strong, the angle of dip moderate, almost flat, and the character of the rock such as renders it capable of being cut with a saw, there is a degree of regularity such as is scarcely to be seen in any other workings. The headings or galleries are 25 ft. wide, and are crossed by others, leaving 12 ft. pillars between; the height of the stratum varies from 8 ft. to 20 ft. in the district. A very long-handled pick is used in these quarries, for the holing, and the rock is then cut away with a saw, the pillars being left permanently for support.

**The Porosity of Building Materials.**—Professor Recknagel has lately called the attention of German architects to the subject of the movement of the air in dwelling-houses, and to the fact, well known among English sanitarians, that air passes through the walls and ceilings. He asserts that the air passes upwards through the flooring with the same force as that with which it passes through the lowest part of the vertical partition of a room; while it penetrates the ceiling with the same force as that with which it passes through the upper portion of the upright wall. Statistics of Berlin mortality show that there is a higher death-rate amongst the persons living in the lowest and highest stories of houses than amongst the inhabitants of the intermediate floors; the dwellers in the loftiest rooms breathing air which has already passed through the lungs of those in the other portions of the house. During the colder seasons this is particularly the case. Professor Recknagel attributes, moreover, to the nature of the filling between the floors a certain share of the blame for the exceptional mortality of 28·2 per 1,000, which prevails in Berlin amongst the inhabitants of the stories higher than the fourth. As in summer a contrary movement takes place, it is remarked that the residents on the first floor then breathe air which has passed through the lungs of the occupants of the garrets. In view of the evidently injurious consequences of dry-hot in the beams which separate one floor from another, it is urged by Herr Wagner, of Mayence, in the *Deutsche Bauzeitung*, that massive work in iron and stone, with a filling of slag-concrete, is the most suitable alternative mode of construction, the difference in expense not being out of proportion to the sanitary and other advantages thereby obtained.

**The "Tale of Troy" and "Orestes."**—The "Tale of Troy," as performed three years ago at Cromwell House, will be reproduced (in the English version) on the evening of May 27th, at the Prince's Hall, Piccadilly. The "Story of Orestes," an abridged translation of the *Orestes* Trilogy of *Æschylus*, which has been written by Professor Warr as a sequel to the former, will be represented on the preceding evening, May 26th, and also on the afternoon of May 28th, in the same place. The tableaux and scenery have been designed by Sir Frederick Leighton, bart., P.R.A., and Messrs. E. J. Poynter, R.A., G. F. Watts, R.A., and Walter Crane, and the music specially composed by Mr. Otto Goldschmidt, Mr. Malcolm Lawson, Dr. Monk, and Mr. Walter Parratt, who has undertaken the choral music for the new drama. The proceeds of the performances will be given as a contribution towards a University Endowment fund, with the object of enabling King's College and University College, London, to extend and cheapen the higher collegiate education, with a view to qualify them for the functions of a Teaching University.

**The Plastic Decoration and Papier Mache Company,** of Wellington-street, Strand (formerly Bielefeld's), have removed their factories from Staines to more commodious premises situated in Market-road, Caledonian-road, N. The offices still remain in Wellington-street.



OILS.		£.	s.	d.	£.	s.	d.
Linseed	..... ton	29	10	0	29	17	8
Cocount, Cochin	..... ton	29	0	0	30	0	0
Castor	..... ton	29	0	0	30	0	0
Copra	..... ton	0	0	0	0	0	0
Palm, Lagos	..... ton	28	0	0	0	0	0
Palm-nut Kernel	..... ton	33	10	0	0	0	0
Mustard, English	..... ton	23	5	0	23	10	0
Do. brown	..... ton	21	5	0	0	0	0
Cottonseed, refined	..... ton	17	0	0	18	10	0
Tallow and Oleine	..... ton	25	0	0	40	0	0
Lubricating, S. G.	..... ton	8	0	0	10	0	0
Do. Refined	..... ton	8	0	0	13	0	0
TURPENTINE—							
Soft, in cks.	..... cwt.	6	6	0	10	0	0
Steeple, in cks.	..... cwt.	10	0	0	19	0	0
Archangel	..... cwt.	0	12	0	0	0	0

*Epitome of Advertisements in this Number.*

Nature of Work, or Materials.	By whom required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Works and Materials .....	St. Gill's Brd of Wks.	G. Wallace .....	March 8th .....	ii.
Supply of Queen Yellow Pine .....	Great Western Co.	do. .....	March 9th .....	ii.
Portland Cement, Ballast, Sand, &c .....	Chelsea Vestry .....	G. R. Strachan .....	do. .....	ii.
Wood Paving Blocks .....	do. .....	do. .....	do. .....	ii.
Construction of the Refuse .....	West Ham Local Bd.	— Horn .....	do. .....	ii.
Works, Repairs, and Materials .....	War Department .....	Official .....	do. .....	ii.
Additional Paving Places .....	South London Tramways Company .....	J. G. L. Stephenson .....	March 11th .....	xviii.
Alterations at Workhouse School .....	Guardians of St. George's .....	do. .....	do. .....	xviii.
Works and Materials .....	Islington .....	Wm. Smith .....	do. .....	xviii.
Underground Urinals, &c. .....	War Department .....	Official .....	March 12th .....	ii.
Stoneware Pipe Sewers .....	Com. of Sewers .....	do. .....	do. .....	ii.
Painting, &c., Works .....	Hamagate Town Council .....	W. C. Barber .....	do. .....	ii.
Works and Materials .....	Met. Asylum Board .....	Official .....	March 13th .....	xviii.
Enlarging Goods Warehouse .....	Bermondsey Vestry .....	do. .....	March 16th .....	xviii.
King's-road Improvements .....	Brighton Town Council .....	S. H. Woodhouse .....	Official .....	xviii.
Paving Footways .....	Brighton Town Council .....	do. .....	March 17th .....	xviii.
Gurnsey Granite and Flints .....	Greenwich Bd. of Wks. .....	do. .....	March 17th .....	xviii.
Tar Pavement .....	Mortlake Highway B'd. .....	J. Medworth .....	March 16th .....	xviii.
New Roof over Machine House .....	do. .....	do. .....	do. .....	xviii.
Additions to Parcel Post-Office .....	Darwen Paper Mill Co. Limited .....	Official .....	do. .....	ii.
Sewerage Works .....	Com. of H. M. Works .....	do. .....	March 22nd .....	ii.
Tower Bridge.—Contract No. 1 .....	Colne and Marsden L. B. Bridge House Estates Committee .....	H. Bancroft .....	March 29th .....	xviii.
Sewerage Works, &c. .....	Com. of Sewers, Lambeth .....	J. H. Barry .....	do. .....	ii.
Wood Carriage-way, with York Stone Footways, &c. .....	Com. of Sewers, Lambeth .....	W. L. D. Marsden .....	April 1st .....	xviii.
Residence and Stabling, Great Clacton .....	Met. Board of Works .....	Official .....	do. .....	ii.
		Alf. Broad .....	Not stated .....	ii.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page.
Building Surveyor.....	Eastbourne Corporation	160 <i>l.</i> .....	March 22nd	xvi.

**BRENTWOOD.**—For additional bathing and lavatory accommodation at the Brentwood Schools, for the Guardians of the Hackney Union:—

Winter, Brentwood.....	£183	0	0
Wood, Chelmsford .....	142	0	0
R. Seed, Dartmouth Park-hill* .....	110	0	0
Norris & Leeke, Upper Holloway .....	165	0	0

BROCKLEY.—For the erection of two shops at the corner of Brockley and Shardeloes roads, Brockley. Mr. James Webster, architect, Doughty-street:—  
A. C. Hoile (accepted) ..... £1,325 0 0

COLCHESTER.—For carpenter's, joiner's, ironmonger's, plumber's and glazier's work to cottages, Wimpole-lane, Colchester, for Mr. John Bare. Mr. G. H. Page, architect, Trinity-chambers, Colchester:—

Clark .....	£168	16	0
Sansom .....	168	0	0
Ambrose (accepted).....	165	0	0

CRANLEIGH.—For residence at Cranleigh, Surrey.  
Mr. George Lethbridge, architect. Quantities supplied by  
Mr. C. H. Goode:—

Mitchell Bros. ....	24,530	0	0
Stanton .....	4,110	0	0
Holden .....	3,988	0	0
Colls & Son .....	3,996	0	0
Scott .....	3,348	0	0
Harrie & Wardrop .....	3,235	0	0
Adcock .....	3,190	0	0

**DORKING.**—For sewerage outfall works, for the Dorking Local Board, Messrs. Smith & Austin, engineers, Dorking.

Contract No. 2.	
J. W. & J. Neave, Leytonstone .....	£3,225 0 0
Leonard Bottoms, Battersea.....	2,858 0 0
J. Harrison, Brighton .....	2,406 6 0
Wm. Nicholls, Wood Green.....	2,663 18 6
E. Peill & Sons, Bromley, Kent .....	2,633 17 6
Mark Putney, Dorking .....	2,510 0 0
John Mackay, Southsea.....	2,422 8 0
J. Edmondson, Edmonton.....	2,296 14 6
C. Killingback, London .....	2,203 6 0
Wm. Cunliffe, Barking (accepted) ...	1,070 10 0

Contract No. 3.		
E. Peill & Sons, Bromley, Kent .....	4,224	12 6
J. W. & J. Neave, Leytonstone .....	4,113	0 0
J. Harrison, Brighton .....	3,916	9 10
J. Mackay, Southsea .....	3,563	10 0
Marion Funtney, Dorking .....	3,784	18 0
Leonard Bottomley, Bexley .....	3,769	0 0
C. Killingback, London .....	3,310	6 8
Wm. Nicholls, Wood Green .....	3,431	16 6
J. Edmondson, Edmonton .....	3,288	3 0
Wm. Cunliffe, Barking (accepted)...	3,261	0 0

DAVENTRY.—For the erection of house and stabling, for Mrs. Hewitt. Mr. J. B. Williams, architect, Drayton and Daventry. Quantities by Messrs. Henry Cooper & Sons, Maidenhead and Reading.—

Green Bros.	23,525	0	0
Martin	3,450	0	0
Cosford	3,395	0	0
Parnell & Sons	3,444	0	0
Geo	3,195	0	0

Stabling.		
Cosford .. .. .	537	0 0
Green .. .. .	525	0 0
Martin .. .. .	520	0 0
Farnell & Sons .. .. .	474	0 0
Gea .. .. .	440	0 0

**EAST GRINSTEAD.**—For additions and alterations to Bramblehurst, and rebuilding stabling at Forest-row. Messrs. N. S. Joseph & Smithem, architects:—

Phillipson, London .....	£3,502	0	0
E. Conder, London .....	2,567	0	0
Mansfield & Son, Tunbridge Well &c.	2,083	0	0
Waters, Forest-row (accepted) .....	2,049	0	0

FULHAM.—For rebuilding old malthouse, Stamford Bridge, Fulham, for Mr. J. Bowden:—

H. Smith .....	£1,378	0	0
Stone .....	1,360	0	0
W. H. Smith .....	1,212	0	0
J. Grover & Son .....	1,178	0	0
Prestige & Co. (accepted) .....	1,070	0	0

GRAYS (Essex).—For the completion of eight shops, High-street, Grays. Mr. J. H. Churchyard, surveyor, Bishopgate-street:—  
H. J. Carter, Grays (accepted) ..... £2,290 0 0

GRAYS (Essex).—For manager's house, for Messrs. Brooks, Shooebridge, & Co. Mr. E. C. Allam, architect:—  
H. J. Carter, Grays (accepted) ..... £864 0 0

HIGHGATE.—For alterations and additions to St. Aloysius's School, Hornsey-lane. Mr. Albert Vicars, architect, Strand:—

T. Heath .....	£3,796	0	0
Grover & Son .....	3,564	0	0
Patman & Fotheringham .....	3,473	0	0
Kelly & Son (accepted) .....	3,375	0	0

ISLINGTON.—For the supply of six water-vans and two water-carts, for the Vestry of St. Mary, Islington.	
Mr. J. P. Barber, surveyor:—	
E. H. Bayley, Newington-caneway .....	238 0 0
J. & W. Rendel, Kingston .....	280 0 0
Glover & Sons, Warwick .....	288 0 0
Bristol Wagon Works .....	284 0 0
J. Smith & Son, Wolverhampton .....	259 5 0
East Yorkshire Cart and Wagon Company, Beverley (accepted) .....	258 15 0

## CURRENT OF MATERIALS.

TIMBER.		S. d.		S. d.	
		£	s.	£	s.
Greenheart, B.G.	..... ton	6	10	7	10
Jack, U.S.	..... lb	12	10	15	10
Quina, F.S.	..... ft. cube	0	2	4	8
Red, Canada	..... ft. cube	0	2	4	8
Roh	.....	3	0	4	10
M	.....	3	10	4	15
R, Dantac, &c.	.....	1	10	4	10
Canada	.....	5	10	6	10
Red, Canada red	.....	3	0	4	0
th, Dantac	..... yellow	3	0	5	0
th, Dantac	..... white	4	0	5	0
St. Petersburg	.....	4	0	5	0
Sinacot, Riga	..... log	2	15	4	10
.....	..... Odessa, crown	3	12	3	15
ad, Finland	..... 1st and 2nd	6	0	7	10
.....	..... 2nd and 3rd	6	0	7	10
Riga	.....	6	0	8	0
St. Petersburg, 1st yel.	.....	8	0	14	0
.....	..... white	7	0	10	0
Swedish	.....	6	0	16	0
White Sea	.....	0	17	0	17
Canada, First	.....	12	0	17	0
.....	..... 2nd	12	0	17	0
.....	..... 3rd, &c.	6	0	10	0
.....	..... Spruce 1st	8	0	11	0
.....	..... 2nd and 3rd	5	0	7	0
few Brunswick, &c.	.....	5	0	7	0
Items, all kinds	.....	4	0	12	0
oring Boards, sq. 1 in.—Pre-	.....	0	0	13	0
.....	..... second	0	7	8	0
Other qualities	.....	0	5	0	7
for, Cuba	..... foot	0	34	0	4
.....	.....	0	34	0	4
.....	..... Australian	0	23	0	8
.....	..... bogan, Cuba	0	5	0	73
.....	..... T. Domingo, cargo av.	0	5	0	73
.....	.....	0	5	0	73
.....	..... obasco cargo av.	0	4	0	63
.....	..... oduras cargo av.	0	44	0	64
.....	..... ple, Bird's eye	0	7	0	7
.....	.....	0	7	0	7
.....	..... abia	0	0	14	0
.....	..... Turkey	5	0	18	0
.....	..... n, St. Domingo	0	0	0	0
.....	..... ant, Italian	0	4	0	0

## METALS.

ar, Wig in Scotland .....	1	19	7	0	0	0
ar, Pals in London .....	4	15	0	5	0	0
39 39 in Wales .....	4	7	6	4	10	0
39 39, Staffordshire, London .....	5	15	0	7	0	0
isels, single, in London .....	7	10	0	9	0	0
all-roads 39 .....	6	5	0	7	0	0
39 39 .....	6	15	0	7	0	0
PER-						
ritish, eke, and ingt. ....ton	43	0	0	44	0	0
net selected .....	44	0	0	45	0	0
isels, strong .....	50	0	0	48	0	0
India .....	44	0	0	48	10	0
istralian .....	45	0	0	48	0	0
ili, bars .....	40	12	6	41	0	0



ISLINGTON.—For alterations and additions to the King's Arms, Liverpool-road, for Mr. W. L. Harris. Mr. H. Hardwicke Langton, architect. Quantities by Mr. F. H. A. Hardcastle.—

W. Smith & Son.....	£1,659	0	0
Faulkner.....	1,545	0	0
Ridout.....	1,427	0	0
Langmead & Way.....	1,426	0	0
S. Godman.....	1,395	0	0
Brown & Harris.....	1,327	0	0
Stimpson & Co.....	1,263	0	0
Mattock Bros.....	1,255	0	0
Harris & Wardrop.....	1,253	0	0
Erton.....	1,237	0	0

ISLINGTON.—For the supply and fixing of twenty street water-posts, and the service-pipes and fittings connected therewith, for the Vestry of St. Mary, Islington. Mr. J. F. Backer, surveyor.—

	Plan No. 1.	Plan No. 2.
Simpson & Co., Fimlico.....	£417 0 0	£433 10 0
Chapman & Reid, Holloway.....	387 1 8	415 5 0
Beck & Co., Southwark.....	371 0 0	374 5 0
J. & F. May, High Holborn.....	367 0 0	361 0 0
F. Bird, Great Castle-street, Regent-street.....	318 10 0	349 0 0
Taylor & Sons, Newgate-street.....	322 10 0	318 18 4
Blakeborough & Sons, Brighthelm-street.....	287 6 8	287 5 0
Plan No. 1.—Lead service-pipes. Plan No. 2.—Iron ditto.		

\* Accepted.

LONDON.—For pulling down the premises, Nos. 43 to 63, Euston-buildings, George-street, Euston-road, and rebuilding seven dwelling-houses, for Mr. Thomas Hughes Messrs. Karlsake & Morimer, architects.—

N. Lidstone.....	£10,197	0	0
G. H. & A. Bywater.....	9,885	0	0
L. H. & R. Roberts.....	9,828	0	0
T. H. Adamson & Sons.....	9,817	0	0
W. Schirmer & Co.....	9,684	0	0
E. Lawrence & Sons.....	9,863	0	0
Patman & Fotheringham.....	8,973	0	0

LONDON.—For stabling at Gayford-road, Starch-green, for the London General Omnibus Company, Limited, under the superintendence of Mr. G. T. Lanham, Quantities by Mr. A. J. Bolton:—

North Bros.....	£2,490	0	0
Roberts.....	2,450	0	0
Lyford.....	2,435	0	0
Watkins & Co.....	2,399	0	0
Richens & Moun.....	2,340	0	0
Hack.....	2,284	0	0
Garrud.....	2,272	0	0
Parlet.....	2,258	0	0
Knight.....	2,110	0	0
Toms.....	2,089	0	0
Hunt.....	2,064	0	0
Haydon.....	2,060	0	0
Mark Manley.....	1,937	0	0

LONDON For constructing foundations and erecting basement story to Nos. 13, 16, and 18, Breck-street, Hanover-square. Messrs. N. S. Joseph & Smitham, architects:—

Asby Bros.....	£238	0	0
J. T. Chappell.....	487	0	0
W. Shepherd.....	449	0	0
W. Hearn & Co.....	403	0	0
Patman & Fotheringham.....	373	0	0

LONDON.—For repairs and restorations to 55 and 56, Aldermanbury. Messrs. Heaps, Son, & Neave, surveyors:—

Oalley.....	£217	0	0
Forest.....	221	13	0
Johnson & Co.....	193	15	0

MARGATE.—For alterations and additions to the Asylum for the Deaf and Dumb. Mr. Arthur B. Mallins, architect, London:—

Brown & Son, Margate.....	£15,923	10	0
Deane, Deal.....	15,598	0	0
Burrows, Faversham.....	15,333	0	0
Perry & Co., London.....	15,024	0	0
Rider & Son, London.....	14,920	0	0
Dowse, London.....	14,610	0	0
Brass & Son, London.....	14,500	0	0
Jarrett, Croydon.....	14,787	0	0
Farmanor, Margate.....	14,718	0	0
Prestige & Co., London.....	14,531	0	0
Chappell, London.....	14,469	0	0
Lawrence, London.....	14,303	0	0
Elliott, Newbury.....	13,944	0	0
Deane, Walmer.....	13,694	0	0

SHORDDITCH.—For additions and alterations to the workhouse laundry at Shorrditch Workhouse, for the Guardians of the Poor of the parish of St. Leonard, Shorrditch. Mr. J. Wallace Peags, engineer:—

G. W. Pratt & Co.....	£360	0	0
Water Jones.....	349	0	0
Manlove, Allott, Frye, & Co.....	327	10	0
Fraser & Fraser.....	310	0	0
Thomas Taylor.....	302	15	0
John & F. May.....	298	0	0
Bradford & Co.....	297	0	0
Joseph Ivory.....	294	10	0
Edwards Clements & Jeakes.....	283	10	0
Ayres & Co.....	263	5	0
Thomas & Taylor (accepted).....	240	0	0

[Engineer's estimate, 26½.]

WESTGATE-ON-SEA.—For the erection of stables in St. Mildred's-road, for Mr. Jarman (exclusive of stable-fittings, plumbing, painting, and glazing). Mr. A. Gordon Collins, architect, Westgate-on-Sea:—

G. Cloake, Westgate.....	£282	0	0
H. Bowman, Ramsgate.....	275	0	0

SPECIAL NOTICE.—Lists of Tenders frequently reach us too late for insertion. They would be delivered at our office, 46, Catherine-street, W.C., not later than Four p.m. on THURSDAYS.

#### TO CORRESPONDENTS.

Registered Telegraphic Address, "THE BUILDER, LONDON."

T. & Co. Boston.—S. M. & Co.—J. C. T.—E. F.—C. T. N.—W. W.—H. R. (the form of frailty you mention cannot be regarded as peculiar to the building trade).—C. B. (will reply by letter).—A. C.—C. B. K. (three-branch hand).—Is a man who can undertake plumbing, painting, and glazing.—Sanitary Engineer (next week). All statements of fact and figures must be accompanied by the name and address of the sender, not necessarily for publication. We are compelled to decline pointing out books and giving addresses.

NOTE. The responsibility of signed articles and papers read at public meetings rests on the contributors, and not on the Editor. We cannot undertake to return rejected communications. Letters of communications beyond the usual limits which have been daily called for other journals are NOT DESIRED. All communications regarding literary and artistic matters should be addressed to THE EDITOR, all communications relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

#### PUBLISHER'S NOTICES.

Registered Telegraphic Address, "THE BUILDER, LONDON."

#### CHARGES FOR ADVERTISEMENTS.

SITUATIONS VACANT, PARTNERSHIPS, APPRENTICESHIPS, TRADE AND GENERAL ADVERTISEMENTS. Six lines (about fifty words) or under ..... 4s. 6d. Each additional line (about ten words) ..... 6s. 6d. Terms for Series of Four Advertisements and Special Advertisements on front page. Competitions, Contracts, Sales by Auction, &c. may be obtained on application to the Publisher.

SITUATIONS WANTED. FOUR LINES (about thirty words) or under ..... 2s. 6d. Each additional line (about ten words) ..... 6s. 6d. PREPAYMENT IS ABSOLUTELY NECESSARY. \* \* \* Stamps must not be sent, but all small sums should be remitted by Cash in Register. Letter or by Money Order, payable at the Post-office, Covent Garden, W.C. to DOUGLAS FOURDRINER, Publisher.

Advertisements for the current week's issue must reach the Office before THREE o'clock p.m. on THURSDAY. The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c. left at the Office in reply to Advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

SPECIAL.—ALTERATIONS IN STANDING ADVERTISEMENTS OR ORDERS TO DISCONTINUE SAME, must reach the Office before TEN o'clock on WEDNESDAY mornings.

PERSONS Advertising in "The Builder," may have *Reprints* addressed to the Office, 46, Catherine-street, Covent Garden, W.C., free of charge. Letters will be forwarded if addressed envelopes are sent, together with sufficient stamps to cover the postage.

#### TERMS OF SUBSCRIPTION.

"THE BUILDER" is supplied direct from the Office to residents in any part of the United Kingdom at the rate of 12s. per annum *Postpaid*. To all parts of Europe, America, Australia, and New Zealand, 20s. per annum. To India, China, Ceylon, &c. 30s. per annum. Remittances payable to DOUGLAS FOURDRINER, Publisher, No. 46, Catherine-street, W.C.

#### Best Bath Stone, for Winter use.

WESTWOOD GROUND, Box Ground, Combe Down, Corsham Down, and Farleigh Down. { Summer { Dried. RANDELL, SAUNDERS, & CO., Limited, Corsham, Wilts. [ADVT.]

#### Box Ground Stone

is the best for use in all exposed positions being a well-known and tried Weather Stone, 50,000 ft. cube in stock. PICTOR & SONS, BOX, S.O., WILTS. [ADVT.]

#### Doubling Freestone and Ham Hill Stone

of best quality, in blocks, or prepared ready for fixing. An inspection of the Doubling Quarries is respectfully solicited; and Architects and others are CAUTIONED against inferior stone, Prices, delivered to any part of the United Kingdom, given on application to CHARLES TRASK & SONS, Norton-sub-Hamdon, Ilminster, Somerset.—Agent, Mr. E. WILLIAMS, No. 16, Craven-street, Strand, W.C. [ADVT.]

#### Doubling Free Stone

For prices, &c., address S. & J. STAPLE, HAM HILL STONE, Quarry Owners, Stone and Lime Merchants, Stoke-under-Ham, Ilminster. [ADVT.]

#### Asphalte.—The Seyssel and Metallo Lava

Asphalte Company (Mr. H. Glenn), Office, 38, Poultry, E.C.—The best and cheapest materials for damp courses, railway arches, warehouse floors, flat roofs, stables, cow-sheds, and milk-rooms, granaries, tin-rooms, and terraces. [ADVT.]

#### Asphalte.

Seyssel, Patent Metallo Lava, and White Asphalte. M. STODART & CO. Office: No. 90, Cannon-street, E.C. [ADVT.]

EVERY DESCRIPTION OF SEASONED WOODS AND VENEERS IN EXTENSIVE QUANTITIES.

#### B. J. HUDSON & SONS,

Millbank Sawmills, Grosvenor-road, S.W.; Whitfield-street, W.; And Store-street, London, W.C. Telephone No. 3,152, and Private Wire connecting Business Premises.

#### Messrs. HARDMAN, POWELL, & CO.,

Metal Workers, of King Edward's Works, Birmingham, Have OPENED LONDON OFFICES at No. 11, ADAM-STREET, Adelphi, W.C. [ADVT.]

#### MICHELMORE & REAP,

Manufacturers of



COLLINGS'S PATENT HINGES, LEVER, SCREW, & BARREL BOLTS, Self-Acting "FALL DOWN" GATE STOPS, and IMPROVED GATE FITTINGS of every Description 36A, BOROUGH ROAD, DISCOUNT TO BUILDERS. LONDON, S.E.

GOLD AND SILVER MEDALS AT AMSTERDAM EXHIBITION.

# IRON CISTERNS.

## F. BRABY & CO.

LONDON, LIVERPOOL, GLASGOW.  
VERY PROMPT SUPPLY.  
LARGE STOCK READY.  
CYLINDERS FOR HOT-WATER CIRCULATION.

Particulars on application.

Chief Office: 360, EUSTON ROAD, LONDON.

# The Builder.

Vol. L. No. 2240.

SATURDAY, MARCH 15, 1886.

## ILLUSTRATIONS.

Entrance Doorway, School Board Offices.—Mr. E. R. Robson, F.S.A., Architect; Mr. Dressler, Sculptor; Carved Panels by Mr. McCulloch ..	406
Entrance Doorway, Royal Institute of Painters in Water Colours.—Mr. E. R. Robson, F.S.A., Architect; Mr. Verheyden, Sculptor .....	407
Grantham Church, Lincolnshire: North Elevation, Longitudinal Section, Plans, Windows, and Details.—Measured and Drawn by Mr. E. H. Sedling .....	410-419

## CONTENTS.

Fifteenth-Century Italian Ornament .....	395	Two London Doorways .....	404	Sewer Ventilation .....	424
The Revised Draft Charter of the Institute .....	396	Measured Drawings of Grantham Church .....	404	Plumbers Work .....	424
Notes .....	397	Architectural Societies .....	421	Lady Artists .....	424
Letter from Paris .....	398	Archaeological Societies .....	421	The Student's Column: Our Building Stones.—	424
A Belle of Wren's Work, London .....	398	Competitions .....	421	Recent Sales of Property .....	424
Architects' Benevolent Society: Annual Meeting .....	399	Royal Architectural Museum and School of Art .....	421	Meetings .....	424
Student Drawings at the Institute .....	400	Brickwork and the Lesuing Towers of Bologna .....	422	The New London Hospital Medical College .....	423
Free Lectures to Artisans at Carpenters' Hall: A Gossip on the Philosophy of Building Materials .....	400	The Disposal of Sewage Sludge: Association of Public Sanitary Inspectors .....	423	Miscellaneous .....	423
Mouldings.—By George Atchison, A.R.A. ....	402	Woodwork .....	423	Prices Current of Building Materials .....	427

### Fifteenth-Century Italian Ornament.



VERY ONE who looks at pictures at all must often have been struck with the elaboration and delicacy of the ornamental designs represented on the hangings and costumes in the works of the early Italian painters. Decorative design has, in the history of most art-producing peoples, preceded the power of expressive and true delineation of the figure; it has sometimes, indeed, been carried to the highest point by nations, such as the Japanese, who have never attained the art of drawing the figure at all except in a grotesque fashion. And in the days when the great art of painting, which was the glory of the Renaissance in Italy, was gathering strength and experience and knowledge for its future triumphs; when the figure was still portrayed with a tentative and laborious striving, still stiff in the joints and conventional in attitude, though the face was often eloquent with pathetic expression of a somewhat restricted kind; at this time the pictures painted were exuberant in carefully worked-out ornament, rich diapers covering the dresses of the figures and the drapery hanging around, so that even pictures which present little of life or interest in the figures themselves became highly interesting and valuable on a merely decorative point of view. The signs thus illustrated are often not only highly elaborate and effective in themselves, but further intricacy is added to the working of them in the picture by the manner in which they are faithfully followed out by the artist through the folds and irregularly-twisted faces of the drapery on which they occur. It is perspective treatment, so to speak, of the sign, while it probably gave the artist an additional interest in his work, and added a problem of technique to the painting, is also difficult in the way of tracing and following: the design, should the spectator be sufficiently interested in it to wish to do so.

It occurred to Mr. Sydney Vacher, the architect who has produced the book the title of which forms the heading to this article, that if the various ornamental designs found in early Italian paintings, or in our National Gallery alone, without counting the riches of private galleries, were carefully copied, and in such a way as to be preserved by the folds of perspective of the simulated stuffs on which they were delineated, were drawn out like the map of the world on "Mercator's

projection," they would furnish a new set of hitherto unedited Renaissance ornaments, interesting both for their intrinsic beauty and the circumstances under which they were found. Mr. Vacher has spared no pains in order to carry out this idea in a worthy manner, and the large folio which shows the result of his labour is one of the most sumptuous books of ornament that has been brought out for some time past.\* Perhaps the effort to produce a volume *de luxe* is rather too apparent, for some of the ornaments which are on a small scale and are simple repetitions of one detail are drawn out all over a large page in a manner which shows their effectiveness certainly, but which occupies more space than is at all required to exhibit the design and construction of the decoration; and the work would have been of more practical and general utility if the amount of design in it had been compressed into a smaller and less costly book. However, this is only from the point of view of the general student, who will probably have the opportunity of consulting and studying the volume in libraries; and, apart from this, we have every appreciation of large and beautifully got-up books on a subject of this kind; there are not too many of them in England, and a beautiful book is an artistic treasure in itself of no mean order.

In his preface, Mr. Vacher suggests a practical utility in the publication of these ornaments, as many of them would be very suitable for reproduction on ordinary stuffs, such as curtains and other hangings, in a cheap form, and as an improvement on many of the patterns that are in use for such textiles. None of these designs, the author believes, have been published before; and some of the best of them occur in paintings that are hung rather high in the National Gallery, and having been glazed for protection, are thereby still more disadvantageously placed for close study, and the beauty of their decorative detail is consequently overlooked, or almost invisible to the ordinary spectator.

The hangings from which these ornaments are taken are mostly used in the pictures as backgrounds to the figures, or sometimes as drapery on a throne or seat, extending down the back and into the floor in front of the seat. Mr. Vacher raises the question whether these decorations were invented by the painters who used them in their pictures, or painted them from actual brocades. He inclines to the latter theory, as the shadows and folds in many of them are painted as if from actual drapery. Some of them, however, we are inclined to think, were inventions; the task

\* Fifteenth-Century Italian Ornament, chiefly taken from Brocades and Stuffs found in Pictures in the National Gallery. By Sydney Vacher, Architect. London: Bernard Quaritch, 1886.

would have been a very congenial one to the early Italian painters, so many of whom were decorators by profession, as much as painters of pictures. But where, as Mr. Vacher says, the patterns are carefully followed out in the deep folds of dresses and hangings, so that one has to look into the shadowed portion of the folds to trace out the combination of the design, it seems probable that they were painted from what was actually before the eye.

Of the thirty designs represented here in as many plates, not a single one illustrates that system of apparently natural growth and elusion of the idea of repetition which characterises so much of the later Renaissance ornament, and so much other fine ornament of different schools, and which has been carried to such a high point of perfection by Mr. Morris in many of his designs for textiles and wall papers. One or two, such as No. 10, from Crivelli's picture of the "Madonna and Child enthroned" (No. 807, National Gallery), or No. 11, from the same picture, present an appearance of intricacy at first sight, owing to the multiplicity of lines, but in reality they are seen to be based on the simplest geometrical arrangement. Some few of the designs given are merely powderings; a good many others are formed on a very simple basis, which Mr. Vacher describes as "a mesh formed of upward wavy lines drawn reverse ways, touching one another." Upon this simple theme, however, a great many variations can be played, as every ornamentist knows, especially with the help of colour. Others may be described as powderings, or repetitions of a small design filling a certain space, but placed so close as to cover the ground and fit into each other. These have an appearance of intricacy, but it is only a small but rather fully detailed design closely repeated.

The first two designs given are from Orcagna's "Coronation of the Virgin" (National Gallery, 569); the second is a repeating pattern of no very great character, but the first, in which bird-like conventional dragons (very like the dragons in Richard Doyle's pictures) are intermingled with a geometrical stem-and-leaf pattern in thin lines, is very delicate and effective, and just the thing to work in fine embroidery; it would require very patient work, however. The third design, from the same painting, a diaper of conventional flowers and groups of birds, gold on a purple ground, is much bolder in character, and looks, as Mr. Vacher says, very like an imitation of an actual textile. The expanded flowers, disks with rays, are very finely designed; the bird part of the pattern is rather feeble, and does not



blend well with the rest of the design. No. 1 is an example, from Fra Angelico, of another type of design, formed by the symmetrical spacing of sprigs of foliage not in themselves symmetrical. The effect of this is very pretty, though, regarded as design, it is disjointed and wanting in principle. A more vigorous and powerful design, on the same system, is given in Plate 30, a design in large conventional sprigs, very finely and broadly treated, from a drapery on the throne in the "Madonna and Child," by Vander Goes (N. G., 774). The charm of the Fra Angelico example is in the graceful design of the separate sprig; there is no contrivance or thought in it. In the plate following this, No. 5, we have one of the finest designs in the collection, taken from Spinello Aretino's "St. John the Baptist" (581, N. G.), where it is continued over the ground on which the figures stand. This is an admirable arrangement of birds and conventional flowers in such a manner as to form a continuous design, each portion appearing designed for its position in relation to the rest; the details are of great delicacy. The design is printed in warm yellow and white, and looks very charming (Mr. Vacher suggests that this and the succeeding one are probably copied from silk tissues, and they look very like it), but for the sake of avoiding too many printings, in other words for economy, two other colours are omitted; for in the original, Mr. Vacher tells us, the dark parts of the birds are black, and the ground has a red enrichment. As we are told this frankly, there is, of course, no misleading; but it is a curious kind of omission to make (and it is made in regard to two or three other examples—always duly noted) in what is intended to be an edition *de luxe*. The first luxury in a book on ornament is to show the ornament with the highest possible correctness and effect; to restrict the chromo-printing is exactly the wrong sort of economy; and if there had been a little less expenditure on the size of the book, the paper, and the binding "by Birdsall, of Northampton" (which is highly creditable to that artist), there would have been enough saved to give the full number of printings requisite to show this and some other designs in their entirety. It strikes us as a singular misjudgment to bring out a costly book of ornament and to economise in the representation of the ornament itself, which is, after all, the ostensible *raison d'être* of the book. This only applies to a few of the plates, but it is impossible to pass the fact without comment.

The two most remarkable designs next in the book are the two very elaborate ones, Nos. 10 and 11, which we have already referred to, from Crivelli's "Madonna and Child" (N. G., 807). These show, as the author says, a very unusual form of ornament, little illustrated; No. 11 especially, formed entirely in white lines on a dull red ground, is an admirable design, and suggests a great deal of varied application of the same method. Plates 12 and 13, from two other Crivellis (N. G., 724 and 739) are examples of ornament designed on the same principle, though not quite equal to No. 11. The fact of this special and unusual form of ornament recurring in Crivelli's pictures seems to us to indicate that it was his own special design, and not a copy of existing textiles or other ornaments. With the next plate we come on a series of a different class, large and open geometrical forms, filled in with very highly conventionalised foliage. Crivelli shines in this class also, which is a principle of ornament much more common, and prevalent in many modern wall-paper designs; one of his, white flowers on an arabesque pattern in two tints of red, is very fine and powerful. Another of Crivelli's, plate 15, black and dull yellow sprinkled with gold, may be noted as very effective. Another very fine one, of a much broader and bolder type, plate 21, is again by Crivelli, who, in fact, contributes a great deal of the artistic value of the book; this latter is from a Madonna (No. 788, N. G.). A very unusual and brilliant one from Matteo di Giovanni follows (plate 22), from the mantle of the Virgin in an "Assumption" (1,155, N. G.). The ground of this consists of a series of panels with scroll edges, in light

grey, so designed that the white inter-spaces form a complementary pattern of similar character; the centres of the grey spaces are filled with a very pretty flower seen on plan, the four cardinal petals symmetrical (we suspect meant to be in gold, but not so printed), the intermediate petals very playfully treated in three colours, varied *ad lib*, the arrangement following no fixed order. The author observes that there is a pattern very similar to this in the South Kensington Museum. The only two others we can mention are another very fine Crivelli ornament, black and yellow, the black predominating, from the "Madonna in Ecstasy" (906, N. G.), and a very original and artistic pattern from the coat of a figure in a picture ascribed to Durick Bonts (783, N. G.). This is an arrangement of unsymmetrical red sprigs on a white ground, with a broad five-pointed flower filling the spaces, the whole interlocked so as to form a symmetrical and continuous pattern.

We have to thank Mr. Vacher for a book which contains abundant material for suggestion to decorative artists, and which is in itself, despite the one defect we have alluded to, a charming work of art and a great ornament to an artistic library.

#### THE REVISED DRAFT CHARTER OF THE INSTITUTE.

THE proposed new Charter, as revised by the Committee, has now been circulated to members of the Institute, signed by twenty-six members of the Committee, and with a protest and an alternative draft signed by four dissentients. The nature of the alterations which have been made from the first draft is thus described in the preliminary remarks attached to the draft by the Committee:—

I. The clauses relating to the Council have been reduced in number, and simplified.

II. The control of general meetings has been specifically defined, and made absolute.

III. The proposed submission of new By-laws to the Privy Council has been rescinded.

IV. A provision respecting "Branches" of the Royal Institute has been added.

V. The power to hold Examinations has been extended to the Provinces, Colonies, Dependencies, &c.

VI. The preamble of the proposed Charter has been modified.

In regard to points I and II, the absurd clause providing that the Charters should state who the first President and Council under it should be (Clause 25 of first draft) has been omitted; another (28) which gave the Council liberty at any meeting of at least five members, "to exercise all the powers of the Royal Institute," is struck out, as also the remarkable clause (35) to which we before adverted, which rules that though the Council are subject to the control of the general meetings, any act previously done by them should not be invalidated by a subsequent resolution of a general meeting. It is not surprising that these two clauses should be struck out; the wonder is that they should ever have been seriously proposed. Taken together, they would have enabled any meeting of five out of the Council to have done whatever they pleased, without reference to the general body or the rest of the Council! The clause (32) which gave the Council power to apply funds in certain cases for the maintenance of Prizes, Medals, Studentships, &c., is also omitted, and left to be dealt with by By-laws; and another clause relating to the application of funds has had the phrase "subject to the control of general meetings" inserted. Emendation IV. merely gives the power to frame by-laws in relation to "branches" of the Institute. On this head Mr. Holden suggests in a note that to the words, "the relations of the Royal Institute to such branches thereof as may be established within the United Kingdom, or its colonies, or its dependencies" should be added the words, "or to such other societies as may be already existent." This would leave the way open for any steps towards that federation or affiliation of provincial societies which in

some form may be possible and desirable. The modification in regard to the preamble consists in incorporating in it a paragraph which in the first draft formed part of clause 38, providing for the making of new by-laws and the management of the affairs of the Institute during what might be called the period of transition. In the preamble also the Gold Medal is defined as given "for the promotion of architecture," instead of "to such distinguished architect or man of science as may have," &c., &c. The sole merit of this alteration is brevity; otherwise it appears to us vague and ill-expressed. On whom or what is the medal to be conferred; and what is the meaning of "the promotion of architecture"? The paragraph was a great deal better as it stood before; it meant something definite then; it means nothing intelligible now.

The preamble of the Draft Charter is rather lengthy, but it is well to have the position clearly defined. The succeeding clauses as they now stand appear to us to be in the main satisfactory; there are, perhaps, still one or two points unnecessarily incorporated in the Charter with which by-laws might have dealt, such as the clause providing that every member should have a right to ask for a certificate of membership. This may or may not prove a necessary or a popular provision; it seems more a case for a by-law. Otherwise, we do not see that there is anything in the Charter as now proposed which is unsuitable.

The four dissentients referred to are Professor Kerr, Mr. Wyatt Papworth, Mr. Lacy W. Ridge, and Mr. Gough. They appear to be in rather "a temper" with the main body of the committee, and complain that they were called "delegates" and not "colleagues." The appointment of the members outside the Council certainly appeared to us to be made in the former sense. The draft was, at the meeting of November 30, returned to the Council for consideration, with the assistance of certain outside members appointed to represent each class of members in considering the revision. The minority object that a number of matters have been incorporated in the Draft Charter which ought to be dealt with under by-laws (in which we do not concur), and they then embody in their own draft the provision that members should have power to vote without personal attendance,—a matter which, of all others, ought to be left to an elastic by-law, inasmuch as it might prove very inconvenient or undesirable, and to fix it for ever by a Charter would be most unwise. But whilst proposing to pin the Institute for ever to this detail, they are so cautious in other respects as to guard their provisions for the election and powers of the President by the saving parenthesis "if any," and the Vice-Presidents the same. Whist occult ideas they have as to the future possible constitution of the Institute which can render such an eccentric provision necessary, they know best; but, to our thinking, the very interpolation of such a provision shows that their alternative document is one which it would be hardly worth while to take seriously!

**Lectures for Sanitary Inspectors.**—The Council of the Parkes Museum are making arrangements for a special series of lectures to inspectors of nuisances. The various subjects with which these officials ought to be acquainted will be dealt with in a course of twelve lectures, and the co-operation of several well-known authorities to deliver lectures in their own departments has already been secured. The course will be repeated twice a year to suit the requirements of persons preparing for the examinations of the Sanitary Institute of Great Britain, and will comprise all the subjects scheduled for that examination. It is believed, however, that the course will have a further use in supplying the wants of acting inspectors and of other persons desirous of obtaining a practical acquaintance with the working of sanitary laws and regulations. The lectures will be given in the Parkes Museum, 74d Margaret-street, Regent-street, W., and members of the class will be granted the use of the reading-room and extensive library, a catalogue of which is on the point of completion. The dates of the lectures will be advertised shortly.



## NOTES.

THE debate on Tuesday last on the payment of interest on capital during the construction of the Manchester Ship Canal resulted in a foregone conclusion. After the recommendation of the Board of Trade that the application should be allowed, it was scarcely possible to doubt what the result would be. We confess, too, that the motion to reject the Bill by one of the members for Liverpool, and the general character of the opposition, namely, to delay or harass the undertaking by a side blow, was scarcely calculated to draw many adherents to the side of Liverpool. We have always been sceptical as to the success of this undertaking, and the apparently absolute necessity which the promoters are in to be allowed to pay interest out of capital in order to enable them to raise the eight millions required, does not promise much for the success of the enterprise. We confess that it seems to us doubtful whether the payment of four per cent. interest during construction is sufficient to induce investors to lock up their money in a very speculative enterprise. Tramway companies and similar bodies promise investors six and seven per cent. during construction, which is obviously a different rate from four per cent., which can be obtained on investing in numerous investments, of which it may fairly be said that they are reasonably safe.

ON Tuesday night the House of Lords read the Code of Arbitration Bill a second time. It is always satisfactory to see a practical branch of law reduced into an intelligible shape, and there are so many laymen engaged in the way or another in arbitrations that it will be advantageous to them to have the law relating to arbitrations in the same clear form as they are now able to peruse the law of bills of exchange and promissory notes. There is much sense in Lord Bramwell's observation that, when a layman is in any real difficulty about an arbitration, he will seek the advice of a lawyer, and not go to the code. But architects and surveyors who have acted as arbitrators must have frequently wished to have the law presented to them in a clear form, and in a reasonable compass, even for their information on general procedure, and it is what the Code of Arbitration Law will do for them.

THE best point made in the address of Mr. Johnson, Secretary of the National Tug Harbour Society, on the occasion of the deputation to Mr. Mundella, on Wednesday, was in regard to the opportunity which works, if undertaken without delay, would give for employing labour at present in full work on a large scale. We observe, however, that the deputation did not, according to the newspaper reports, make any specific suggestion as to points where harbours were not necessarily and immediately required, bringing the subject into a practical form in regard to the employment of labour during the present bad times, something more definite in a general recommendation to construct harbours was needed. The subject is undoubtedly of great practical importance,—we urged it before; but we doubt whether the society which has taken it up is very anxious or forcible in its advocacy. We join part of Mr. Mundella's reply, as being the *per contra* of the subject:—

"He was happy to be able to assure the deputation that the loss of life in the fishing industry on the coasts of the United Kingdom had diminished in the last year, and it was a matter of great satisfaction to see that while the trade was increasing, the number with which it was attended was decreasing. Several of the speakers had referred to the relief which such works as were proposed would afford to the unemployed. But the expenditure of 3,000,000, fully on harbour works would only allow the employment of about 20,000 men, and, in order to employ 100,000 men, an expenditure of 15,000,000 would be necessary, and a million and a half more would be necessary. As to the expenditure on harbour works, England compared favourably with other countries, since we had expended more under this head than all the countries of Europe."

ONE more scheme for the disposal of the sewage of the Lower Thames Valley has been issued. It is that of Messrs. Kinipple & Morris, M.M.C.E. In a report which they have submitted to several of the authorities in the Thames Valley, they describe what is designated a "divided" and a "combined" scheme. Under the former scheme the parishes of the Lower Thames are divided into three divisions as follows:—First division: Barnes, Mortlake, Kew, Richmond, Petersham, and Ham. The estimated cost of the works for this division is 199,614*l.*, with an annual expenditure of 11,410*l.*, equal to 9*d.* in the pound. The second division consists of Kingston, Surbiton, Maldon, Hook, Long Ditton, Thames Ditton, Esher, East and West Molesey, Teddington, Hampton, Hampton Wick, and Sunbury. The cost of this division is estimated at 277,430*l.*, with an estimated annual expenditure of 16,757*l.*, equal to 8*½d.* in the pound. The third division includes Walton, Weybridge, Addlestone, Chertsey, Upper and Lower Halliford, and Shepperton. The estimated cost of this division is 55,411*l.*, with an annual expenditure of 3,227*l.*, equal to a rate of 4*½d.* in the pound. It is not intended to make in each division a complete system of sewage disposal, with intercepting-pipes, pumping station, and precipitating-tanks. Each division, however, would have its own intercepting sewers and pumping station, from which the sewage from each division would be pumped to central precipitation works, where the whole of the unclarified sewage would be treated. The scheme proposes to filtrate the effluent water through land before it passes into the Thames at a point just below Teddington Lock, thus complying with the recommendations as to filtration made by the Royal Commission on Sewage Disposal. The site for the proposed precipitation works is on the River Wey, near the Basingstoke Canal; the directors of which, it is stated, are willing to take a certain sum for the absolute freehold right of the canal. The distinguishing feature of the combined scheme is that instead of three cast-iron main intercepting pipes there would be only one, conveying the whole of the sewage to the precipitation works. This combined scheme is estimated to cost 499,153*l.*, including the cost of the canal and the land. The annual expenses of maintenance would be 28,971*l.* On a rateable value of all the towns and districts included in the scheme of 926,241*l.*, a rate of 7*½d.* in the pound would be sufficient for these annual expenses.

THE House of Commons have come to the same conclusion in regard to the proposed Bill for constituting the Metropolitan Board of Works a general opposing counsel against Water Supply Bills which we suggested two or three weeks ago,—that it is no part of the function of the Board to expend the ratepayers' money in such an object. The "Metropolitan Board of Works (Water Supply) Bill" was accordingly thrown out on the second reading by a majority of 130 against 76.

IT has been determined to erect a monument near the entrance to Prospect Park, Brooklyn, in honour of the soldiers who fell in the war of the Revolution, the Mexican War, and the last Civil War in the United States. The model which has been accepted is designed by Mr. Richard M. Hunt, and the sculptor who has been commissioned to execute the work is Mr. J. Q. A. Ward. The height of the monument, when completed, will be about 80 ft., and it will be constructed almost entirely of granite. The shaft forming the principal portion of the monument is to consist of two granite drums, not less than 16 ft. in diameter, standing together 32 ft. in height. There will be a base beneath them about 48 ft. in diameter, erected upon a circular platform 120 ft. in diameter. The latter is to be surrounded by a balustrade with four openings, approached from each direction of the compass by a flight of steps. The group surmounting the central shaft will represent an angel of peace, holding the olive branch in her hand and separating two combatants at her feet.

Beneath, on the exterior of the shaft, will be inscribed the names of the most important battles in which Brooklyn soldiers had distinguished themselves. On the base of the shaft will be bas-reliefs, illustrating the departure for, and return from, the war; and the work executed by women during the various battles, as well as the conflict between the *Monitor* and *Merrimac*. Four abutting pedestals, each supporting an equestrian figure, are to be placed around the base. These figures will represent Grant, Washington, Scott, and Jackson respectively. A series of four oblong pedestals, which are to support colossal figures, will stand on the chief platform, being partially enclosed by the balustrade. These figures are intended to represent a Zouave resting, with his rifle betwixt his knees; a sailor, holding a telescope in one hand and shading his eyes with the other hand; a dismounted cavalryman, kneeling on his saddle, his sabre broken, and armed with a pistol; lastly, an artilleryman, seated on a cannon, and grasping a rammer in one hand. It is calculated that the project will occupy at least five years to accomplish, whilst the cost is estimated at between 500,000 and 600,000 dollars.

WE have received a second "monograph of American Architecture" in the shape of a portfolio\* of reproductions by the Helio-type Printing Company of a series of exterior and interior photographs of "the State Capitol, Hartford, Connecticut," of which Mr. Richard M. Upjohn is the architect. Plans of three floors are added. The building is a rich and costly one, and appears to have been worked out with care in all the details; but we do not find here the genius and originality which struck us so much in a former similar monograph of the Harvard Law Schools by Mr. Richardson. The style is Gothic, of an effective but unrefined type. Ornament is overdone and too lavishly introduced; and it is not "ornament of a meek and quiet spirit" by any means, but very self-asserting. Large, lumpy crockets stick out from little gables, giving them a ragged outline; windows are cut into heavy angular plate-tracery; shafts are placed standing far out from the walls on corbels, and with very big foliated capitals to carry statues which do not appear to be forthcoming. The design is what English Gothic architects (the best of them) would certainly regard as vulgar. If this is to be regarded as a typical modern Gothic design in the States, they have not caught the spirit of it in those regions yet. The plan is an effective one, but seems very lavish of space in entrance-halls and corridors, in comparison with the whole area of the building. As an example of recent American architecture, the design is very disappointing in comparison with its predecessor in the "monographs."

IN reference to the Sunderland Municipal Buildings competition the Secretary of the Northern Architectural Association has addressed the following letter to the Town Clerk of Sunderland:—

"Newcastle-on-Tyne, February 10th, 1886.

SIR,—The attention of the Northern Architectural Association has been called to an advertisement appearing in the daily press inviting plans for the new municipal buildings.

They would feel very much obliged if you will kindly inform them if a professional assessor is retained to adjudge the plans sent in.

I enclose a series of recommendations for regulating the conduct of architectural competitions, published by this Association, which have been sent to and adopted by other corporations under similar circumstances.

Perhaps you will be kind enough to lay it before the Town Council of Sunderland, and we hope they may see their way to adopt the recommendation in this case.—Yours faithfully,

FRANK W. RICH, Hon. Sec."

In view of the importance now attached by architects to the employment of professional advice in deciding competitions, and the fact that a large proportion of the profession have signed an undertaking not to compete except on the understanding that such advice will be

\* Published by Messrs. Tichner & Co. in Boston, and Messrs. Trulmer in London.



obtained, we think it well to make public the fact that such a request has been made to the promoters of the Sunderland competition.

A GOOD deal is expected of Borough Surveyors in comparison with the salaries offered them. We have before us a circular from the Corporation of Eastbourne defining the qualifications and duties for candidates for this office under the borough. The surveyor must "be properly skilled and educated in the art or practice of building" (which is it, an "art" or a "practice"? Probably they mean "theory and practice"); he must hold a certificate from the Royal Institute of British Architects, or the Institution of Civil Engineers, or "the Institute of Sanitary Engineers" (*sic*), and "devote the whole of his time to the duties of his office, and not engage in any business, profession, or occupation, either for profit or otherwise"; and he is offered a salary of 156*l.* a year and an office (not a house). Not a brilliant prospect, certainly.

A CORRESPONDENT sends us one or two notes as to the results of competitions without the intervention of professional advisers in the case of two recent Board School competitions. In one case we find architect's estimate, 1,600*l.*; lowest tender, 3,670*l.*; total final cost, about 4,000*l.* In another case architect's estimate 4,500*l.*, to 5,000*l.*; lowest tender, 8,540*l.*; total cost after sundry law expenses (we are not told what these amounted to), 10,130*l.* A very practical form of argument in favour of employing professional advice in the choice of plans.

THE Governors of the Charterhouse have appointed Mr. R. H. Carpenter, who is an old Carthusian, as architect for whatever alterations are necessary: an appointment which is a guarantee that there will be as little as possible destruction of the ancient work. Sir R. E. Webster will take charge in the House of Commons of the Bill in relation to the powers of sale and reconstruction sought by the Governors.

MR. SHAW-LEFEVRE has endeavoured to throw whatever weight on such a subject may attach to his name against the Institute of Architects' scheme for improving the treatment of the site for the War and Admiralty Offices, in a letter to the *Times* of Friday in last week. His objection, as stated, is, solely on the ground of economy. His estimate of the increased expenditure which the Institute scheme would involve is very much over the mark, as Mr. Robins conclusively showed in a subsequent letter to the same journal. That Mr. Shaw-Lefevre is not alive to the architectural advantages to be gained might be expected from what he has shown us of his perceptions on that subject in connexion with this and other matters in which he unfortunately obtained far more of his own way than was for the architectural benefit of London. Any one who could deliberately support as adequate such a way of placing a great public building as that proposed by the Government for the War and Admiralty Offices must be very badly endowed with æsthetic sense. It is some satisfaction, however, to observe that Mr. Shaw-Lefevre's architectural lectures in the *Times* in favour of his own ideas are now apparently to go under his own name.

**The Architect's Department, Metropolitan Board of Works.**—At the meeting of the Metropolitan Board of Works on the 5th inst., the Clerk presented a communication from Mr. Vulliamy, the Superintending Architect, with reference to his absence from the office in consequence of the state of his health, requesting, in accordance with the Act, that during his absence Mr. Hobbs, the Assistant Architect, may be appointed as his Deputy in all matters connected with the Building Act Office, and Mr. Goddard, Surveyor and Valuer, in all other branches of the Department. This was agreed to. We regret very much to hear of Mr. Vulliamy's continued illness.

#### LETTER FROM PARIS.\*

WILL the centenary exhibition be national or international? is the question now suggesting itself to the public and to the Government. The latter has opened some rather injudicious *pourparlers* on a matter which requires a prudence, tact, and adroitness of which French diplomacy, unfortunately, has no longer the secret. Some proposals, made late in the day, have been met by foreign Governments with a reserve which is not re-assuring. However it may turn out, it seems now to be understood in high quarters that the time for action has arrived; and M. Lockroy, the new Minister of Commerce, seems animated by abundance of zeal, of which we shall, no doubt, see the first result before long. Possibly by the time these lines appear, the Chamber may have already formulated the law to regulate all the financial questions in regard to the Exhibition of 1889. It is unnecessary to add that now the candidature of M. Antonin Proust for the duties of Commissary-General appears entirely put aside. That political sinecure will be well replaced by an executive committee, in which M. Alphonse will be called on to occupy a prominent position, a fitting culmination of his active and useful career. A commission of control will be attached to that committee, and the municipality of Paris will be called upon to furnish a part of the guaranteed fund for the work, about eight million (francs) out of 40 millions; 12 millions will be granted by the State, and the rest furnished by a financial society. The matter is, therefore, entering on a new phase, and we shall, no doubt, have some further information to give in our next letter. It now only remains to say that a petition has been addressed to the Government by a great number of architects praying that the design and construction of the Exhibition may be open to competition. This request, signed by many well-known names, has been laid before the Ministry by M. Clémenceau. This question deserves serious consideration if the Exhibition is to have a character of grandeur and originality and to rise above the ordinary commonplace of exhibitions, and make us forget the bad architectural taste of that of 1878.

To come from this great exhibition to smaller ones of immediate interest, that of the Water-Colour Painters is, as usual, the most brilliant and the most frequented of the smaller exhibitions which are rife at this time of year, though less so this year than on some previous occasions. This year there are some new recruits, whose talent does not make one forget the absence of so many old members. De Neuville is no more; Detaillé and Cazin do not exhibit; the infirmities of age have kept Eugene Isabey's pencil idle. But Lamy, the valiant octogenarian, is always there, younger and abler than ever. We may note one or two of the new comers; M. Boutel de Monvel, who imitates pleasantly the style of modern English art; MM. François Flameng, Gilbert, Morot, and Albert Besnard, an impressionist who employs all possible means, good or ill, to make us forget his possible origin. We might speak also of the exhibition of the Mirillons, or that of the Cercle Volney, but not with many compliments. This art of the club has the serious fault of smothering a few fine works by real painters among the commonplace efforts of amateurs, who make art a pastime, who are applauded by a kind of fashion, and whose works remain at the same level year by year.

As to the "Union des Femmes Peintres et Sculpteurs," which holds its annual exhibition at the Palais d'Industrie, I prefer to pass over in silence an exhibition of utter insignificance, if one excepts the marine paintings of Madame Lavillette, a good enough painting by Madame Annie Ayrton, and a pretty statue by Madame Léon Bertaux.

Formerly, when an eminent artist completed a work, he invited his friends to advise and criticise quietly in private before exposing it to the public. We have got beyond that now; the jaded palate requires a more sensational first exhibition. Thus we had the other day the "private view," exhibition of a sensational painting of the "death of a great composer," accompanied by a concert of sacred music intended to render more complete the nervous impression on the organism of the public. Under a carefully-prepared half-light the

spectators seemed to see the form of Mozart extended on a couch in the pallor of death, while from behind the canvass were heard the strains of his "Requiem." This carefully-arranged effect was too much for more than one fair "mondaine," whose lace handkerchiefs were moistened with their tears. Was it the music or the painting? This attempt has been succeeded, at the establishment of a well-known picture-dealer, by another on a larger scale, and less carefully prepared.

We advanced through a series of galleries to the Holy of Holies, where the work is unveiled to the pious gaze of the faithful in a mysterious and theatrical light. There will be further developments of this scenic contrivance, no doubt; and the good public runs after it with avidity. It is a suitable amusement for the Parisian "snob," whose name is legion, but it is a charlatanism unworthy of art. Munkacsy has no need of this kind of *mise en scène*, and why select it for his last work especially, which is certainly inferior to many preceding ones? The principal figure, that of Mozart, is poor and expressionless; the surrounding figures are mere commonplaces copied from models. The exaggerated praise lavished on this work only draws attention to the comparative failure of a painter whose real powers we admire too much to pretend any great admiration of this his latest effort.

We much prefer the modest exhibition of the works of a Viennese landscape-painter, M. Otto de Thoren, in the Rue de la Paix. There is here no pretension, but true artistic excellence, a genuine appreciation of nature, and some outdoor studies from animals executed with great truthfulness; and true art can stand on its own merits without the assistance of the picture-dealer's artifices of effect.

While the exhibition of the collected works of Baudry, which will open in April, is in preparation, there are several candidates for the succession to the post held by the great artist at the Institut. M. Puvion de Chavannes, who had been named as the successor, declines to come forward, and the contest remains between MM. Henner, Gustave Moreau, Jules Lefebvre, T. Laurens, and Jules Breton, of whom the latter has probably the best chance. M. Paul Dubois, the sculptor, we may here mention, has offered to execute gratuitously the monument to be erected to Baudry at Père Lachaise, on a site granted by the municipality.

Our permanent museums, as has been observed, have been undergoing important alterations. The enlargement of the Musée de Cluny, where one of the courts has been transformed into a gallery for glass exhibits, is completed, and it is hoped that the new Luxembourg will be opened to the public this month. The placing of the works of art is nearly accomplished, and the exterior sculpture of the new façade is in process of completion, but the work has been very long in hand. The State adopts a cautious delay in matters of this kind; witness the Porte St. Martin, which has for whole months disappeared behind scaffolding, and of which the restoration has not yet commenced. M. Asbach has, however, been commissioned to restore the statue of "The Rhine." That of "Holland," which has suffered so much, has been confided to M. Gaudes. MM. Pezieux and Desbois are to occupy themselves with the groups of lions, while M. Mattieu Meunier will undertake the bas-reliefs. All is ready, and the work might be very soon done. The Government might take example from the Railway Company "De l'Ouest," which is pushing on the new works at the St. Lazare Station with great energy. There is here a large building yard in very full occupation; the buildings are rising fast, and the service to the suburbs should be open to the public at the end of this year. The architects have, nevertheless, encountered serious difficulties. As in the case of the construction of the Opera, there is a subterranean piece of water to contend against on the site of the ancient Grange de Batellière; deep pits had to be dug and foundations carried down, for which reason the façade to the Cour de Rome has been seven months in rising above the ground. However, now the old houses in Rue St. Lazare will be soon demolished, the Rue d'Amsterdam widened, and passengers arriving from England will find, in the very heart of Paris, a vast and commodious station with a terminus hotel situated near the promenades, the theatres, and other main objects of interest in Paris.

The work at the Pont Neuf is being carried

\* Deferred from last week for want of space.



on diligently. All the upper portions which have shown signs of weakness have now been removed, and the foundations are now being dealt with by the aid of caissons. Towards the end of the month the demolition will be complete, and the work of reconstruction will commence, which will probably occupy the rest of this year.

In the way of new constructions mention may be made of the barracks for the "sauteurs-pompier," which is to be inaugurated on the Boulevard Diderot. The organisation for fire-extinction in Paris, long in a very stationary condition, has recently been the object of much attention on the part of the administration, which has obtained from England, Holland, and the United States information as to the most recent improvements. The barrack building is a model of its class. In the principal building, intended for the officers, and the façade of which is adorned by a fine bas-relief by M. Rety, there is recorded, on a marble tablet, the list of firemen who died in the execution of their duty. This list already includes seventeen names, among them that of the sauteur Havard, who was burned in the conflagration of the Magasins du Printemps, and that of Colonel Troidevaux, who perished in 1882, a victim to his devotion. Beside this is the telegraph-room communicating with all the postal telegraph stations. As soon as a fire is signalled, the telegraphist has only to press a button and the alarm-bells sound, the doors of the fire-engine houses open automatically, the gas is turned up at the same moment, and the engine is ready to start in one minute. There are special apparatus for enabling the men to slide from their dormitories into the engine-house, a high tower which serves for gymnastic exercises, and a basement with wells attached where the men are to go through a drill in the operations of fire-extinction and rescue of property. All the details have been carefully studied by the architect, M. Roncé, who obtained the commission in a public competition, and has given his mind to the consideration of all requirements and all the recent improvements in connexion with the objects of his service.

The bust of the celebrated historian, Henri Martin, was recently inaugurated in the Mairie Passy. It is the work of M. Marquet de Lassol, whose statue of Lamartine, now in the founder's hands, will also be erected towards the end of April. Without contesting the honour paid to the memory of Henri Martin, was going further than necessary to re-name after him the "Avenue de Trocadéro," the title of which belonged properly to its situation. These changes of names cause a great deal of public inconvenience.

A few days before, a similar ceremony took place at the College of France in honour of laude Bernard; and in the last week in February was celebrated the centenary of Arago. The ultra-republican section of the municipal council declined to take part in this because Arago, when Mayor of Paris in 1848, refused to take any compact with the insurrection. It is to be hoped the council will be less severe in its views in regard to Admiral Courbet, whose statue it is proposed to erect in the Square ontholon. Nevertheless, if circumstances had not the gallant admiral a military command in 1871, there is no doubt he would have employed all the rigours of repression against the Communists. The execution of the monument to the admiral has been confided to M. Luguère and Mercié, with the assistance of Pujol as architect. There is soon to take place also the inauguration of the funeral monument to Berlioz at Père Lachaise, and (in the Parc de Monssouris) that of the fine work by Mercié, entitled "Quand Même," a reproduction of the original erected at Belfort. The artist is completing the model for the statue of Victor Massé, the composer, intended for Morbihan. It is a fine work and a striking enceph.

The same cannot be said of the greater part of the busts which adorn the Institut, and are intended to perpetuate the features of eminent men who have done honour to France. These are mostly below mediocrity, and the Académie des Beaux Arts has entrusted a committee of artists with the duty of weeding out those as unsatisfactory either in an artistic point of view or as likenesses.

There have been fresh gaps in the artistic ranks since our last. We may record specially the death of M. Emile Lafon, pupil of Gros & Arcohe, two of whose pictures are in the

Luxembourg, "Jesus disputing with the Doctors" and "John the Baptist recognising Jesus." Lafon was 68 years of age.

The sculptor Loison, who has also died recently, was about the same age. Born in 1820, he had followed with success the teaching of David d'Angers. Among his principal works may be cited "Phryne," "Daphnis," "Chloe," "Pandora," "History" (a marble group), the bust of Berryer which figures at the Institut, and various statues in stone at the churches of La Trinité, St. Ambroise, &c.

#### A RELIC OF WREN'S WORK: LONDON. THE COLLEGE OF PHYSICIANS.

"There stands a dome, majestic to the sight,  
And summits arches bear its oval height;  
A golden globe, placed high with artful skill,  
Seems to this distant sight a gilded pill."  
Garth's Dispensary.

AN enclosed and forgotten fragment of Wren's handiwork has lately been exposed to view. An extensive range of new buildings is in course of construction along the western side of Warwick-lane. The ground to be covered lies between Warwick-square and the back of Newgate-street. Between this ground and Newgate Prison stand the foundries and show-rooms of Messrs. J. Tylor & Sons. Their principal block of workshops is conspicuous for its high tower, which soars above the prison shaft and the Holborn valley below. Immediately northwards of this block are the show-rooms and offices, embodying, in parts, all that is now left of the old College of Physicians. The eastern façade of this remaining fragment will soon be again lost to sight. The Royal College of Physicians derive their foundation from certain meetings which were held at his residence in Knight-bridge-street, by Dr. Linacre, physician to kings Henry VII. and Henry VIII., and the friend of Erasmus, Latimer, and Sir Thomas More. The members subsequently migrated from Linacre's house, which they had inherited under his will, to more commodious premises by Amen-corner, these ever memorable for the lectures that Harvey delivered therein upon his own great discovery, and for which he used some preparations that were religiously preserved after his death. Harvey, as did John Hunter in Leicester-fields, built for himself a museum adjoining to the site of the existing Stationers' Hall. But the college, the museum, and the earlier Stationers' Hall were destroyed by the Great Fire. The physicians, having assembled during the interval at their President's house, next went to the new College which Wren had built for them in Warwick-lane. Those buildings (finally completed in 1689) included a hall, dining-room, lecture-theatre, and library; together with a large octagonal porch, entered from Warwick-lane, carrying the dome and its golden ball, which Garth commemorates in his "Dispensary." Pennant records that "on the summit of the centre" was fixed the bird of Æsculapius,—the admonishing cock. The amphitheatre gained well-deserved praise for its plan and proportions, both being admirably adapted to the purposes it should serve. The interior doubtless supplied to Hogarth a background of plate iv. of "The Stages of Cruelty." According to D. Loggan's print of 1684, and certain invitation-tickets of later date, the court's western, and principal, side consisted of two lofty stories, surmounted by an attic-floor. Above the central pediment rose an octagon tower, in two stages. This tower, with columns at its angles, closely resembled that of Wren's existing church of St. Michael Paternoster Royal, on College Hill; whilst its lantern, carrying a vane, and the cock mentioned by Pennant, was like to that of Wren's church of St. Michael Bassishaw. The relic of which we speak presents, as viewed from the east, the two lofty stories, these being after the Classic model, and having no balustrade. Of its two orders the upper is Composite, the lower is Ionic. The pilasters, one above the other, support entablatures. In the middle intercolumniation were a niche, and the great doorway, gained by steps. The other corresponding spaces were pierced for windows. The upper range of single windows,—high, narrow, and round-headed,—have unusually large and far-projecting ornamented keystones or bosses. The windows below are square: each of the several

\* Originally sold in 1761, price 4s. the set. Hogarth had published, January 1st, 1760, the subjects of plates iii. and iv. from wooden blocks, on a larger scale.

pairs is separated, vertically, by a hanging festoon. The row which corresponds to them, to the west, forms, in part, a dividing wall to Messrs. J. Tylor & Sons' premises. The fragment comprises three whole bays, or divisions, together with a fourth, which latter is broken. The broken division and the one next thereto are slightly in advance of the two others. King Charles II.'s statue occupied the niches over the door; Sir John Cutler's stood opposite to this in the western side of the Warwick-lane main entrance. These two statues, of heroic proportions, we last saw in the vestibule of the City Museum, Guildhall. Cutler's statue possesses a singular history. It was voted for, in 1680, by the Fellows, fervid with gratitude for what they conceived to be a munificent gift by Cutler in aid of the new fabric. At the work's completion, they borrowed from him an additional sum. In 1699 Sir John's executors made a demand for 7,000*l.*, as including the recognised loan, and the pretended donation,—but set down for a debt in his own books,—with interest charged upon both amounts. In the result, Lord Radnor and one Mr. Boulter, the executors, accepted 2,000*l.* from the College, remitting the balance. In compliment to them, the Fellows did not disturb the statue, but marked their sense of Cutler's conduct by effacing the inscription which they had written beneath his figure:—

OMNIS CUTLERI CEDAT LABOR AMPHITHEATRO.

The library was furnished with books by Sir Thomas Mayerne, a native of Geneva, and physician to James I. and Charles I. The Marquess of Dorchester added to Mayerne's collection. The amiable Sir Samuel Garth caused Dryden's body to be conveyed to the College Hall. There it was honoured with a solemn performance of music, previously to the funeral, which was largely attended, in West Minister. On June 25th, 1825, Sir Henry Hallford, who had examined the remains of King Charles I. at St. George's Chapel, Windsor, *coram* the Prince Regent, delivered the customary Harveian oration, in Latin, to celebrate the opening on that day of the new buildings. These were erected by Sir R. Smirke, R.A., at the corner of Pall Mall East and Trafalgar-square. The amphitheatre, together with certain other parts of the old edifice, returned awhile to the base uses of Newgate Meat Market. The entrance gateway and dome survived until about twenty years since. In the Crace Collection are two tickets, of dates 1721 and 1725, inviting Dr. Stukeley to a lecture and meeting respectively; whereon the President, Thos. Parkins, asks his "Excellency" to attend "*cum pileo et togâ*."

#### ARCHITECTS' BENEVOLENT SOCIETY. ANNUAL MEETING.

THE thirty-sixth annual general meeting of the subscribers and donors to this society was held on Wednesday afternoon last in the Meeting-room of the Royal Institute of British Architects, Conduit-street, Mr. Ewan Christian, President, in the chair.

Mr. W. H. White, the Honorary Secretary, read the annual report, which stated that the Council, during the last twelve months, had held five meetings, at which they had distributed the sum of 580*l.* 5s. among thirty-four persons,—identically the same number as in 1884-85,—and had paid one pension of 20*l.* The Council were glad to be able to state that the number of annual subscriptions to the Society had increased, though the amount received in donations (which were carried invariably to the capital account, and, in due course, invested) was less than it had been for the last six years, partly because of the absence of legacies such as those which were bequeathed to the Society in 1880, 1883, and 1884, by Mr. Edwin Nash, Mr. T. H. Wyatt, and Mr. David Mocatta. The contributions from Corporations or Societies had been few, namely, twenty guineas from the Worshipful Company of Carpenters (which was a renewal of their gift, to a similar amount, of the preceding year); ten guineas from the Architectural Association of London; ten guineas from the Nottingham Architectural Association; and, as in former years, the income of the small charitable fund pertaining to the Royal Institute of British Architects had been paid to the Society's account. A desire to see the funded property of the Society increased was still evinced by a few benefactors. At the present time it consisted of a sum of 4,200*l.*



London and North-Western Railway Four per Cent. Debenture Stock, and a sum of 1,500l. New Three per Cent. Stock, which together represented a total double that of a few years ago, the increase being mainly due to the initiation of Mr. George Godwin, F.R.S., and the exertions of the late Mr. T. H. Wyatt, aided by Mr. George Mair, the late Treasurer of the Society. Some months ago Mr. Godwin again urged upon the executive officers of the Society the paramount necessity of raising the Society's capital to 10,000l., and he offered to present 100l. to the fund with the view to twenty-five other donors each presenting or collecting a like amount. Professor Hayter Lewis, the present Treasurer of the Society, also offered a contribution of 100l., and he had accepted, at Mr. Godwin's wish, the difficult task of devising some scheme whereby the generous intention of the latter might be fulfilled. The time, however, was not favourable to such work,—to even a labour of love such as Mr. Godwin proposed,—and the Council were of opinion that it might be advisable to wait until the calamitous depression of trade and want of confidence in business affairs had passed away or abated. Since the last annual meeting, the honorary secretaries of other provincial societies had followed the excellent example of Mr. Holden, of Manchester, and had prepared circulars to the various architects in their several localities, pointing out the advantages of the Society and the pressing need of increasing its funds. At present the Council were not able to report as to the results of those efforts. The Society had a powerful claim on provincial architects, inasmuch as a large proportion of the applicants for relief were from the provinces. As an instance of this, out of nine applications considered by the Council that day, the majority were country cases.

The income account and balance-sheet for the year ended 31st December, 1885, duly certified by the auditors (Messrs. George Scamell and Hugh McLachlan), were presented with the report. They showed that the total receipts during the year 1885 were 632l. 11s. 11d., including 64l. brought forward from last account, 206l. received in dividends, and 360l. received in subscriptions. The disbursements included payment of one pension, 20l.; 580l. paid to applicants for relief; and 28l. 9s. working expenses, leaving a balance to be carried forward of 3l. 17s. 11d. on income account; a balance of 36l. 15s. 8d. remaining at the bankers.

Professor Hayter Lewis, Honorary Treasurer, in moving the adoption of the report and balance-sheet, said it was to be regretted that the Society was not at present receiving so large a measure of support from provincial architects as could be wished, but in other respects he thought the Society might be congratulated on having maintained its position fairly well, and on its subscription showing a slight increase, notwithstanding that the present time of depression was seriously affecting the income of many charitable institutions.

Mr. E. N. Clifton seconded the motion.

The Chairman, before putting the motion to the meeting, said the most satisfactory feature of the report was the increase in the annual subscription, slight though it might be, for it betokened a continued and a lively interest in the work of the Society. It behaved every architect to do something to help so deserving a Society. However prosperous a man might be, however lucrative a practice he might enjoy, he or his family might come to want the aid which the Society could afford. He regretted to say that two recent applications for relief were on behalf of the families of men who had made way in their profession and had done a great deal of work. He was sorry to see that, while the architects of some provincial towns were doing their best to help the Society, there was one large town where there was always a great deal of work going on, and where architects were numerous, and yet the Society only received a solitary guinea from that town. That was not as it should be. After mentioning a suggestion that he made a few years ago to the Council of the Society,—to the effect that every architect who takes pupils should, so to speak, send titles of each premium to the Architects' Benevolent Society as some remuneration for being the means of introducing new members into the profession,—the chairman referred to Mr. Godwin's offer, mentioned in the report, and which he hoped would meet with adequate response.

The motion was then put, and carried unanimously.

A vote of thanks was passed to the retiring members of council, viz. :—Messrs. T. G. Jackson, M.A., E. C. Robins, F.S.A., Prof. Roger Smith, Mr. Waterhouse, R.A., and Mr. E. N. Clifton; and to the auditors. To fill the vacancies caused by the retirement of members of council, and by the death of Mr. J. H. Good, the following gentlemen were unanimously elected, viz. :—Messrs. T. M. Rickman, Geo. Scamell, Lewis H. Isaacs, M.P., W. Grellier, C. R. Pink (President, Architectural Association), and Banister Fletcher, M.P. In case any two of these gentlemen were unable to serve, Mr. W. M. Fawcett, of Cambridge, and Mr. Thomas Wells, were nominated as alternative members. The President, Hon. Treasurer, and Hon. Secretary were re-elected; and Messrs. C. F. Hayward, F.S.A., and W. Hilton Nash were elected auditors for the current year.

Thanks were voted to the Royal Institute of British Architects for office accommodation, &c.; to the Honorary Secretary; and to the Chairman. In the course of the proceedings it was pointed out by Mr. Scamell that the working expenses of the Society averaged less than three per cent. of its total receipts,—a result, he said, which probably could not be shown by any other charitable society.

#### STUDENTS' DRAWINGS AT THE INSTITUTE.

FOLLOWING upon a disappointing competition this year for the Pugin Studentship, which was by many attributed to a growing taste among students for other than purely Gothic art, comes an equally disappointing exhibition of drawings in connexion with the Tite Prize, which would seem to show that, if Gothic is beginning to be neglected, at least the purer Classic styles have not yet taken its place. We think that from several points of view it is to be regretted that the judges awarded the Tite Prize at all, unless it is to be understood that only in very rare cases indeed is it to be withheld. Besides depreciating the value of the prize to other winners in other years, who have sometimes received it, and it may be hoped will often receive it, for really first-rate work, it will seem to many at any rate of those who were not present at the meeting on Monday week to set the stamp of the Institute's approval upon a class of architectural design which can only be described, at best, as good commonplace.

Whatever may be said, however, of the architecture of the design "Medicine," by Mr. B. P. Shires, of York, the plan is excellent, and shows not only considerable study and knowledge of the requirements of a medical school, but great care and no little skill in the arrangement of a rather complicated building; the elevation of the front looks better than the perspective, but we should like to see the central feature omitted.

"Spes," placed second, appeared to have good plans, but they were hung too high to be fairly seen; the detail is a little purer than that of "Medicine," but the design could hardly be judged by the terribly hurried ink perspective. "Doric," which was awarded a certificate of honour, showed a design in really good Italian style, pure in detail and correct in arrangement, but, unfortunately, the author had "come altogether to grief" in his plans. Among the rest we noticed "Hygeia's" clever effort in the Palladian style,—as to plan and grouping as well as detail,—a good and useful study, but unfinished, and without a chance of success in these days when Science is the master and would not put up with such a dissecting-room as "Hygeia" provides, for any artistic consideration whatever.

The competition for the Soane Medallion was well up to the average; it is only a little surprising that with such an attractive subject more cannot be said. Mr. A. Needham Wilson, who takes the Medallion, has a very effective set of drawings, executed with great care both as regards drawing and the more important points of planning and design. As in all the other really good designs, the nave and chancel are of the same width. A heavy-looking but effective tower, which stands over the north chancel aisle on rather inadequate supports, is shown in sharp perspective, as seen in a narrow street, in a beautifully-executed drawing, which was carefully hung at Conduit-street with the

top of the nave on a level with the eye, or a little lower. It must be confessed that styles are rather unhappily mingled in this design,—most of the constructional, and many of the decorative, arches are of the blunt, stilted form peculiar to Early French work, while the tracery and canopies over the statues are of English fourteenth-century character. The design by Mr. J. H. Curry, placed second, is cleverly planned to make the most of the site. The most striking feature is the open cloister connecting the porch and transept on the street side. There is a central tower, and a morning chapel with a double curved end, which develops rather an ugly form in the roof. The drawing is effective.

Mr. Bidlake, who was awarded a medal of merit, has produced a design which shows certainly more knowledge and, probably, more power, than any of the others. We should much like to have seen what he could have done with more time and care. Mr. Schultz (certificate of honour) has attempted a central octagon plan and a design in a not very happy rendering of the late brick Gothic style of the North German or Dutch churches, with an "onion" dome. There were two other designs shown with central domes, neither of which calls for much remark. The design "Angelus" showed a fine open plan inside and an effectively piled up group outside, but we cannot commend its style and detail.

As is often the case, the competition for the Silver Medal for measured drawings produced the best work of its kind. Architectural drawing has now been brought to such perfection that, among the best draughtsmen, the choice of a good subject, and plenty of time to finish the drawings with due care, become very important elements of success, and but for these elements we believe the judges would this year have had a far harder task than fell to them. Mr. E. H. Sedding's drawings of St. Magnus, London Bridge, and of Grantham Church, Lincolnshire; Mr. A. B. Mitchell's of Layer Marney Towers, Essex; Mr. E. L. Conder's, of Long Melford Church; and Mr. S. H. Barsley's of Old Cleeve Abbey, are all first-rate specimens of drawing; but perhaps the detail of the Ionic capital of St. Magnus Church is quite the finest piece of work of the kind that has been yet seen at Conduit-street.

The Griesell Gold Medal only attracted one competitor, Mr. A. A. Cox, who has produced an octagonal iron roof, of somewhat novel construction, standing, as far as we could judge on a hasty view, on rather inadequate piers.

There is no doubt that Mr. Paul Waterhouse's and Mr. Oldrieve's essays well deserved the prizes awarded them.

#### FREE LECTURES TO ARTISANS AT CARPENTERS' HALL.

A GOSSIP ON THE PHILOSOPHY OF BUILDING MATERIALS.

THE third of the present series of free lectures to artisans under the auspices of the Carpenters' Company, was delivered on the 3rd inst., by Professor Kerr, F.R.I.B.A., and was entitled "A Gossip on the Philosophy of Building Materials."

Professor Kerr said he wished to take his hearers a little below the surface of things, even in so humble a matter as building materials, and to ask in the first instance how far they supposed Nature or Providence had undertaken to supply them with these materials? Many might answer on the contrary, to advance the doctrine that nature did not profess to supply them at all. One of his objects, therefore, was to satisfy his audience that enterprise in the direction of the invention of building materials was a thing to be considered with the utmost interest. A friend of his, very learned in the science of geology, found himself a few years ago in the company of a Scottish divine of the usual orthodox type, a pleasant man, but one with very confirmed opinions. The conversation having turned upon the antiquity of the globe, the geologist found the ecclesiastic was thoroughly satisfied that this earth was suddenly made out of nothing by an omnipotent power, exactly 4,004 years before the commencement of our era. The geologist, who held a very different opinion, asked the clergyman how he could account for the existence of the fossils found deep down in the stone. The reply was that they were not fossils at all, but that the devil had



put them there for the express purpose of deceiving people like the interrogator. Now he (the speaker) hoped they had got a little beyond that stage of belief, and he would first ask them to consider what stone was. Granite was a compound of broken grains of quartz, feldspar, and mica, which had somehow reached the surface of the globe boiling hot, as it might now be found not many miles below the floor of Carpenters' Hall. Sandstone, again, was a deposit of those grains which were washed down from the summits of the mountains by denudation, carried down the rivers, and deposited and compressed long ago. As to limestone, if they looked into the deep sea they would find the water charged to the full with myriads of little shells whose inhabitants had fulfilled their destiny and died, and which were falling through mile after mile of the depths of the ocean, and forming limestone at the bottom. These were materials which they were accustomed to say that nature had provided. He would take another case, that of timber. The tree was not grown for the purpose of furnishing timber, but in the luxuriance of vegetation lasting its day, dying when it had fulfilled its purpose, and being converted into coal. These were the natural materials, but he would take another, viz., brick. Nature did not supply them with brick, but only with mud or clay. How much more available a material was brick than stone! For instance, most of them knew what "bond" meant, and how brick fulfilled that condition. Terra-cotta and pottery were still more useful, so to speak, and altogether artificial. He would also refer to the most entirely and unreservedly artificial of all materials, viz., iron, and to artificial stone for grindstones, which beat everything else in its special line. The fact, therefore, was simply this, that natural materials had to be adapted, and those materials which were not so adapted had to be created; therefore, there was great scope for the invention of man in the legitimate enterprise of inventing artificial materials to correspond with the artificial purposes of building. The countries of the world might be divided into the two categories of stone and clay countries, and out of this arose the first great distinction in regard to building. In all probability brick was used before stone, except where stone walls of a very rude kind would necessarily be used in a stone country; but it was remarkable that the earliest known use of stone in anything like ordinary building was its use in enormous masses. Rude and rough small rubble stone might have been used at first, when better was not to be had, and when the skill of the workman was primitive indeed; but it was a remarkable thing that the most ancient remains of stone building were composed of stones of the largest size. This brought him to the distinction between Egypt and Assyria, as the representatives of the two rival civilisations of antiquity. Egypt was a stone country, Assyria a clay country, so that whereas the remains of Egyptian buildings were in existence at the present day, those of Assyria had wholly disappeared, except some pieces of sculpture which ad doubtless been brought from a distance. This also reminded him of the distinction between London and Paris. No one of his age could now pass through the streets of London without being struck by the enormous progress which had been made in building within the last thirty years. Still, though stone had been largely used, London could not attempt to vie with Paris. The existence of the beautiful dome underneath the city of Paris might have led something to do with the peculiar grace and elegance of Parisian artistic sensibility. But, at all events, there was a clear manifestation of the distinction between the clay basin of the Thames and the stone quarry of Paris. Turning to timber countries, it seemed probable that good building was in every case first manifested in timber. The Greek temples in their design pointed distinctly to a timber origin, while Solomon's Temple appeared to have been mainly built of wood. One of the most remarkable peculiarities of ancient times was that of massed labour. The division of labour nowadays gave to every man his own province, and the result of combination was the production of such works as we were familiar with. But when we saw the great works of primitive antiquity, it was difficult at first to understand how such enormous masses of stone could have been moved and placed. The answer was always the same,—it was done by

massed labour. Turning to stone, he had already explained what granite, sandstone, and limestone were. Magnesian limestone was rendered partly crystalline by the accidental passage of a stream of volcanic heat in the formation of the stone, and that reminded him of the story of the stone used in the erection of the Houses of Parliament. For this purpose it was determined to employ the best stone to be found in the three kingdoms. Portland stone, as they knew, was a very good stone, but it had one remarkable and serious defect,—on one side it became blackened with the London soot, while on the other side it was blanched with wind and rain, the two effects being in most dismal contrast. It was therefore determined to discover a fitter material, and a Royal Commission was sent all over the three kingdoms to examine the different stones. They did their work well, and at Southwell, in Nottinghamshire, found a church of the Norman age, with its carvings as clean cut as if done the year before. This stone was carefully examined, and found to be the Mansfield Woodhouse stone, which the Commission determined should be used. No pains, however, were taken to inquire whether there was enough of it; so, by the time the basement had been built the supply of stone gave out. They next found the Anston stone, in the same neighbourhood, a stone partly made crystalline by a stream of heat passing through a certain portion of the quarry, the crystalline and non-crystalline stone being quite indistinguishable. This was quarried, and sent up to London. Mr. C. H. Smith, a well-known mason in Titchfield-street, was one of the commissioners, and was appointed to examine the stone as it arrived, but by reason of some difficulty in the matter of his remuneration, he naturally declined to serve. The consequence was that the stones came in without being checked, and the result was that those which were non-crystalline were the stones which had decayed. Out of this decay arose the idea of stone-preserved. A great many people were permitted to apply their nostrums to the face of the building, and it was well understood that the one object of a stone preservative was to keep out the wet. Let them consider for a moment where the Houses of Parliament stood. For the sake of being placed over a perfectly useless and purely traditional place, called St. Stephen's Chapel, the building was put on the bank of a dirty river, opposite the filthiest manufactories that could possibly be devised, generating gases directly destructive of stone. These gases were suspended over the river in the fogs, or blown straight against the beautifully carved surfaces, and carried with the wet into the stone, with the most lamentable results. If the moisture could be kept out, so would the destructive gases, and for this purpose some of the inventors used such things as boiled oil and shellac, but none of them were good for anything. One invention, however, was brought out, which he was sorry had not been more successful in this country: he referred to Ransome's preservative, one of the most admirable of scientific contrivances. Ransome conceived the idea of forming silicate of lime inside the stone; he first washed it over with silicate of soda, and after allowing it to settle into the substance of the stone, he applied chloride of lime in the same way. A chemical combination was the result, silicate of lime being produced within the stone, and common salt thrown out in small quantity. Ransome's artificial stone was still more ingenious, because it was the practical application of the idea. Here any sand, provided it was clean, was mixed into a paste with silicate of soda. When made up and moulded under pressure, it was submitted to the action of chloride of lime; a cross-combination ensued, and without the application of heat or anything else, silicate of lime was formed within, so as to constitute the sand an artificial and perfect sandstone, the chloride of sodium being washed out. Thus was produced a perfect material wholly artificial, and even better than natural stone. Owing to our prejudices, however, Ransome's invention had not been a success in England, though he understood it had been more successful on the other side of the Atlantic. Our prejudices now were artistic, and we abhorred shams, but he could not help being sorry that so meritorious an inventor should have cause for complaint as to the reception of his brilliant invention. Dealing with brick, the first mention of anything like good bricks was in connexion

with the Tower of Babel. In early brick-work there was a rivalry between the sun-dried and the fire-burned brick. The sun-dried was similar to clay-lump, and was a very good material so long as the wet did not get at it. The bricks made in the Israelites in Egypt were sun-dried, the clay being mixed with just so much straw as would give bond to the bricks. In cutting a brick two things had to be considered; in the first place, it must be a soft brick, and, in the next place, the cutting would remove the protecting surface, thus rendering it a bad and rotten material. It also seemed a pity that so much ingenuity should be wasted for the mere whimsy of the moment, in the imitation of Dutch architecture, when we could do so much better with our own. In endeavouring to improve anything in this world, as regards the eye, a price had invariably to be paid in the disturbance of substantiality. The best brick facing was plain selected stocks, and the more they were chosen for beauty of effect, the more was this obtained at the sacrifice of substantiality. Glazed bricks were not liked for facing, but was it not possible to glaze or semi-glaze a brick or stone? Any one who could invent a glaze which would not require heat, but would still keep out the weather, would, he believed, make a fortune. Our brickwork was dirty, and we would not fall into the good French habit of giving the houses a wash down once a year. As to mortar, the earliest buildings of any magnitude were built of great masses of stone without mortar. The first mortar was tempered clay,—unburned brick and common clay making a good wall of its kind in the East. The next mortar seemed to have been burned brick and asphalt. The theory of lime mortar was that it consisted of lime and sand,—an artificial stone, like concrete, composed of sand with a minimum of lime and water. The sharper the sand, the better the mortar; the strength of the mortar was in the sand, and therefore the theory of perfect mortar was that it should be composed of grains firmly dovetailed together, with just enough of lime to fill the interstices, and no more. Mortar made without sand had no strength; and the question of the minimum of water was a vital one. The water had to dry out, thus leaving the spaces empty, so that the more water that was put in, the less solid was the artificial stone which the mortar constituted. Timber was a natural and very crude material, of fibrous and at the same time multitubular structure. This required to be seasoned. The tree was felled at a time when the sap was at its lowest, cut into logs, and kept in running water, so as to wash out the sap, which was albuminous. When this was done the tubes which contained the sap contracted, and so resulted the shrinkage of the timber. This was a material which, on the face of it, ought to be improved on, and nature insisted upon this being discovered sooner or later. Indeed, the purposes of building were wholly artificial, and no material was supplied upon the responsibility of nature, but upon the responsibility of man, who was expected to improve it in the course of ages. Iron, again, was a material as absolutely artificial as if it were had from another planet. To the ore (which looked very unlike a built girder) was added a flux which produced slag, the result being pig-iron, and here was artificiality of an extreme character already. The pig-iron was then re-melted and became cast-iron, a most valuable material of a granular texture, but at the same time somewhat treacherous, acquiring in the process of cooling accidental fractures and air-holes in the interior, which no amount of inspection short of testing would discover. Malleable iron was still more artificial, being refined and submitted to the blows of the hammer. The pig was a granular material, but when refined it seemed to lose this character, and under the roller or the hammer acquired fibre in the direction of the pressure, so that the identity of character with cast iron was entirely gone. By repeating the process the iron became more and more fibrous, until an iron tube could now be bent by the pliers into a spiral of 2 inches in diameter. Rolled iron was even more artificial, when they looked at a built girder, and considered that it was just as if it had been cut out of paper with a pair of scissors: they would agree that the extreme limit of artificial material had been reached by the persevering ingenuity of man. And here they would observe that the more the artificiality, the



more the reliability of the material. The weak point of iron was its liability to rust. Iron oxidized like anything else by reason of its contact with air, and could only be protected by being galvanised or painted. Galvanising was originally done by what might be termed the electrical process, but was now accomplished by dipping into a bath of zinc. The reason for using zinc was that, though it oxidized, it was protected by its oxide. But the protective processes for iron were as yet imperfect, so that structures like the Crystal Palace or the Tubular Bridge over the Menai Straits, must be considered to be theoretically and practically weak. He believed, however, that, in the course of time, some application would be invented to protect iron effectually against the influences of our moist climate, and if so then it must have a great future before it for constructional works. The slag thrown off in smelting was also a material which promised great things in the hands of inventive ingenuity. Lastly, he would say a word about paint. Common oil-paint originally was a coating of white-lead and oil. A coat of paint was the formation of a film of carbonate of lead, to protect the wood or iron from the influence of the atmosphere. The oil,—the vehicle,—evaporated, leaving the carbonate of lead dry on the surface. The more pigment that was used the more was the white-lead weakened, pure white-lead being a strong and substantial coating. Professor Kerr, in conclusion, hoped he had succeeded in persuading his audience that there was much room for the exercise of ingenuity in the direction of artificialising building materials, and that nature did not undertake to find us in these materials, but, on the contrary, expected us to prepare our own.

The lecture was enlivened throughout by a variety of historical and anecdotal allusions.

On Wednesday evening last the fourth lecture of the series was delivered by Mr. T. Chafeld Clarke, F.R.I.B.A., his subject being "The Architecture of City Buildings." Mr. Alfred Preston, a member of the Court of the Carpenters' Company, presided, and the lecturer was listened to with marked attention, his remarks being frequently applauded. A report will appear in our next issue.

#### MOULDINGS.\*

BY GEORGE AITCHISON, A.R.A.

In the Middle Ages the total size of every group of mouldings depended on the thickness of one course of stone. The architects altered the profile according to the size of the building, i.e., in large buildings the members were few and large, in small buildings they were many and small. This was opposed to the ancient system, where the module was adopted. One course might serve for a small Corinthian cornice; while the cornice to a large order might require several courses.

There are two main moulding members in a building, the cornice to throw off the wet, and the base moulding to spread the weight. Their shape must clearly explain their use to bring them within the pale of art. The Dorians did this most admirably; the top fillet was a drip-stone, the hawk's-bill was a drip-stone, and so was the corona; there was little reason for this in the sloping pediment, and they, therefore, crowned it with a cyma. The bottom of the column was large, and the steps acted as footings. The Ionians, living in Asia Minor, probably had less necessity to guard against rain, and had more sun; hence, in the Ionic, the crowning member of the cornice is mostly an ovolo. In this order the columns have bases.

But we must not lose sight of one thing, that though the corona may have a purely useful end,—that of protecting the face of the building from rain,—it has an equally important æsthetic end, that of producing a deep shadow where it was wanted, æsthetically to tie the building together, and to repeat and affirm the horizontal shadow from the lower edge of the architrave, broken by the capitals of the columns.

In the smallest thing connected with architecture we must always bear in mind that it is originally founded on construction, and cannot stray far from it if it is to satisfy the reason

and the sentiment. We are far removed from Greek times, and have not even a tradition of their ways and thoughts in relation to architecture: so we can only try to resolve their problems by examination of their works and reflection upon them. Vitruvius, who hands us down something he learned from them, is a bad guide; he not only came late, when everything had fallen into rules, but he was using a wholly exotic art.

The Roman building material was rubble; the Greek material was marble. Of æsthetic architecture in its proper sense he was absolutely ignorant. He did not even know what it meant. When he had done his building he wanted to make it architectural, and for that purpose he considered he must stick on to it some sort of caricature of a Greek temple. English architects at the beginning of this century had much the same view. They built a square brick box, with holes for windows and doors, and plain projecting eaves and gutters; but they wanted it to be architectural: to achieve this they added a porch of Greek Doric or Ionic, in stone, wood, or plaster, and the thing was done. It is certain that Doric columns were derived from stone, and not from wood construction, as they get thinner as the Greeks learned more about stability. The architrave was probably stone, and the en-style, sy-style, dia-style, and aræo-style were expressions of the bearing power of the stone,—in masons' words, "safe," "too thick," "rather thin," and "risky." The projection of the corona was to some extent governed by the thickness of the walls; it would have toppled over if the tailing had not been greater than the projection.

We modern architects are too much divorced from our materials, so that our mouldings are too apt to represent artistic rather than real needs. The early Mediæval architects were mostly masons, even so late as the building of the Ducal Palace at Venice. The architect, Bon, was called a stone-cutter (*taglia pietra*). Carpentry, too, is extinct in England, and so are carpenters: excepting the hedge-carpenter, we have none,—they are all joiners,—and their maxim is never to work timber, but to case it. The Saracenic architects did the same. Their beams are often round balks, with the square ends, and fretwork in thin casing. In consequence of this the architect loses all sense of constructive propriety in his mouldings,—their only propriety is æsthetic.

About 300 A.D. the Romans began to think about architecture, began to abolish lintels, and use arches; but they still adhered to the entablature, and put it over the arches. The Greek architects who worked in Syria also thought (I am by no means sure that Dioctetian's architects were Romans, and not Greeks); the orders began to be lengthened out, to suit their position. Ionic pilasters may be found at the angles of the basilica at Chaga, running from top to bottom of the building, some 20 diameters high. The cap comes under the architrave, and in the middle of the pilaster is a moulding. But before this epoch in Europe the orders got turned into long shafts, with their caps under the cornice or architrave. In Syria the frieze had been discarded, the architrave had been moulded, and the cornice was a flat projecting stone, with a gutter in it. The Crusaders made acquaintance with these Syro-Roman or Syro-Greek buildings, and from them much of the Romanesque work was taken, and their methods and features were altered and improved upon when Gothic began. The cornice proper in Early Gothic first consisted of a drip-stone, with a large quirked ogee beneath it, and the frieze was a hollow and bead, filled with leaves. Eventually this sculptured frieze was omitted, and the cornice came to be but a drip-stone and hollow, the whole tendency being to use cornices merely as a narrow string, of the least possible importance.

It is in the archivolt and vaulting ribs, and in piers, that profusion of moulding is to be found; and it is by studying successive examples of them that we see the stages of alteration and improvement in the mouldings. In archivolts of the early part of the thirteenth century, a common form is a large torus, forming the bottom arch, flanked by a smaller quirked torus on each side; then the lower torus got a fillet or nose put on it to mark the centre; then the side toruses got their fillet; then the spaces between were hollowed; then subsidiary beads got put in, until at last the lower torus became a prism with hollowed sides, and the side ones were so hollowed out and

undercut that they became a sort of ogée. The setting out was, from first to last, on virtually the same geometrical form, a triangle of 45 deg. or 60 deg. And the mouldings alone were gradually altered, as more skill in construction was acquired, and greater lightness, elegance, and variety were demanded.

I do not intend to give you an archæologic history of Gothic mouldings, I merely want to point out that where the Mediæval architects perceived a defect they remedied it; where they saw an improvement might be made, they tried various means until they got the effect they wanted; not by capriciously abandoning their system, but by variations and improvements in the detail.

In spite of being trite, I will say that in horizontal mouldings, those that are concave rarely look well as supporters; an ovolo or ogée does best for that, and cymas or cavettos as crowning members. The Greeks felt this in their Ionic bases, and brought out the fillet of the scotia to the face of the torus above, so that it might have a solid bearing under it. Inside mouldings must be treated differently from those outside, as the light inside is diffused, and in certain places is below instead of above them, and they are lighted only by reflected light. I may also mention that in places that are only, or mainly, seen by artificial light, the mouldings may be designed as for sunlight; only care must be taken to ascertain the level of the light. An excellent group of mouldings, designed for a top light, may be lost or look ugly when the light comes from below. A little inquiry, thought, and care will prevent such untoward occurrences.

There are some effective groups of mouldings in some of the mirror and picture frames at Venice, mostly Milanese work; these groups begin with a small projection from the wall, carried on some distance, and then a bold, projecting moulding comes out, and from that the face recedes but slightly to the picture or glass; besides the differences of plane, effect was gained by the use of fillets of considerable projection chamfered on the edge. Much of the effect is also due to a peculiar ornamenting of the surfaces by undulation, and by carefully contrasting the different qualities of surface, some being left wholly plain.

Brick, soft stone, hard stone, and marble require different treatment in moulding. Brick requires a greater difference in treatment than stone or marble, particularly in the projection of the planes. With a 9-in. brick you can with difficulty get any considerable flat projecting surface.

Soft and hard woods must be moulded differently; very thin members break off in soft wood, and sharp edges get broken off or bruised.

Metal, too, requires different treatment from marble, stone, brick, or wood. You may get edges as sharp as you like in metal, but you cannot undercut, because the pattern will not draw.

We can never progress unless we resolve, think, strive, and learn. It is mainly to this end that I have given this lecture. We must resolve what effect we want; we must think how this effect can be got; and we must strive to make it as beautiful as possible. And when it is done, we must learn from our failures how to do it better next time. But this is not enough, for this only deals with individual experience, and what is wanted is aggregate experience.

From each architect, or each small group of architects devoting themselves to separate styles, the profession is a mere aggregation of individuals or of knots of men; lacks all the cohesion and discipline of an army, and cannot, as a body, benefit by experience. The successes or failures of the knots or the individuals only instruct the man or the group. A knot of imitators of Greek learn nothing by the success or failure of Mediæval imitators; this is well put by Ferguson:—

"The only one means by which man ever did anything great, either in the useful or fine arts, was by this aggregation of experiences. One man may be equal, either intellectually or bodily, to two or three of his fellow-men; but one can scarcely be equal to ten others, much less to a hundred or a thousand; and at all times it will be found that a thousand little steps of a thousand little men, if in advance of one another, will surpass the stride of the greatest intellectual giant the world ever saw; and it is only by steady perseverance onward that we can

\* Continuation of a lecture delivered at the Royal Academy on the 25th ult. See p. 365, ante.

French Medieval Pier Arches.

Renaissance: Sansovino's Logetta.



English Medieval Pier Arches.

Greek: Cornices, &c.

SECTIONS OF MOULDINGS USED AS ILLUSTRATIONS TO MR. G. AITCHISON'S LECTURE AT THE ROYAL ACADEMY.



really hope to accomplish anything great, or worthy of ourselves, or which shall be a benefit to those that come after us."

I do not want to make you vain, but I do desire to make you feel a due sense of your own worth, and that of the age in which you live. Are you not better than a ferocious Roman, a savage Norman, a half-barbarous Medieval or Mahomedan? In many respects you are superior to an ancient Greek. Why should you bow down before these people, and say "you are great and we are nothing; we can never hope to rival your work; we will humbly copy you?" Do you think, if your compere in sciences and the useful arts had posed in this fashion, they would now "flash the lightning and weigh the sun"? No: we should have baliste instead of cannon; triremes instead of steam-driven ironclads; probably a flint and steel for getting fire, without even tinder or a brimstone match. We should have wick lamps or torches for our light instead of gas and electricity; scribes would copy our writing instead of giant cylinders driven by steam; and hand-loomes would weave our cloth instead of Arkwright's machinery. Would Argand ever have made his lamp if he had believed the Romans unsurpassable? Should we have the steam-engine? Should we know the earth went round the sun? Would the law of gravitation have been found out? It should be as contemptible to copy an old building as an old book.

The great architectural ethnographer, James Fergusson, said of architecture:—"It possesses durability beyond almost any other of man's works,—except, perhaps, the lay of the poet,—and in this respect comes before us with a sort of pseudo-eternity, speaking to us of past times and people who have left no other record of their existence, and telling its tale with a distinctness and reality which, to my mind at least, no other art can match." Is it, then, not worth making an effort to re-create it, for we have no national architecture?

Savage hordes like the Goths, the Lombards, the Franks, the Normans, and the Saracens, managed to impress on their buildings sufficiently striking characteristics to enable us to say to which horde they are due. When they became partially civilised they produced Gothic in the West of Europe, and Mahomedan in Asia, Africa, and the East of Europe.

The masterpieces of both these styles excite even now our wonder and admiration. Neither the Mediaevals nor the Mahomedans were equal in civilisation to the Romans, and though no Gothic building covered a space equal to the Flavian Amphitheatre, nor was equal in permanence to the basilica of Maxentius, their tallest buildings exceeded the Pyramids in height. In every useful art, and in every science, we have not only left the Saracens and Mediaevals behind, but the Greeks and Romans as well; it seems, therefore, that it is not because we are altogether inferior to former peoples that they had architecture while we have none. This does not apply to England alone, but to France, Italy, Germany, Russia, Spain, Portugal, Sweden, Denmark, Norway, and America, and to the American, Australo-, Indo-, and Africo-English.

It is simply because a new phase of humanity has superseded that we, as well as the other civilised nations, have building, but not architecture.

From the savage upwards, until, say the middle of the last century, no one ever made anything without an attempt, however rude, to give it some beauty of form. In the middle of the last century this desire ceased amongst civilised nations, possibly owing to the discoveries of science and the invention of machinery. Old traditions still hung about all arts,—they do even now; but, from a toast-fork to a steam-engine, things began to be made for the end of use, and use only; and this new view applied to building, and does so still. A friend of mine remarked to the foreman at a cotton factory that it was very ugly. The reply was, "It perfectly answers the purpose of spinning calico in, and I don't know what more you want." This may be said to be the mental attitude of the bulk of civilised mankind. Whether what we call the improvement in taste is a real thing, or only a fashion, I cannot say; but before you can have any real architecture you must have the desire for it amongst the people and an effective demand. One of the most important factors in this is that the people who order a building must, when they see it completed, have a genuine love for it, and feel that it is not only more pleasing to them

than something else, but that it fulfils the desire for the particular beauty they want. The bulk of the people must feel thankful to the man who has done it, and be proud of him. I never heard that Messrs. Tyndal, Spencer, and Huxley were rich; they certainly have no official honours; but every English-speaking person in the world admires them, and is proud of their being English. The same feeling must be given to the architect. James Fergusson said we have no architecture, because we do not follow the method employed in old times of gradually improving on each thing done, and employing a vast number of able persons on it. This might be true, if we had anything to improve, but, as I said before, you cannot improve on nothing.

There is no lack of skill nowadays. You may get a Greek temple, sculpture, painting, and all, of nearly equal excellence to one of the days of Perikles; a Roman basilica, a Romanesque or a Gothic cathedral, an Italian palace, or a Swiss chalet; but you cannot get an original style, unless mankind want it, and when they really want it they will get it. So you must try and cultivate the public taste until you can produce a real want. Critics may carp, but that is the solution, and that is why savages, barbarians, and half-civilised people produced architecture that we now admire and copy,—and we cannot.

I believe, with our present knowledge and skill, we could take the truly British house,—a brick wall with holes in it,—and gradually form a new style out of it. I believe we could make a steam-engine beautiful, or one of the hideous abortions of the engineers, if mankind wanted it. I do not say that this generation could bring it to perfection, but they could make the first step.

Archimedes said he could move the earth if he had any fulcrum for his lever. We are in the same position: our fulcrum is the true love for a new species of beauty amongst mankind; and that we have not yet found, because it probably does not exist.

If you will go on perfecting yourselves in the knowledge of your art, in logically working out the problems before you, in making each necessary piece of your structure as true, as expressive, and as well-proportioned as possible, and in getting it ornamented with what you truly admire, you will be ready to meet the true taste when it does arise. If you neglect this all the recondite arts that are necessary to plan, construct, and put buildings into harmonic proportion will be lost, and will have to be laboriously disinterred from books and ruins, and will probably take a century or more. All I can hope is that a national taste may arise in your time.

The lecturer thanked those who had assisted him:—

Messrs. G. Jackson & Son for running the plaster mouldings.

Messrs. Bruciani & Co. for the cast from the Erechtheum.

The R. I. B. A. for lending him the Pugin drawings.

Professor Lewis for the diagram of the comparative forms of Doric capitals and Ionic Bases.

Professor R. Smith for diagrams of Gothic mouldings.

Signor G. Boni for the fac-similes of the mouldings of the Ducal Palaces at Venice and the drawing of the Loggetta.

Mr. Bidlake, Pugin Prizeman, for the loan of his drawings and Gothic mouldings.

**Remodelled London.**—At the Surveyors' Institution on Monday night, the discussion was renewed on the paper read a fortnight before by Mr. William Woodward, on remodelling London. The proposal was to deal with the metropolis as a whole in regard to its entrances, streets, squares, open spaces, and edifices, by schemes of improvement, some fifty in number, which would result in the formation of boulevards traversing the whole of the suburban districts, and communicating with each other, the formation of new streets running north and south, east and west, with avenues, cirques, diagonal thoroughfares, isolating all churches, theatres, and public buildings, iron and glass covered arcades for shelter in wet weather, sites for new public buildings, recreation grounds, baths, gymnasias, and healthful accommodation for all classes of the population on a larger scale than exists at present, at an estimated cost of 67,000,000 sterling.

## Illustrations.

### TWO LONDON DOORWAYS. SCHOOL BOARD OFFICES.

THE new principal doorway to the enlarged offices of the School Board for London, from the designs of Mr. E. R. Robson, F.S.A., is a free rendering of what may be described as French Renaissance. The principal panel contains the Queen's head surmounted by a Crown, and has a ribbon bearing the inscription, "Elementary Education Act, 1870," alluding, of course, to the Queen's sign manual, which completed the Act which brought the Board into existence.

This panelling, together with the whole of the foliage and lettering, is by Mr. McCulloch.

The interior of the enlargement contains, in addition to the various business offices, a large committee-room panelled in walnut, the panels being carved by Mr. Aumonier.

Messrs. Higgs & Hill were the builders.

### ROYAL INSTITUTE OF PAINTERS IN WATER-COLOURS.

The design of this door, in Piccadilly, by the same architect, may be described as a playful treatment of neo-Greek. Its difficulty, of course, consisted in being obliged to give way to the internal interests for light, and it is thus pierced at two points with large windows. Two unusually fine figures crown the same, which are by Mr. Verheyden, the sculptor, and are symbolic of water-colour painting. The foliage, lettering, &c., are by Mr. McCulloch. The busts along the façade of the building are the work of Mr. Onslow Ford. Messrs. Peto Bros. were the builders.

### MEASURED DRAWINGS OF GRANTHAM CHURCH.

The parish church of Grantham is dedicated to a Norman saint (Bishop Wolfran), who died three hundred years before the Conquest.

The church, as it now stands, consists of one large parallelogram divided into three nearly equal widths, viz., the nave, north and south aisles, running the whole length of the building.

The oldest portions visible are the three nave transitional piers, exactly in the centre of the church; and the core of the piers at entrance to chancel.

The three arches over these three piers are late, and of much greater height in order to take both the original arch and clearstory window over (see arch-stones over these arches).

The very wide arch is late work, the extra width being given in order to give the utmost view to the roof-screen, of which stone foundations run the width of the chancel, now stairs being formed in the piers of either side.

The church was then extended to its present length, and the whole north aisle up to the late north chancel aisle, the vestry being jammed out at the junction of both.

The north porch also is an addition, the wall being continued from the buttresses of one bay. The inner door is Early English, and probably came from the earlier west end.

The south side is much of one date, the latest work being eastward, over the Early English crypt.

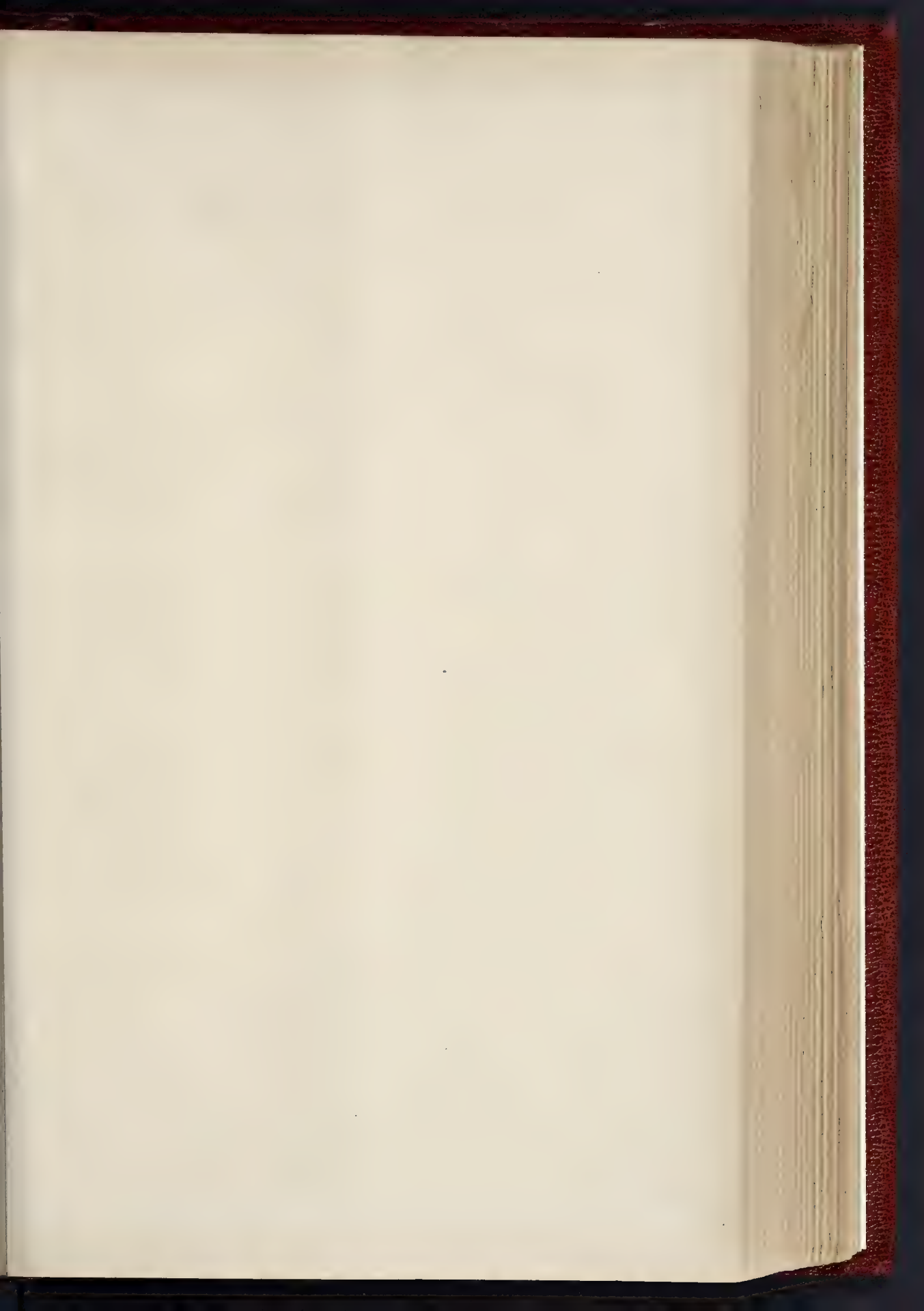
### TOWER AND SPIRE.

The tower was built in two stages. First stage, up to the chime chamber, terminating outside with the quarefool work. Soon after the upper part was built up to the base of the spire and finally finished with the magnificent spire, as Sir Gilbert Scott said, only second to that of Salisbury. The whole is of Ancaster stone. There is a splendid peal of ten bells, the framework of which sadly needs repair.

EDMUND H. SEDDING.

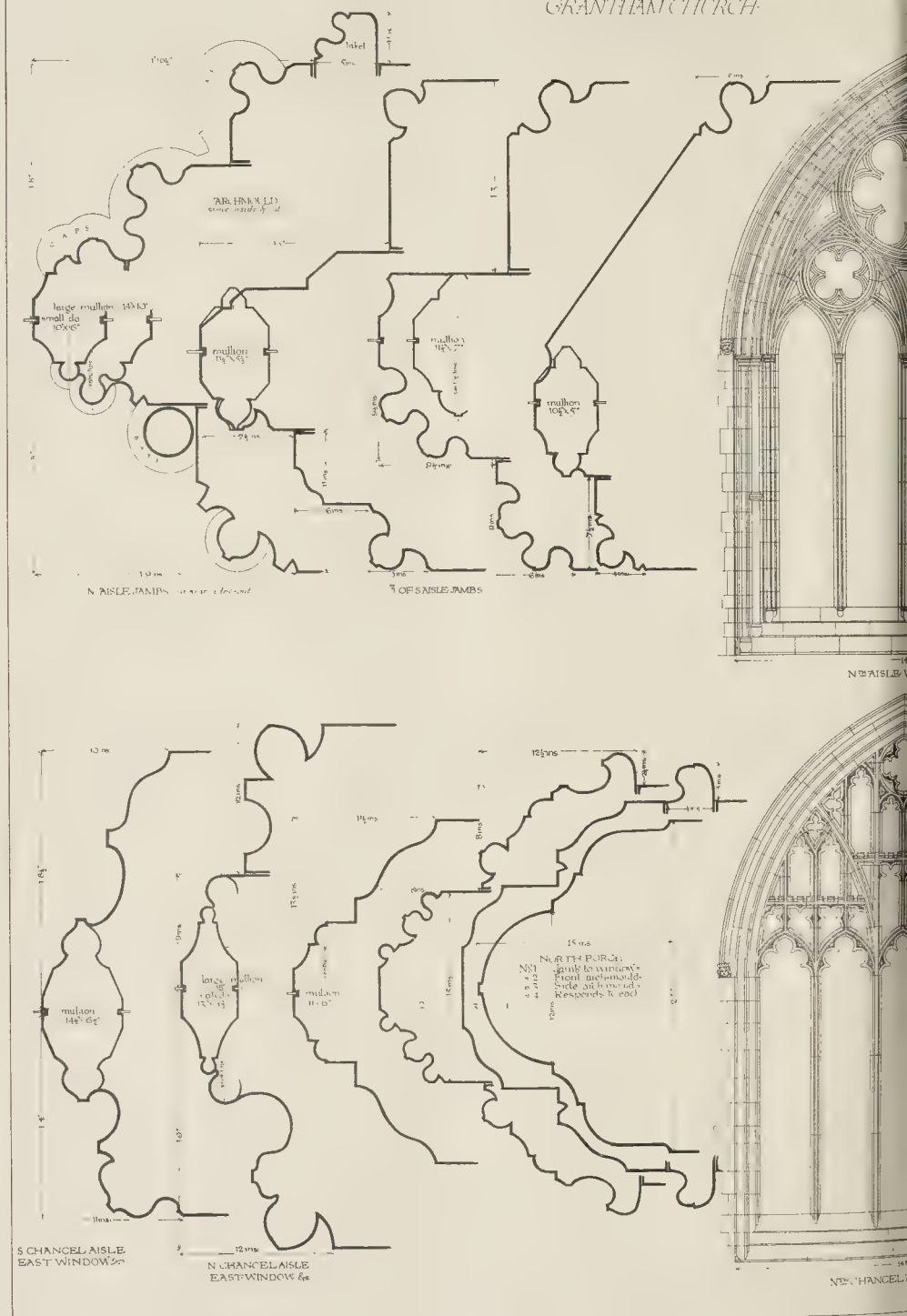
**Hellenic Society.**—This Society held its second meeting of the year, at 22, Albemarle street, on Thursday, when papers were read by Mr. A. S. Murray on "Antiquities from Lipara," and by Mr. Arthur J. Evans on "Terra-cotta from Tarentum."

**Institute Prizes.**—It was stated in error last week that Mr. Mitchell had received 1 "Medal of Merit" only for his measure drawings of "Laver Marney Towers." Two silver medals were awarded; the first, with five guineas, to Mr. E. H. Sedding; the second with five guineas, to Mr. Arnold B. Mitchell. Mr. A. A. Cox, not A. R. Cox, is the name of the winner of the Grissell Medal.





## GRANTHAM CHURCH



GRANTHAM CHURCH, LINCOLNSHIRE

AWARDED THE INSTITUTE

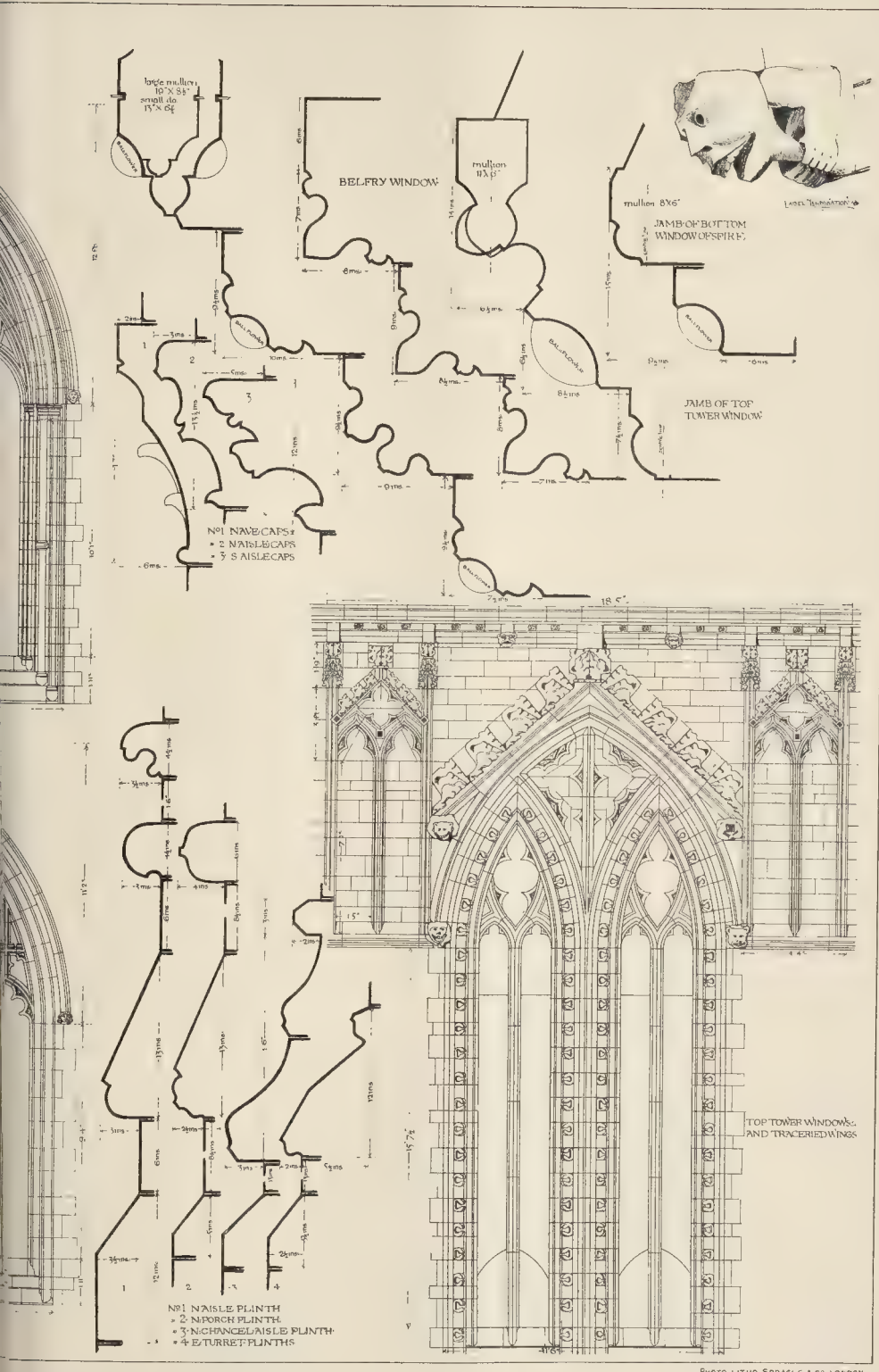
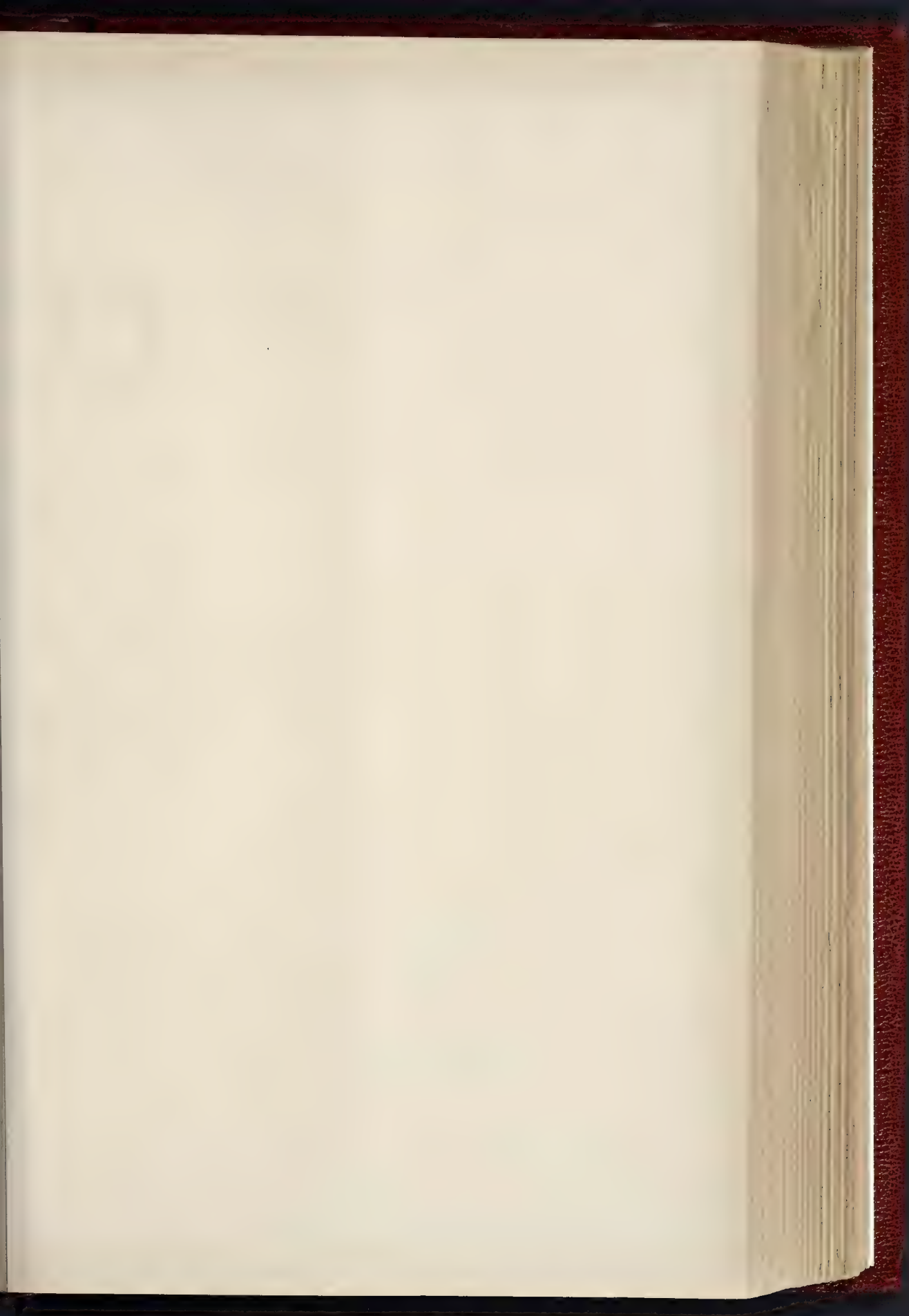


PHOTO LITHO SPRAGUE & CO LONDON

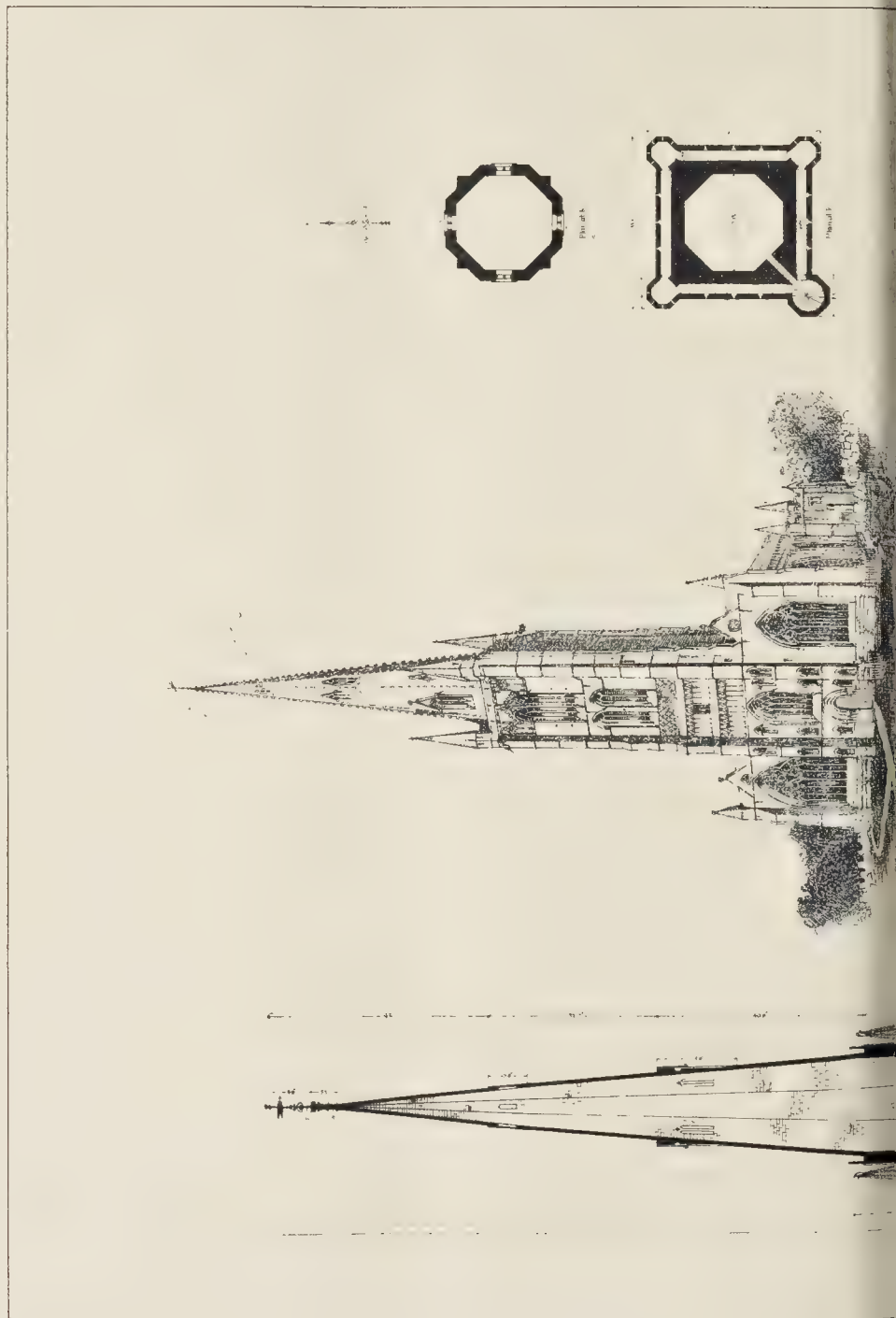
AND DRAWN BY MR. E. H. SEDDING.  
AND TEN GUINEAS.

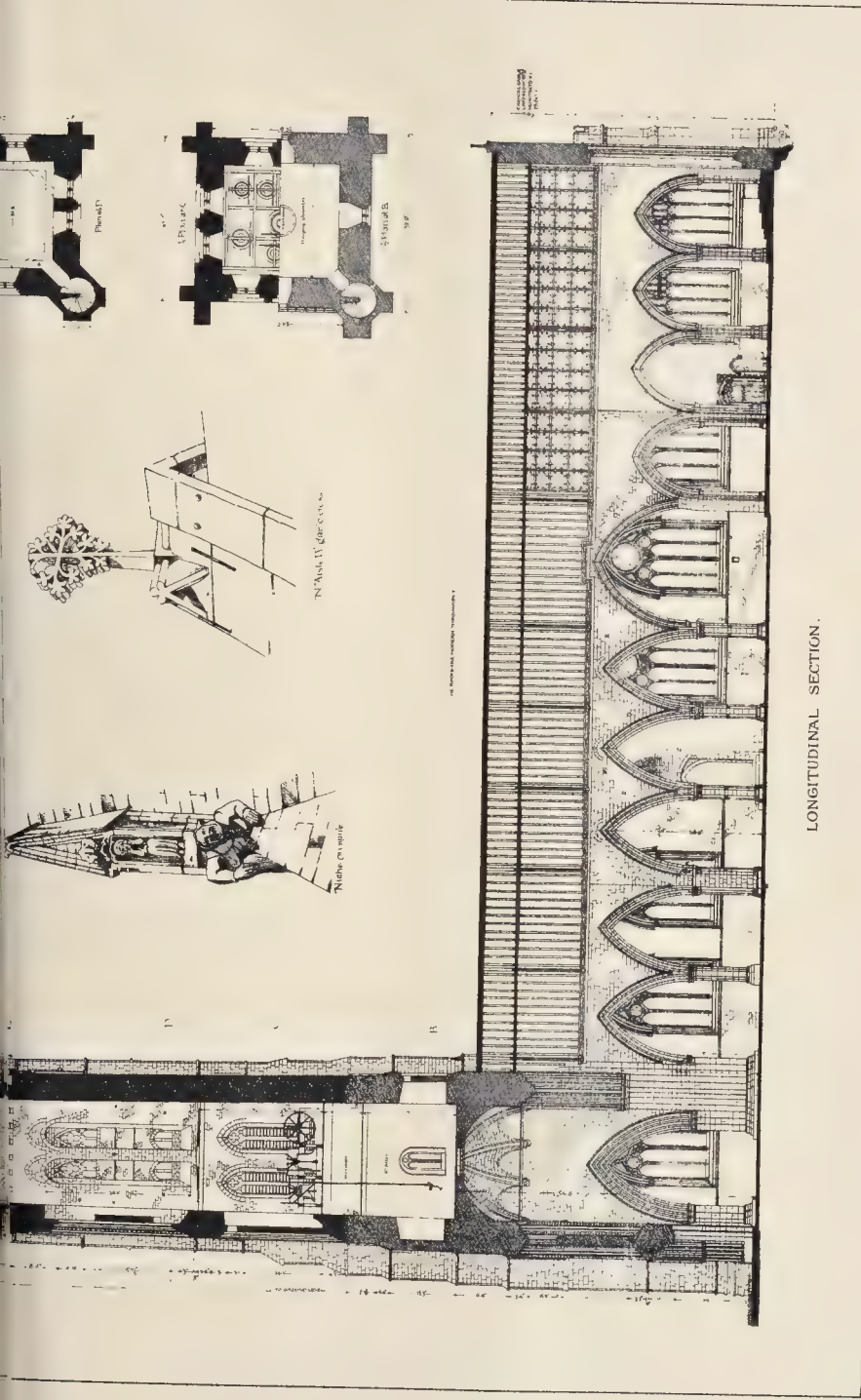












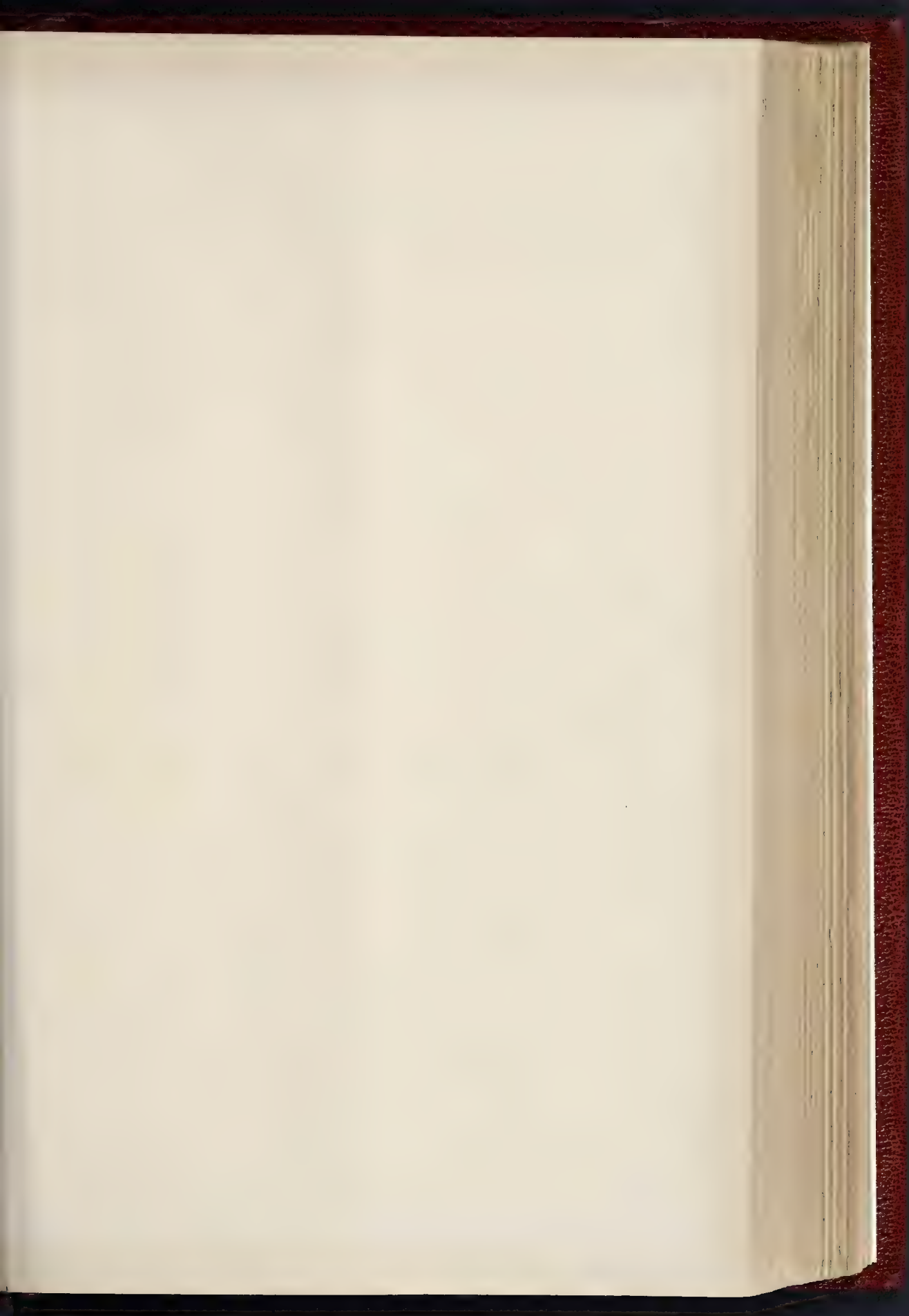
LONGITUDINAL SECTION.

PHOTO LITHO SPRAGUE & CO LONDON

GRANTHAM CHURCH, LINCOLNSHIRE.—MEASURED AND DRAWN BY MR. E. H. SEDDING  
AWARDED THE INSTITUTE SILVER MEDAL AND TEN GUINEAS.











ENTRANCE DOORWAY, SCHOOL BOARD OFFICES.

MR. E. R. ROBSON, F.S.A., ARCHITECT; MR. DRESSLER, SCULPTOR; CARVED PANELS BY MR. McCULLOCH.



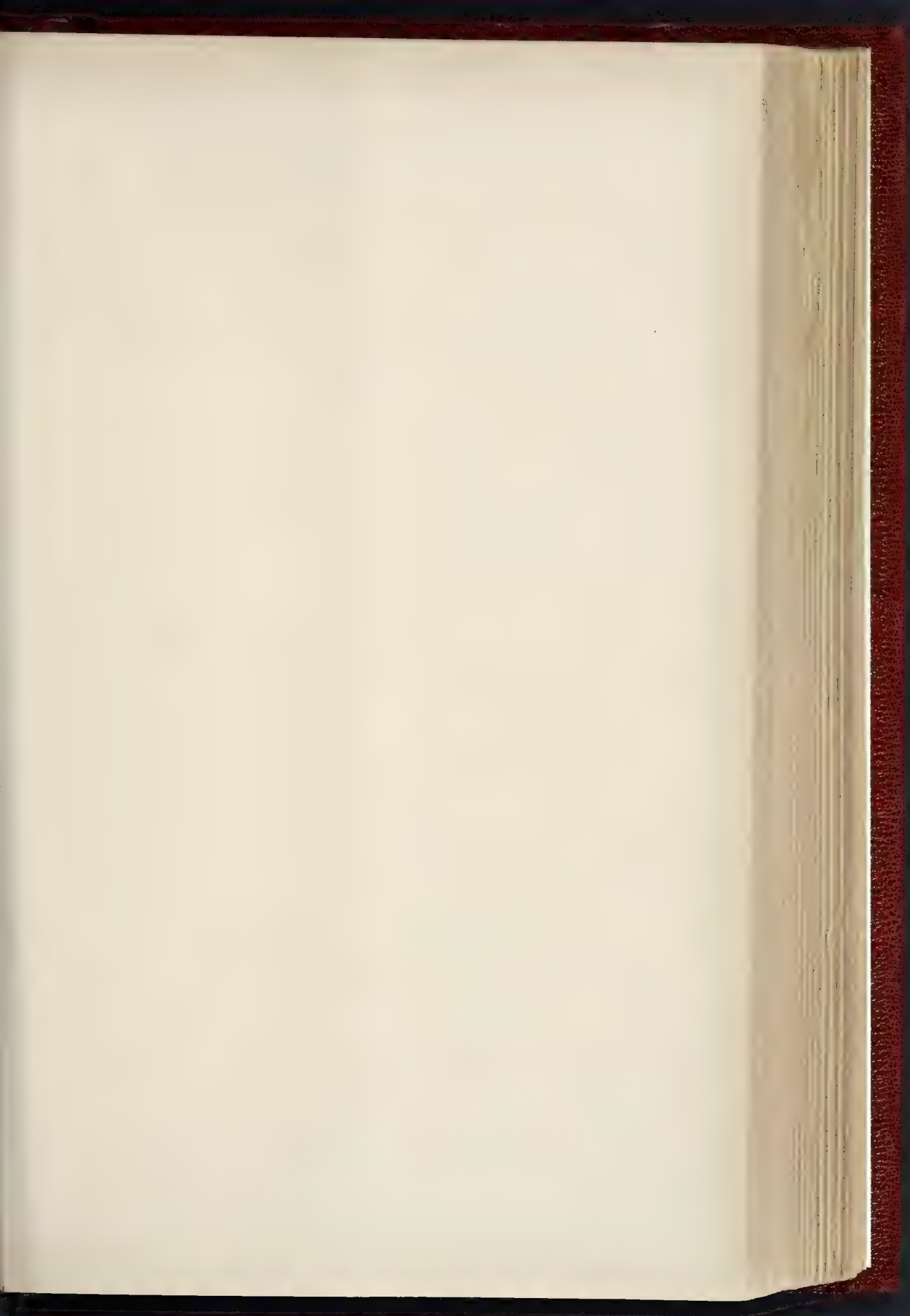


ENTRANCE DOORWAY, ROYAL INSTITUTE OF PAINTERS IN WATER COLOURS.

MR. E. R. ROBSON, F.S.A., ARCHITECT; MR. VERHEYDEN, SCULPTOR.

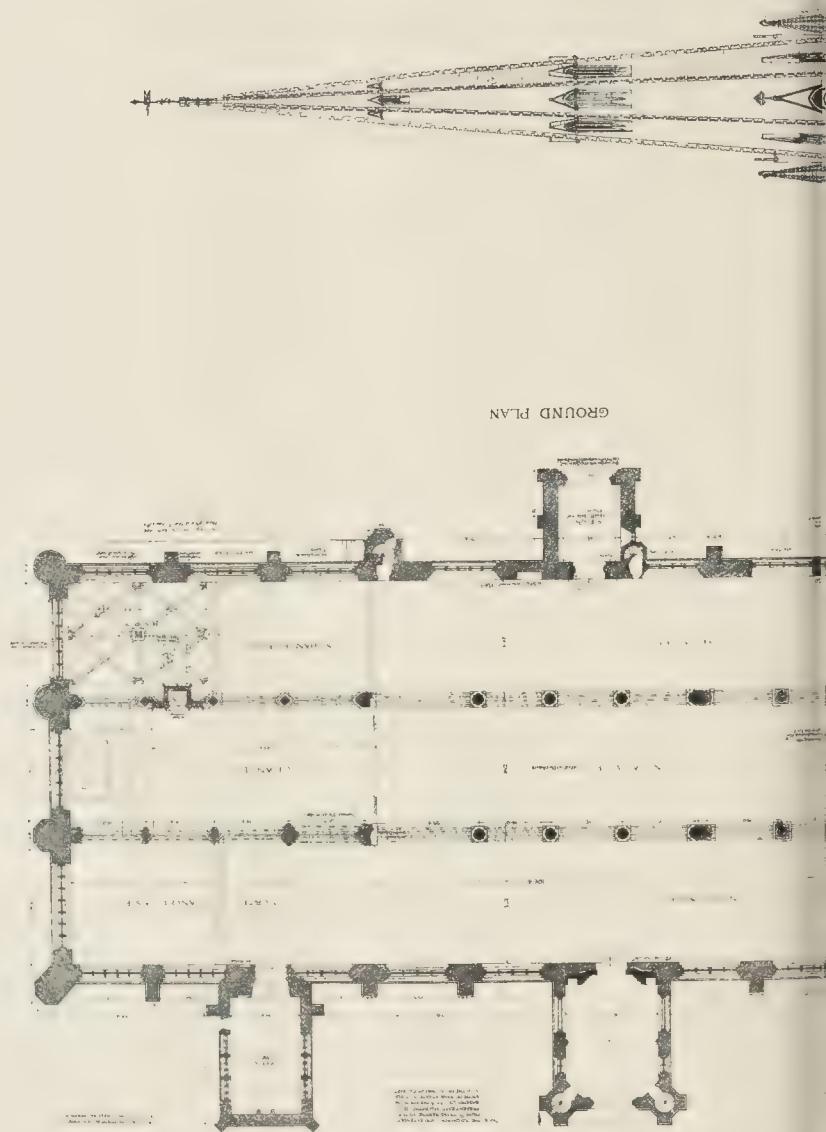


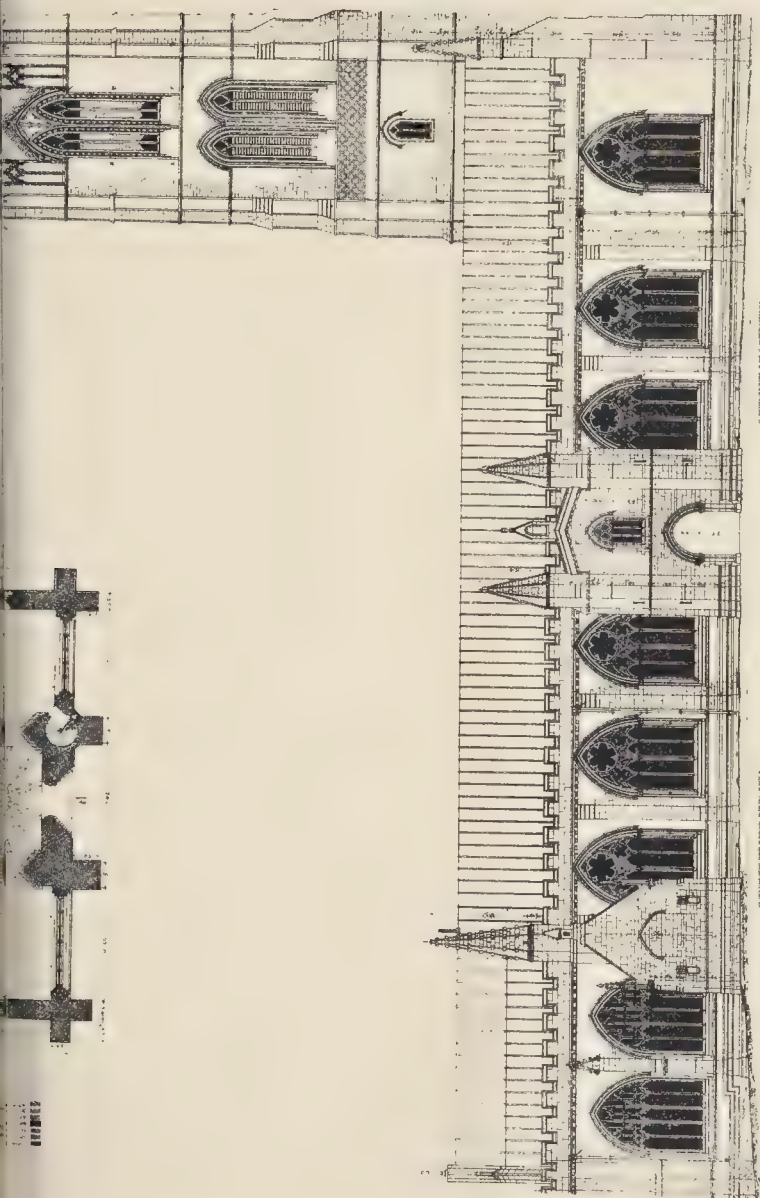






THE BUILDER, MARCH 13, 1886.





NORTH ELEVATION

PHOTO BY THE SPRAGUE & CO. LONDON

GRANTHAM CHURCH, LINCOLNSHIRE. MEASURED AND DRAWN BY MR. E. H. SEDDING.  
AWARDED THE INSTITUTE SILVER MEDAL AND TEN GUINEAS.





## ARCHITECTURAL SOCIETIES.

**Birmingham Architectural Association.**—The sixth ordinary meeting of the current session was held at Queen's College on Tuesday evening last. The Vice-president (Mr. John Cotton) was in the chair. A paper was read by Mr. T. Amm on "Old Stained Glass," which was very ably illustrated by examples taken from various cathedrals and churches at home and abroad. In addition to the different phases of the mediæval art, the lecturer entered into the methods of modern manufacture, and made a statement to the effect that stained glass could be produced in this country to equal both in colour and form that of the Middle Ages. A lengthy and interesting discussion followed at the close of the lecture. A vote of thanks, proposed by Mr. W. Churchill, and supported by Messrs. T. W. P. Newton, J. Cotton, and Victor Scruton (hon. sec.), was heartily accorded Mr. Amm for his paper, and after a response on that gentleman's part, the meeting terminated.

**Leicester and Leicestershire Society of Architects.**—On Wednesday, the 3rd inst., the President, Mr. Everard, entertained at dinner at his house, Woodville, near Leicester, the members of this Society. Thirty-two members, including pupils and assistants, responded to his invitation, and the Mayor of Leicester honoured the society by his presence. After the loyal toasts, Lionel Millican responded for the Volunteers, proposed by Mr. Goodacre. The Mayor, Mr. T. T. replied for the town and trade of Leicester, proposed by Mr. W. Jackson. Mr. Everard proved the toast of the evening, "Architecture at the Royal Institute," which was acknowledged by Mr. Goddard, and the Chairman's wish was then toasted with acclamation and musical honours.

**Northern Architectural Association.**—The annual meeting of this Association was held in Old Castle, Newcastle-upon-Tyne, on the 1st inst., when the following additions were made to the roll of members:—Members, Messrs. W. S. Hicks, A. B. Plummer, and John H. Associate, Mr. James T. Cackett. Assistants, Messrs. Wm. P. Brewis, J. A. Bryson, B. Dick, Alex. Drysdale, W. H. Dunn, jun., C. Hinton, C. J. Marshall, E. Rich, and G. Wilson. The election of officers for the ensuing session was also proceeded with, with the following result:—President, Mr. G. G. Hoskins. Vice-Presidents, Messrs. E. Shewbrooks, and Glover. Hon. Treasurer, Mr. W. L. Newbe. Hon. Sec., Mr. F. W. Rich. Committee, Messrs. W. H. Dunn, J. H. Morton, C. Oswald, Thos. Reay, Wm. Livesey, W. Knowles, and C. E. Oliver. Auditors, Messrs. J. Creswell and J. T. Cackett.

**Edinburgh Architectural Association.**—The eighth meeting of this Association was held on the 4th inst., Mr. G. Washington being, president, in the chair. Mr. John Lachlan read his third paper on "Old Edinburgh Architects," going back to some of the eminent men who lived before the end of the century. Beginning with Sir Wm. Bruce, Cross and Balcaskie, in the time of James II., Mr. M'Lachlan referred to his civil services in connexion with the Restoration, and to his appointment as Master of the Works and Architect to his Majesty. He had been brought up in the school where the Classicism asserted its power, and his principal works were Holyrood Palace and the central portion of Hopetoun House. Dealing with the Mylne family, Mr. M'Lachlan told us they were Master Masons to many successive Kings of Scotland, and they were connected with many important buildings in the town. Having briefly sketched their career, he said that to Robert Mylne we owed the square and Mylne's-court, which were erected as a protest against the narrow lanes of the 17th century, which were so characteristic of the work of previous centuries; the same architect and builder repaired the battlements of Edinburgh Castle after its siege by the Earl of Mar in 1689; while his grandson built the blackfriars Bridge over the Thames, and the latter's brother William was architect and builder of the Edinburgh Bridge. The Adam family were also important in the history of Scottish architecture, one of the most notable of its members being William Adam, who lived in the beginning of the eighteenth century, and who, among other works, designed the wings of Dunfermline House, Floors Haddo House, and the old Edinburgh

Royal Infirmary. On the motion of Mr. Russell, a cordial vote of thanks was awarded to Mr. M'Lachlan for his interesting paper, and the Chairman expressed the hope that he would continue his efforts to give them some account of their professional ancestors.

## ARCHÆOLOGICAL SOCIETIES.

**British Archaeological Association.**—At the meeting of this Association on the 3rd inst., Lieut.-Col. Adams, F.S.A., in the chair, the Rev. Canon Routledge sent for exhibition a piece of Roman carving, probably one of the horns of an ancient altar, found built up in the walling of St. Martin's Church, Canterbury. It had been used as old material in later Roman times, for there are traces of mortar and pounded brick. Sir Henry Dryden sent a squeeze of the newly-discovered Saxon stone at Moulton. It is covered with interlaced patterns with a grotesque animal. Mr. Loftus Brock, F.S.A., exhibited a collection of old views of demolished buildings formerly in the City of London, illustrative of the amount of information to be derived from their study. Mr. Romilly Allen, F.S.A. (Scot.), described a remarkable horn powder-flask of Danish workmanship, bearing a late date, 1697, the curious patterns which covered it being very similar in appearance to the very early work on crosses and in MSS. Mr. R. Blair, F.S.A., exhibited a fine collection of views and sketches of little-known antiquities in the north of England, among which were many Saxon interlaced crosses. The first paper was by Dr. A. Fryer on the "Divining Rod in Ancient and Modern Times." A paper was also read "On the Roman Villa at Box," by Mr. R. Mann. Some curious pavements have been discovered, one of which is remarkable for being all but exactly similar to another found in Gloucestershire. Mr. C. H. Compton stated that the remarkable sculptures found by Mr. Grover in the Athyna Vault, under St. Paul's Chapel, Clapham (and which were described in the *Builder* for Jan. 2 last, p. 60), had been brought above ground and were now safe in the disused mortuary.

**Society of Antiquaries of Scotland.**—At the monthly meeting of this society, held in Edinburgh on Monday afternoon, Dr. Arthur Mitchell in the chair, the first paper was a notice of two very fine Communion cups from Dairinish, Skye, by Professor Macpherson, Vice-President. In form and ornament they closely resemble a pair of cups in the Temple, London, and were supposed to have been presented to the parish by Sir Roderick Macleod, of Talisker. The Rev. Dr. Struthers and Mr. Law, of the Signet Library, followed with some remarks on the forms and uses of several of the vessels, especially the tall covered cup from St. John's Church, Perth, which Mr. Law considered to have been a pyx. The second paper was a notice by Mr. Cochran Patrick and Mr. Thomas Dickson, of Her Majesty's General Register House, on the discovery of the MS. Chartulary of the Monastery of Lindore, in Fife. The Chartulary, which is of the thirteenth century, and written on vellum, was discovered in the library at Caprington Castle, Ayrshire, and was exhibited to the Society by permission of Mr. Smith Cunningham, of Caprington. The third paper was a notice by Professor Duns of an idol human head from Ecuador, now presented to the Museum by Dr. R. H. Gunning. In the fourth paper Mr. Hutcheson gave an account of a stratum containing worked flints at Campbell, Broughty Ferry, which presented some very interesting features, and from which he had made a considerable collection of flakes and cores, which he exhibited to the society. The fifth paper was a notice by Dr. J. Jamieson of the discovery of a cist with an urn at Knockankelly, Arran.

**Medals.**—The Society of Medallists, under the Presidency of the Hon. C. W. Fremantle, Deputy Master of the Royal Mint, has determined to offer 20l. in prizes for medals to be competed for by students of this and other countries. Particulars can be obtained of Professor Legros, of the Slade School, University College, and of Mr. R. S. Poole and Mr. H. A. Grueber, at the British Museum. Medals for competition should be sent to the care of Mr. R. S. Poole, British Museum, on or before the 10th May next.

## COMPETITIONS.

**Paisley New Congregational Church.**—A meeting of the congregation was held on the 3rd inst. to decide upon an architect for the new Church to be erected in School Wynd, the present church having been acquired by the Railway Company. Four Paisley and four Glasgow architects had been invited to compete, and the committee unanimously recommended one of the designs, which was adopted by the congregation. The author was found to be Mr. John B. Wilson, of Glasgow, and he was accordingly appointed architect. The building is to be proceeded with at once.

**Blackburn Poor Law Offices.**—A competition, limited to the architects of the Union, was lately instituted. The Guardians appointed Mr. James Hibbert, architect, Preston, to be professional referee, and to draw up the conditions of competition. Sixteen architects applied for conditions, and six sets of designs were sent in by the following:—Messrs. Stones & Gradwell, Mr. J. W. Bulcock, Mr. W. S. Varley, Mr. H. V. Wolstenholme, Mr. James Aspinall, and Mr. T. H. Duerden, all of Blackburn. On Mr. Hibbert's report the Guardians unanimously accepted the designs sent in by Messrs. Stones & Gradwell, Blackburn. The plans are on public view during this week in the present Board-room. It is intended to proceed at once with the work, which is estimated to cost between 8,000l. and 9,000l.

**New Cemetery at Armley.**—The Armley Burial Board recently offered two premiums of 20l. and 10l. for the best sets of plans of a chapel, mortuary, lodge, and board-room, proposed to be erected on the site recently purchased for a new cemetery for the township of Armley. Forty-three sets of plans were sent in; those prepared by Mr. J. P. Pritchett, of Darlington, and bearing the motto "*Labor et spes*," have been placed first; Mr. Thomas Winn, of Leeds, whose designs were marked "*In perpetuum*," being awarded the second premium. The cost of the buildings is estimated at 1,600l.

**Stretford Local Board Offices.**—At the meeting of the Stretford Local Board last week, it was decided to employ Messrs. Mangnall & Littlewoods to carry out Mr. Gibbons's designs for this building. At a special meeting of the Board previously held, it was reported by the Chairman that Mr. John Gibbons, to whom had been awarded the first premium for his design for new offices, was an assistant in the City Surveyor's Office, and that Mr. C. M'Leod, who obtained the second premium, was an assistant in the office of Mr. W. T. Gunson, so that both of them were unable to carry out their designs. A protracted conversation took place as to the best course to take under these circumstances, and subsequently the Chairman and two of the councillors were requested to seek an interview with Mr. Gibbons and report to an early meeting. As the result of the interview with Mr. Gibbons, the Board decided to employ Messrs. Mangnall & Littlewoods, as before stated.

## ROYAL ARCHITECTURAL MUSEUM AND SCHOOL OF ART.

THE Council, in an address to the subscribers on the work of the Museum and School during last year, say that in most respects they are able to give an encouraging report, especially as to the progress of the School, which now forms a very important part of the whole very useful Institution, the valuable collection of the Museum giving a character to the School that it could not have without it, and the School forming a means of extending the sphere of usefulness of the Museum by bringing, as during last year, nearly 200 students to the building, many of whom came to draw or model from the casts contained in it. "This is the tenth year of the existence of the School as a regular School of Art under the Department of Science and Art. Nearly a thousand students have during that time been educated in art for longer or shorter periods, some of the students having been regularly in the School for over six years; over these not only has there been the influence of a systematic art education by very unusually talented masters, more especially the head-master, Mr. Frederick Brown, well known as one of the best teachers in London, but also of the continued presence of the unrivalled historical collection of works of art, ranging from the age of the Greeks to the present time. 396 works were sent up to the Department



many of which were from the casts in the Museum, including some excellent copies in clay by the modelling class, composed of carvers, masons, and a few young architectural students, whose studies of this character are of the greatest advantage to them."

With regard to the Museum itself, the Council say:—"The Museum was founded thirty-five years ago, and was supported at its foundation by annual subscriptions and donations alone; during the same ten years that the School has increased in funds and students, the subscription list, upon which the whole Institution still so much depends, has, principally from the deaths of subscribers or from the retirement of members of firms originally much interested in the Museum, decreased from 2881. 18s. 7d. in the year 1876 to 1591. 15s. 6d. in 1885." An appeal is made for new subscribers.

The annual public distribution of prizes will take place at the Museum, Tufon-street, Westminster, this (Friday) evening, March 12.

#### BRICKWORK, AND THE LEANING TOWERS OF BOLOGNA\*.

HAVING now considered the construction, we come to the design and proportion of the tower externally. It is a work in which nothing is meagre or vulgar, nothing clumsy or top-heavy. There is no extravagant treatment. By a nice adjustment of parts a result has been arrived at which we may call bold and simple without being crude; light without being flimsy; massive without being cumbersome. I am sorry to be able to say so little about the basement story. But it affects the present outline but little. It is, in any case, effectually concealed by the houses from all points from which the whole could be properly taken in. If these houses were away, the value of its massive basement would no doubt be evident. The next stage is built with little or no diminution in its sides. It terminates in the embattled weathering or set-off, which forms a base high above the surrounding houses. The set-off being as much as 16 in., is strongly marked, although there is no abruptness in the lines by which it is effected. But your attention must be especially directed to the diminution of the shaft of the tower and to its relation to the overhanging parapet. It will be observed from the dimensions that the parapet overhangs beyond the line of the bottom of this shaft, but it is only by 2 in. that it does so. In the photograph it would appear to be almost within this line. But some allowance may perhaps be made for the further diminution caused by the height of the lines extending beyond the proper focus of the lens. The parapet, however, is still more than 14 in. within the plinth line. The square plain drip under the battlements projects 4 in., which might seem, at that height, almost lost. Indeed, with this exception, its only relief consists really in the plain arched corbel course which carries the parapet. There are no deep mouldings, no startling or difficult projection of string-course or of cornice. The parapet, it is true, projects nearly two-thirds of its thickness, but each battlement is backed by a buttress inside, of 16 in. or 14 brick square, weathered off so as to thicken it out to the solid of the wall below. The height of the arched space below the string must be about 5 ft., or a trifle more, and the eplay of the corbel about 6 ft. 6 in., but I had no means of ascertaining those dimensions.

I know not if there be any tradition as to the original intent of these towers, whether they were built out of mere personal vanity, or for the perpetuation of a family name or a family feud. We will hope, however, that one chief object was that of adding a striking feature of an ornamental description to the city. It is certain that the general character of a place depends very greatly upon the style, magnitude, and outline of its permanent public buildings. It is probable that some amount of virtuous emulation led the representatives of the Garisenda family to follow the good example the following year. We can only regret that in some respects the endeavour met with so hapless a result. The height of the Garisenda Tower is said to be exactly 1 ft. more than half that of the Asinelli, but its declination from the perpendicular being in actual measurement half as much again as that of the

other, its proportionate inclination is nearly three times as great, and, if continued to the same height, the top of one side of the tower would, within a few feet, overhang the plinth on the opposite side. But the subsidence in each case is not on the square, but more nearly on one of the diagonals. The towers are planned at an angle with each other, and the subsidence is somewhat towards each other. The appearance of their divergence changes, therefore, with every step you take. To make a proper perspective from geometrical drawings would fairly tax any one's powers of simple geometrical perspective, and certainly the distorted bird's-eye perspective of the Garisenda Tower, as looked down upon from the Asinelli, is very singular.

But we must turn for a moment from the purely practical; for a friend blessed with a sentimental turn of mind has insisted on my giving you a quotation from the thirty-first canto of the "Inferno," as showing its early subsidence, and as illustrating its imposing impressiveness. This appears to have suggested to the poet a grand simile for his visit with Virgil to the tenth circle, "Guil's Last Abyss." You must excuse my not giving it in the original, but I must give you the best I can. With very slight poetic licence, the passage may be rendered thus:—

"And then, at ease to lift me, stooping nigh  
The big Anteus tower'd in the night,  
As when one walks 'neath Garisenda's height  
His lofty battlement, athwart the sky  
Suspended, seems through fleecy clouds to fly,  
Declining fast, to crush the luckless wight  
That looks up spell-bound at the awful sight."

An examination of the foundations and surrounding soil would probably be an interesting and instructive subject of investigation if it could be made. I dare say there are men who would undertake to restore the towers to their upright position, by countersinking the higher side sufficiently to bring it down to the other. The foundation must itself, of course, be one solid mass. How far the footing spreads we have no means of knowing; but we do know how difficult it is to be sure of one's foundation on the slope of a hill of clay or of friable limestone.

I remember, many years ago, a builder telling me of a difficulty which he had surmounted in the erection of a chimney for some gasworks, by a singular and ingenious device. A chimney had been twice built, and twice it had failed. This builder then made himself responsible for its secure erection. The site was not far from the bank of an estuary, and the foundation was unequal and uncertain. The builder judged that if it must sink at all, it ought to be made, or at all events allowed, to sink equally; and therefore had a large block of granite of several tons weight, roughly shaped into a pyramidal form. First of all this block was embedded, point downwards, at a reasonable depth, and from its upturned base was gathered out the walling to the extent required, so as to bring it still some feet below the ground at the proper base of the walls. The chimney was built, and although it subsided nearly 18 in., it sank so regularly as to keep its erect position as nearly as possible.

This brings us, in conclusion, to a more detailed discussion of our own modern brickwork. I am not now going into the various forms of bond, nor yet into the different descriptions of brickwork prevailing in various countries, localities, or ages. The size of the bricks has, as you know, varied enormously, as well as the mode of constructing them. Two centuries ago England produced some of the finest possible rubbed and gauged work. Some of this has been reproduced of late years. It is laid closely with joints of fine lime putty. But the fine facing has necessarily allowed of very little connexion with the rougher work behind it, except by the objectionable use of smaller bricks. Early in the present century it had become the custom to cover the brickwork with compe. From old letters it appears that much of this was done mainly from fashion. Even good old work was covered with compe equally with the poor rough work which this practice induced. The clean smooth surface was supposed to possess the merit and the beauty of fine dressed stone. It prevailed equally elsewhere. In England it is very fast disappearing. In Sweden the practice is deplorable. At Stockholm, last summer, I observed they are able really to produce grand effects in naked brickwork. They make this of a very rough description, having a ready resource in

the compe to give it a finish, and what they would call effect. In a handsome set of flats, I believe it was, drawing towards completion, there were manifest evidences of art and of skill in the treatment as well of the masses as of the details. The grouping and the graduating of the window spaces in the several stories, the arcades, and the deeply-recessed windows gave light and shadow not to be found in any ordinary street in London. And life and spirit, too, were evident when you were just far enough away not to detect the offensive crudeness of the brickwork. With a little more care in the making and laying of the bricks, they would have been in advance of us. Yet they are content to reduce their work to a far lower level.

The character of much modern work is spoiled by the excessive thickness or height of the brick in proportion to its length and breadth. The actual size is of less consequence than the proportion. The size of our own bricks formerly was, of course, regulated very much by the tax on bricks, which was abolished about forty years ago, but from the effects of which we have not yet fully recovered. The brick was made of a maximum thickness and length. Its length is naturally a little under half its length. Its length is still practically regulated by Metropolitan and Local Building Acts and By-laws. Its length must be about 9 in. in order to work in with the thickness of walls usually described in Acts of Parliament. We have not yet arrived at 12 in. and 16 in. as standard thicknesses for solid walls. Even if a new system be adopted occasionally for country houses the old proportions will necessarily be followed for all our ordinary urban or suburban structures. But we are now threatened with large terra-cotta facing bricks. They make a good face, but not a pleasant one. We are painfully conscious of their unpleasant repetitions, proportions, the marked uniformity of their size and colour, and of the structure of the wall made by them. It is probable that these will be available for buildings only on a large scale, where large ornamental detail can be introduced to relieve their pronounced monotony.

In strong and pleasant contrast with these is the thin brick which is now sometimes made, especially when a little time and money are available for their manufacture and use. But even ordinary brickwork must be more costly when a fine and thin joint is employed, and there can be no sufficient reason why this fine joint should be used rather than a thin brick for all ordinary purposes.

The great aim in ancient brickwork seems to have been to secure strength and mass. At the present day we aim at cheapness; and at a display of neatness of finish wherewith to disguise the economy. We are ashamed at the economy, which has become a painful necessity; and we are obliged to put the best possible face upon it.

In several particulars a very false economy has arisen from the mere following of ignorant fashion and tradition. I would speak with special reference to the construction of work almost universally in use. I mean as to the proper filling, or rather the not proper filling, of all the cross-joints and inside joints of the brickwork with mortar. At the present day each brick is carefully laid with only a small fillet of mortar next its outer edge. The bed joint is sometimes done in like manner. This allows of a specious pretence of finishing up the unfilled joints, or portions of joints, from the top. But the more closely the bricks are laid the less is the possibility of the joint getting filled by such means. The flushing of the best case comes but about 4 in. below the top bed. Very curiously such work is always supposed by the bricklayer to be firmer and better than if all the bed joints were properly filled in.

It is actually argued that, like a chair or table standing on three or four legs, so a brick the firmer for having support only at its edges instead of being solidly bedded and jointed into one homogeneous mass. The real result is a series of cavities or pockets in the walls in which the wet is drawn or is driven, and from which, perhaps, it takes weeks to dry, and the drying out at last into the building rather than out of it. The continuous vacuum in the wall is a direct vehicle for the accumulation of water for the saturation of the whole body of the wall. I have seen, on the south coast, bubbling through the inside end of the brick

\* Continuation of a paper by Mr. William White, F.S.A., read before the Architectural Association on the 28th ult. See pp. 368, 388, ante.



header in a 9-in. wall not yet covered with its sprightly weathering. Surely as regards the keeping out of wet it must be evident that the greater the obstruction which can be provided against the wind passing through the body of the wall the better. Then, again, or inner walls and partitions, these cavities greatly tend to make a house noisy. They contribute a lot of little drums to make a great reverberation; and with the slightest shrinkage or settlement, which may indeed be induced by them, we have leaky chimneys and troublesome draughts. It is true the joints allow of a little economy in the quantity of mortar. But at what a loss! They allow of a neater, narrower joint being easily made; a little empty show at the greatest sacrifice of substance, and for the mere gratification of the bricklayer's whim in allowing his infernal fashion, his senseless addition. The inevitable result is a flimsy, noisy, draughty, damp, unsanitary house. Some clerks of works, and some builders, and even their foremen, will profess to see the fallacy of the custom. But, whether they see it or not, they rarely provide any efficient remedy for it. From a long experience can hardly believe that there is a bricklayer in England who has learned his trade in the usual way, but will stick to it, unless the reasons by it is wrong shall have been calmly and respectfully pointed out to him. The intelligent British workman, supposed to inherit and enjoy a traditional experience of centuries, will still be found to follow it, and if you should venture to be a little dogmatic in your opinion as to it, he will be ready to regard you as a born idiot, ignorant of the first principles of his trade, and he will look at you as much as to say, "You, sir, may have your opinion on a matter which you know little about, but I am not going to change mine; not if I know it." How many of you have been told, or have heard out for yourselves, the real origin and fallacy of this custom? And how did it really originate? Formerly, every cranny of the wall was well filled; every brick was well surrounded with mortar, or else with grouting. It was with the grouting, indeed, that the evil of all had its rise. In the days of rougher work and wider joints, there was no difficulty in flushing up the work with mortar or with grout. The bond will not allow you to use the joints in the body of the wall than in the outer face, and as the finer work became the custom, and the joints were left unfilled, it came the custom to specify careful grouting in every course. By degrees, this degenerated to every third, fourth, or fifth course. This partial grouting being really of very little use, was still again reduced, but the narrow joint was left, and it still remains to be a witness to the altered condition.

These evils are but partially remedied by adoption of hollow external walls, to which really this base and hollow system has in rise. The treatment of hollow walls has been much controverted. A great deal is to be said in favour of making the cavity next the outside, as there is also of making it next the inside. Some of the evils caused may be remedied by filling the hollow with a damp-proof concrete, or by rendering with cement against the outer face of the cavity. The cavity of air is considered great service as a non-conductor; but if the cavity is to be filled with air superheated with moisture, or if streams of wet to dribble down its interior, the benefit will be worse than questionable.

A cavity next the inside with only a 4½ in. gap and unfilled joints, is frightfully noisy in a room; and it is not firm for the support of the sills of floors and roofs.

It must draw to a close. If I have been to bring before you anything fresh, or anything worth further discussion or consideration, must thank our worthy President, at whose request I have come forward. I can trust that the subject may prove to be as interesting to you as it has been to myself.

**10th Annual Exhibition of Meteorological Instruments.**—Under the auspices of the Royal Meteorological Society, an exhibition of barometers, and of such new instruments as have been invented and first constructed since the last exhibition, will be opened on Tuesday evening next on the premises of the Institution of Civil Engineers, 25, Great George-street.

## THE DISPOSAL OF SEWAGE SLUDGE.

ASSOCIATION OF PUBLIC SANITARY INSPECTORS.

At the March meeting of this Association, held on Saturday last, at No. 1, Adam-street, Adelphi, a paper was read by Mr. W. Warner, C.E., of Nottingham, on "The Disposal of Sewage Sludge," Mr. Jerram, the Chairman of the Council, presiding.

Previously to the reading of the paper a proposal was unanimously adopted to support the memorial to the Local Government Board of Mr. Rees, late Sanitary Inspector at Guildford, for an inquiry into the circumstances of the dismissal of the memorialist without reason being assigned, after many years of faithful service. The Chairman pointed to the case as an illustration of the insecurity of the tenure of office of the sanitary inspector. Mr. Rees, at the age of 54, when too old to be eligible for a similar engagement elsewhere, had been suddenly discharged, apparently for no other reason than having ventured to bring to the notice of his Board infractions of the sanitary regulations by certain members of the Board itself.

Mr. Warner, after referring at the outset of his paper to an attempt to deal legislatively with the question of drainage as early as the reign of Henry III., to the flogging of John Shakespeare, of Stratford-on-Avon, in 1552, for having a heap of refuse before his house in Henley-street; and to a paper on the subject of drainage by Sir Christopher Wren, in 1678,—fixed upon the date 1855 as the commencement of the new sanitary epoch. In that year the last cesspool disappeared, and in 1858 the gigantic scheme of Sir Joseph Bazalgette was approved by Parliament, the works at the outfall of the main drainage system being opened by the Prince of Wales in 1865. The offensive and dangerous accumulations which soon afterwards manifested themselves at Barking Creek and Crossness disproved, as a Royal Commission had to admit, the theory that sewage could be at once got rid of by being discharged into a tidal river, and a great variety of inventions had been since produced for dealing with raw sewage. These inventions he divided into three classes, according to the three principles of action involved, viz., irrigation, filtration, and precipitation. Excellent results are obtained at Winchester from the irrigation process, and it is more or less successfully operating in Edinburgh, Carlisle, Nottingham, Leamington, Bedford, and some other towns; but the difficulty of finding agricultural land sufficient for a large city almost precludes the adoption of the irrigation principle in the metropolis, and various gigantic schemes for metropolitan sewage irrigation had come to nothing. The more costly filtration and precipitation processes have had to be resorted to in many towns, one of the most successful being in operation at Southampton. The method adopted there was illustrated by a large scale drawing of the works constructed from the plans of Mr. Bennett, C.E. The most important of the three principles was precipitation, in which the liquid sewage is deprived by precipitation of as great a proportion as possible of the solid matter it contains in solution and suspension, by the application of lime, animal charcoal, different alums and clays, ashes, blood, and other matters. The most conspicuous success had been achieved at Aylesbury with a process of this class, where the resultant solid product, native guano, found ready sale at 70s. per ton, and the effluent water was clearer and brighter than the drinking-water of many towns. Alum, clay, animal charcoal, and blood are used in the purifying process at Aylesbury. Good results with analogous processes are said to be obtained at Southampton, Basing, Hertford, and Coventry. The most perfect of the precipitation schemes, that of Mr. Melliss, C.E., as carried out at Coventry, provides a bed of loamy soil wherein vegetables and roots are planted, over which the effluent has to pass after filtration by chemical agents, before it can enter the ordinary water-course. The matter precipitated, termed "sewage sludge," still contains 90 per cent. of moisture, and to extract from 45,000 gallons of it the 2 cwt. of solids they contain is a matter which has employed the highest mechanical skill and inventive genius in the country, culminating in Messrs. Fryer & Alliott's mechanical subsider. Bricks made at Leicester by Mr. Monson, and cement made at Burnley under General Scott's process, are illustrations

of other purposes for which the sludge is utilised. From the purely sanitary point of view, the "Destructor," in which the residuum is destroyed by fire, is the most to be recommended. The plan adopted at Basing under Mr. Jones, C.E., is to pump the sludge into dams containing house refuse, and to burn both in the fiery furnace of a "Fryer's Destructor." The latest developments of mechanical invention have been devoted to a combination of the precipitation and the filtration principles. The invention of Bowing's filter press for yeast and other residues of breweries suggested forms of sewage filter presses which Messrs. Manlove, Alliott, & Fryer, of Nottingham, have successfully produced. According to the calculations of Mr. D. K. Clarke, C.E., each of these presses will treat four times as much as the older forms of press, and twenty of them will suffice for the whole of the sludge of the metropolis, which amounts to 4,000 tons every day. Alliott's sewage-sludge apparatus, recommended by Mr. Lacey, town surveyor of Brentford, after a careful inspection of all the processes in use, is expected to be in operation in a few days.

In the course of the discussion that followed the reading of the paper, further details of the process carried out at Southampton were given by Dr. Angell and Mr. Bennett, who had accepted an invitation to be present at the meeting for the purpose.

Dr. Angell said that during the past year their efforts at Southampton had been mainly directed to getting rid of lime in the purification process. The effluent produced by lime was extremely fetid and favourable to the development and the support of bacteria, which evolved the foulest forms of gas. The lime effluent passed through some very offensive phases, the trouble not being observed immediately on being discharged into the stream, but beginning three or four miles down the river. The materials substituted for lime at Southampton contained what was called occluded oxygen, and the results obtained had been almost marvellous. The filter presses were marvels of skill, but they did not turn out a substance which was of much use afterwards. The resultant cakes in the Southampton process were saleable at 15s. per ton, but unfortunately the time when they were most anxious to be rid of the stuff was just the time when the farmers were the least in want of it. They had to destroy 4,000 tons of it in the summer, and from a purely sanitary point of view he admitted that to burn it was the only proper way of dealing with the sludge.

Mr. Bennett, C.E., gave some explanations with regard to the details of the process adopted at Southampton. It was a combination of several systems. They employed the carbon process for precipitation, Shone's ejector, and finally the destructor.

The chairman and several inspectors took part in the discussion, and a vote of thanks was accorded to Mr. Warner and to Messrs. Angell and Bennett.

## WOODWORK.

SIR,—I am very much interested in Mr. Cruickshank's letter [p. 390, ante] about the woodwork at Beaufort Castle. The few observations I was able to make in my lecture would teach little to those who have made a careful study of the subject, but,—thanks to the *Builder*,—they have penetrated far, and may increase the interest in the treatment of timber which the Carpenters' Company desire to promote.

Modern conditions tend to make the joiner into a machine. The best work he has a chance of doing in the matter of framing is to put together a door with flat narrow panels and heavy bevelled mouldings, and to hang it between jamb-linings and architraves of the most commonplace and mechanical-looking sort. Machinery can do most of this work, and anybody can do the rest. It can be done anywhere and brought over here, so that when the system has reached perfection our joiners will be little more than "fixers." Now there is a vast and little-trodden field for talent in the design and making of a door. What woods shall we use in the different parts and of what substance? How shall the panels be designed, how joined, and with what mouldings round them? The treatment of the door-jambs will give rise to a dozen interesting questions. Few things are so constantly seen or give such solid satisfaction as a handsome door.



way, internal or external. I was once so struck with the appearance of a Dutchman's front door as to forget that I had rung his bell: so he caught me making a sketch of the panels, which were an inch thicker than stiles and rails, raised with a fine bold ogee curve instead of the ordinary splay, and with a nice moulding on the rising. I have drawn dozens of doors on the Continent and hardly recollect one without a raised panel. It is the same with our old panelled doors and such as are still made in old-fashioned places in this country. We can get the best of such work done here now, but the cost scares us.

It is in the village workshop and on large estates that young joiners and carpenters are most likely to find time and encouragement to perfect themselves in skill of hand and to become accomplished in the management of timber in every stage. Where they can get books and papers treating on such subjects, and particularly if they are within the influence of a class in connexion with the City and Guilds of London Institute, they may have all the advantages of Town training unalloyed. I should think also that a good deal of the money that is now being sent out of the country might find a temporary lodging in their pockets. I have just been shown some specimens of architectural carving in oak with the offer to have my own wood sent over to a small Swiss town to be carved to my own design and returned on reasonable terms. I never saw a "Crofter," but I have seen and admired a good number of Swiss village workmen, and I do not think there is anything so very particular about their brain or muscle that he need fear to try his skill against theirs.

THOS. BLASHILL.

#### SEWER VENTILATION.

SIR,—In a recent issue your contemporary, the *Lancet*, favoured the public with its opinions on this important subject.

After severely criticising the many foolish notions prevailing, the writer suggests that all sewers should be ventilated by 4-in. pipes, carried up "as perpendicular as possible," above the roofs of the adjacent houses. If it is intended to carry up the pipes from the centre of the streets, this, no doubt, would have an imposing appearance.

I quite agree with the *Lancet* that a great deal of ignorance prevails on the subject. In my humble opinion, sewer-ventilation, as generally spoken of, is all nonsense. Thorough aeration by surface-grates at frequent intervals, and a perfect system of flushing, bas, in almost every case within a long and varied experience, prevented the generation of the gas altogether; and I contend that this is the only solution of the difficulty. If space permitted, I should be glad to give some practical illustrations, but will content myself by protesting against the system of keeping fresh air out of the sewers and attempting, by impossible pipes, to get rid of noxious sewer-gases, which ought never to be generated.

SANITARY ENGINEER.

March 4th, 1886.

#### PLUMBERS' WORK.

SIR,—Will you kindly allow me, as a general foreman, to reply to "A Practical Plumber" [p. 390, ante], whose experience of us must have been either very limited or unfortunate, and whose cool request for yet another trade privilege is so singularly ill-timed.

Your correspondent overlooks the fact that the trade to which an efficient general foreman has been brought up is but one of the many things that he has to know, and does know. General foremen, as a rule, are not plumbers, and although probably they cannot wipe joints nor make bends, they are capable of superintending plumbing, and certainly know when it is or is not efficiently executed.

I have known men who, after acting for a short time as plumbers' labourers, have by some means obtained work with the tools, and suddenly blossomed forth into full-blown and full-moneyed plumbers, while yet hardly knowing the right end of a trap. Is it to such a man the architects are to issue instructions, in preference to one who, in all probability, has, before becoming a general foreman, acted for several years as deputy foreman, and has therefore been thoroughly educated in the manifold duties required to be performed by him? Carry a "Practical Plumber's" impracticable suggestion to a logical issue, and its absurdity is at once apparent. If the general foreman is incapable of directing the plumbers, he is equally incapable of directing the men of any trade other than that at which he worked, and an architect must, on each of his jobs, act as the builder's general foreman.

If your correspondent would kindly condescend to emerge from the density of mystery in which plumbers from time immemorial have contrived to enwrap themselves and their trade, and to descend

from the lofty pinnacle from which they are accustomed to look down upon their fellow-workmen, and would answer the pertinent questions so ably put to them in your columns by "G. A. M. B.," he would do much good, and would considerably enlighten us.

I agree that plumbing generally costs more than it ought to do, but the remedy lies in a direction contrary to that which he indicates, and I propose, with your permission, to refer to this branch of the subject in your next issue.

March 10th, 1886.

#### LADY ARTISTS.

SIR,—I notice a remark in your issue of Feb. 27 [p. 329], "Men and women who paint with real power are completely on a level now; there are no 'female disabilities' of any kind." This is not entirely accurate. The Society of Painters in Water-Colours (which you proceed to speak of) still maintains its rule that "no Lady Associate shall in any case become a full member." Surely it is time that this absurd anachronism should be reformed!

March 4th, 1886. W. W.

••• We were certainly not aware of that; if it is correct, the sooner the Society alter such an absurd rule the better. The works of one lady, Mrs. Allingham, are among the chief attractions of their exhibitions, and those of the late Mrs. Angell were equally so.

#### The Student's Column.

##### OUR BUILDING STONES.—I.

**T**HE importance of bringing science to bear on the selection of stones for our large public and private buildings is manifest to all who have had to deal practically with the subject. The questions that at first arise are as to what sciences are necessary, and what parts of them particularly apply to it.

The principal object of these articles is to supply material for the outline of a study of the causes which affect the decay of stone, in order that the student may be able to judge of the difference between good and bad building stone, and the selection of stone for particular purposes.

To begin with, after noticing briefly the action of the atmosphere on ancient buildings, we shall pass on to describe the various agents which attack and destroy stone. The artificial methods which have been employed to test the quality and durability of building stones will next be treated of, after which the use of the microscope will be explained in examining them.

A brief description of the common minerals found in the stones, together with their general characters and method of decaying, will be followed by an account of the origin, chemical composition, specific gravity, mode of decomposition, and other characters of some of the principal granites, sandstones, limestones, flags, and slates used in this country for building purposes. The more prominent stones used for ornament will also be described.

The next part will be devoted to the various ways of selecting stone for building, by pointing out where to look for defects and the means of detecting them. The position of the building with reference to the agents which particularly affect the locality, together with some remarks on the best modes of placing stone in building, in order to counteract these deleterious agencies, will then claim attention. The methods which have been employed in hardening stone artificially, and some account of the principal and tried artificial stones, their durability, adaptability for construction and uses as internal ornaments, will form the conclusion.

Much of the work will necessarily be theoretical. Without practice, however, this theory is of little use, and although pointing out the manner in which the theory can be put into practice, the author cannot supply the practical part itself. This rests entirely with the student. No amount of reading can possibly teach anybody the mode of selecting building stones; pieces of the stones themselves must be obtained and studied. How and where to obtain samples of the stone will be pointed out when treating of the examination of stone.

#### BUILDINGS OF THE ANCIENT AND MEDIEVAL PEOPLE.

The ordinary dwelling-houses of the ancient Britons were made of wood and thatched with grass. We learn from Diodorus Siculus, who wrote in the first century B.C. that the Britons

used to store their corn in excavations made in the ground; and this is fully borne out by the numerous remains of these underground repositories, found more particularly in Kent, Essex, and Wiltshire. There can be but little doubt that they also lived in these holes, at least during certain portions of the year, or during a time of danger.

If, however, we may judge from some of the monuments said to have been raised by the Druids, we find that these early people understood the art of working stone for building purposes to some extent.

Stonehenge is an example of this; the trilithons there bearing unmistakable signs of having been rudely shaped and fitted together. When we come to consider the very primitive tools which they must have used in the work, it is marvellous that they should have accomplished such a difficult task. If we may judge from the way in which work is executed by uncivilised people in other parts of the world, the process must have taken a considerable time. The Sarsen stones used in the construction of Stonehenge from their nature are exceedingly durable. They are, no doubt, the remnants of a tertiary deposit and have resisted the action which caused their surrounding rock, when in situ, to decompose and disappear.

Roman masonry was principally of two kinds. The first consists of tiles or flat stones alternating with bands or layers of pebbles or small stones imbedded in mortar. The other variety consists of walls formed of square stones or ashlar, and the interior of rubble imbedded in mortar.

They seem to have discovered at an early period the means of counteracting the destructive action of the atmosphere on their mortar, for we find that after 2,000 years it appears to have undergone little or no change. The Romans understood what does not seem to be comprehended by some modern builders, that, if the work is to be of a durable character, good mortar must be used. The remains of good mortar built in Britain, however, show us that the workmanship in general was inferior to the buildings executed by them on the Continent. The stone, however, employed in building parts of the Roman Wall is of a very durable character, the peculiar tooling of the masonry being quite distinct at the present time.

Many of the works attributed to the Saxons were partly constructed with Roman bricks and tiles. They appear to have tried to imitate Roman work on their capitals, though sculpture is seldom attempted on their doorways.

Illuminated Anglo-Saxon MSS. exhibit "the long and short work" and other distinctive features of the architecture of the period, of which there are examples at Earl's Barton Church, Northamptonshire; Sompting, Sussex; Repton, in Derbyshire; Jarrow, and Monk's Wearmouth; and in the crypts of Ripon and Hexham.

The principal object in view in speaking of the existing examples is to enable the student to see how the stone has lasted in these early buildings. It is necessary, of course, to ascertain which parts of the edifices refer to their respective periods. This, as will be seen, is to some extent been made easy by pointing out the particular parts of the buildings which refer to the period under consideration.

A very useful list of ancient buildings, with the state of their preservation, may be seen in Gwilt's "Encyclopædia," pp. 470-478.

We have good evidence for believing that the architects of the Middle Ages exercised care in selecting the stone used in their substantial edifices. Amongst other things, we know that Caen stone was brought from Normandy, held in high repute by them, and was largely employed. We may specially notice that it was used in the Temple Church, and parts of Winchester and Salisbury Cathedrals.

Stone derived either from Normandy or England was not uncommonly employed in Ireland, in structures of the eleventh and twelfth centuries.\*

The art of stone-cutting appears to have reached its highest development at the commencement of the sixteenth century; the works of this date exhibiting a perfect mastery of the subject.

About the beginning of the seventeenth century the celebrated Portland stone came into use.

\* Wilkinson's "Ancient Architecture of Ireland," pp. 84, 86.



to be generally used. The various important buildings constructed with this and other well-ried stones used in buildings of subsequent date, will be treated of when the stones themselves are described.

# RECENT PATENTS.

## ABSTRACTS OF SPECIFICATIONS.

2,404, Ventilating Buildings, &c. G. F. Harrington.

In arrangements for supplying fresh air to the spaces to be ventilated, self-revolving cowls provided with vanes to cause them to face the wind are employed, and may be of a swan-neck form, with mouths of about double the area of their throats. When employed to ventilate drains the cowls are made of a special shape. They are trapped with oil to prevent the escape of wind between them and their shafts, which lead to the spaces to be ventilated.

2,352, Supporting Window Sashes. F. W. Croft.

A wooden roller rests between the edge of the sash and a curved strip of metal pivoted at its upper end, and pressed toward the sash by a spring. When the sash is raised the roller rises and allows it to slide freely, but when the sash is released the roller is pressed against it and holds it. The strength of the spring is adjusted by means of a clip.

11,425, Wood-planing Machines. J. Dent and J. Holt.

Scrapers are formed from a thin plate of steel, and are clamped between metal plates. These scrapers are pressed against the rollers of the planing-machine, and clean them while the machine is in work.

13,493, Manhole Cover for Drains. H. Colley.

The cover has a bevelled edge, and is provided with an annular vertical projection, which drops into a groove filled with glycerine.

14,120, Door Furniture. J. Walker.  
In the form known as Maco's door furniture an improvement is introduced. A rose is stamped in a circular blank, and a central hole made in the edges of the metal round the hole are raised up finally pressed down on the rim of the barrel handle.

15,908, Closing Doors. R. S. Moss.

Permanent magnets are used to close and keep closed doors, &c. A magnet is bedded in the jamb, a piece of steel attached to the door, so that if the door be nearly closed the attraction of the magnet will shut it.

16,781, Window-sash Fastener. J. Walker.  
An arm turns on a pivot on the meeting rail of the sash in the usual manner. A projection on its outside engages in a slot on the slide, and which is drawn across the joint when the arm is pulled inward.

# NEW APPLICATIONS FOR PATENTS.

Feb. 23.—2,787, A. Pilling, Latches or Locks for Doors, &c.—2,789, D. Swan, Pigments.—2,803, T. Mario, Overflow Pipes for Syphon Cisterns.—2,804, F. Lambert, Letter Boxes.

Feb. 27.—2,841, A. Pilling, Self-closing Doors.—2,842, R. Baird, Frames and Sashes of Windows.—2,843, H. Owen, Chimney or Ventilator Top.—2,861, T. Mario, Water-waste Preventer.—2,872, R. Mario, Self-closing Window Fastenings.

March 1.—2,896, W. Ross, Water Waste Preventers.—2,923, W. Martin, Fasteners for Window Tenders.

March 2.—2,949, J. Sowden and W. Cowan, Hooks.—2,957, J. Cundall, Attaching Door-knobs and Latches.—2,961, J. Davis, Fanlight Covers.—2,967, J. Hicks and C. Tight, Levels.—2,968, A. Boulton, Ventilators.

March 3.—3,002, A. J. Fletcher, Intercepting Traps for Sewers.—3,003, J. Fletcher, Ventilating Covers for Sewers.—3,006, H. Watson, Water Taps.—3,012, Hill, Balancing Window Sashes.—3,019, J. Ham, Ventilators for Windows.—3,037, J. G. Artistic Exposing and Erecting of Gas Buildings.—3,043, H. Hampton, Cramps or Clamps.—3,044, C. Ventilators.

March 4.—3,073, E. Cheetham, Connecting Pipes.—3,074, T. Weekes, Portland Cement.—3,106, H. Owen and Others, Electric and Magneto Bells.

# PROVISIONAL SPECIFICATIONS ACCEPTED.

43, V. Schneider, Automatic Water-waste Preventers.—799, C. Hurdle, Wall or Ceiling Ventilators.—1,036, E. Hawks, Screws, &c.—1,075, A. Service Cisterns and Valve for Water-closets.—86, F. Wendling, Paint.—1,088, H. Hunting, A. Teller, Mortising and Dovetailing Machines.—23, C. Allen, Cements or Plasters.—1,156, Ott, Securing Knobs or Handles to Doors.—1,157, M. Conrath, Embossed Material for Decorating Walls, &c.—1,222, J. O'Callaghan, Securing Handles or Knobs to Spindles.—1,372, Watson and H. Moorwood, Fireplaces, &c.—1,373, A. Trud, Pipes for Drains, Sewers, &c.—1,374, A. Gatten, Bakers' Ovens.—1,394, J. Brewster, Heating and Cooling Buildings.—1,913, E. Short, Chimney and Ventilating Cowls.—11,029, G. Grove, Cooking Range.—15,088, M. Buckner, Windows.—15,741, J. Buchanan, Locks.—905, T. Young, Door-lock Spindle.—1,089, A. Shaw, Water-closet Cisterns.—1,218, C. Glossop, Basin for Drain Cisterns.—1,233, W. Bartholomew and E. Reynolds, Flushing Syphons.—1,243, A. Fould and P. Genereux, Refractory Bricks, Tiles, &c.—1,319, J. Pickstock, Excluding Rain, Dust, and Draughts from Doors and Windows.—1,332, E. Hill, Supporting Window Sashes.—1,414, J. Haley, Glass Tiles.—1,513, T. Speight, Joiner's Bench Hooks.—1,663, T. Melvin, Floor Cloths and Tiles.—1836, J. White, Portland Cement.—1862, R. Hunter and J. Turnbull, Kitchen Ranges.

# COMPLETE SPECIFICATIONS ACCEPTED.

## Open to opposition for two months.

3,273, E. Taylor, Fireplaces for Consuming Smoke, &c.—4,247, G. Crowe and W. James, Flushing Apparatus for Water-closets.—4,721, J. Fell, Pneumatic Door Check Spring.—4,751, J. Garrett, Earth Closet.—5,639, R. Hodges and F. Lilley, Adjusting Door Knobs to Spindles.—5,773, H. Y. Hall and J. Thomson, Water-waste Preventer.—6,133, E. Cammies, Bricks.—14,253, C. Garlick, Stench Traps.—1,091, J. Peckover, Stone Saws.—1,168, D. Winter, Automatic Door Closer and Check.—6,121, J. Weston, Door Springs.—6,748, V. Schneider, Automatic Water-waste Preventers.—6,849, J. Denny, Bricks, &c.—7,343, W. Riches, Hinges.—8,339, A. Edmondson and Others, Step Ladder Hinge.—1,165, A. Boulton, Syphons for Flushing Cisterns.

# RECENT SALES OF PROPERTY.

## ESTATE EXCHANGE REPORT.

### MARCH 1.

#### By R. TUDMAN.

Islington—29 and 27, Cleveland-road, 68 years, ground-rent 9l. £795

### MARCH 2.

#### By VENTNOR, BUTLER & COOPER.

West Kensington—37 and 39, Glasbury-road, 90 years, ground-rent 13l. 1,620

81, 83, and 85, Talgarth-road, 90 years, ground-rent 26l. 2,300

Whitechapel—10, Leman-street, Freehold 1,350

### By H. RUTLEY.

Lee—46 and 48, Turner-road, 70 years, ground-rent 7l. 600

### By F. FARMER.

South Hampstead—116, Belsize-road, 68 years, ground-rent 8l. 400

### By W. J. J. NEWELL.

Lewisham—18, Evelyn Terrace, 98 years, ground-rent 5l. 140

### By DEBENHAM, TAYSON, & CO.

City—40, Cornhill, Freehold, area 770 feet. 14,000

Edgware-road—No. 156, Freehold, area 3,160 feet. 4,100

### MARCH 3.

#### By BRAY, WEBB, & CO.

Sydenham—Freehold Ground-rents, 160l. 18s. 3,775

reversion in 33 years. Freehold 900

St. Luke's—39, Central-street, Freehold 415

Islington—72, Canonbury-road, 33 years, ground-rent 21l. 1,610

Tottenham—1, 10, and 12, Grove-place, Freehold 465

Islington—127 and 135, Balls-pond-road, 17 years, ground-rent 11l. 7s. 600

### By E. & F. SWAIN.

Notting-hill—2 to 5, Heathfield-street, Freehold ... 600

### MARCH 4.

#### By A. WALTON.

South Norwood—1 and 2, Clifton Villas, 67 years, ground-rent 10l. 405

Victoria Dock, Freeman's-land—Freehold 929

Ground-rents of 42l. a year 330

Wrightman-street—Freehold Ground-rent of 14l. 16s. a year 470

22l. 10s. a year 100

### By J. G. & A. PERVOET.

Midle End, Moody-street—A Plot of Freehold Land 845

Canonbury—23, Petherton-road, 63 years, ground-rent 10l. 1s. 845

Barbary—29, 31, and 33, Pulteney-street, 18 years, ground-rent 18l. 415

Dalston—38, Blomfield-street, 51 years, ground-rent 3l. 223

Edgware-road—Nos. 456 and 114, North-street, 40 years, ground-rent 46l. recently burned down, including policy for 70l. 755

No. 458, Edgware-road, 40 years, ground-rent 34l. 715

Stratford, Buxton-road—The Buxton Arms, Freehold 865

Islington—137, Liverpool-road, 13 years, ground-rent 7l. 185

De Beauvoir Town—29, Balme-road, 42 years, ground-rent 4l. 380

Commercial-road, E.—68 and 60, Charles-street, 7 years, 8l. 13s. 6d. 75

Plainton—19, Beale-street, Freehold, &c. 170

By FARMER, BUTLER, & CO.

Hackney-road—Ground-rents of 28l. a year, term 20 years 490

By WORSFOLD & HAYWARD.

Dover—38, Smeaton-street, 46 years, ground-rent 8l. 350

26, Trevanion-street, Freehold 390

8 and 4, York Terrace, Freehold 540

MARCH 5.

By F. OGDON & SON.

Brompton-road—No. 134, with Stabling, Leasehold 650

Walham-green—30 and 32, Britannia-road, 70 years, ground-rent 9l. 570

By FARMER, BUTLER, & CO.

Leytonstone—Ground-rent of 3l. 10s. reversion in 79 years 73

Ground-rents of 28l. reversion in 68 years 620

Islington—9, Midway-grove, Freehold 1,350

Ground-rent of 7l. reversion in 75 years 180

# MEETINGS.

## SATURDAY, MARCH 13.

Architectural Association.—Visit to Houses now being erected in Kensington Court. Members to assemble at 8 p.m.

## MONDAY, MARCH 15.

Royal Institute of British Architects.—Mr. John B. Cass on "Some American Methods." 8 p.m.

Society of Arts (Cantor Lectures).—Mr. Boverton Redwood on "Petroleum and its Products." 11. 8 p.m.

Victoria Institute.—8 p.m.

Philosophical Society of Glasgow (Architectural Section).—(1) Paper by Mr. W. Cairns on "Plumbers' Work." (2) Annual Business Meeting.

## TUESDAY, MARCH 16.

Institution of Civil Engineers.—Discussion on Mr. Dugald Clerk's paper "On the Explosion of Homogeneous Gaseous Mixtures." (2, time permitting) Three papers will be read on "The Economical Construction and Operation of Railways in newly-developed Countries, or where small returns are expected," by Mr. Robert Gordon, Mr. J. B. Mosse, and Mr. G. C. Cunningham. 8 p.m.

Manchester Architectural Association.—Mr. John Holden on "The Duties and Requirements of an Architect's Practice." Nomination of Officers. 7.30 p.m.

## WEDNESDAY, MARCH 17.

Carpenters' Hall, London Wall.—Mr. John Slater, B.A., on "Concrete." 8 p.m.

British Archaeological Association.—(1) Mr. W. de Gray Birch, F.S.A., on "The Legendary History of St. Nicholas of Myra." (2) "Notes on Haslemere," by Mr. Thomas Morgan, F.S.A. 8 p.m.

Builders' Foremen and Clerks of Works' Institution.—Ordinary Meeting. 8.30 p.m.

Society of Arts.—Mr. Vincent Robinson on "Eastern Carpets." 8 p.m.

Royal Meteorological Society.—Mr. William Ellis will give "A Brief Historical Account of the Barometer." at 7 p.m., after which the members will adjourn to the Exhibition of Barometers and other Instruments, at 25, Great George-street.

## THURSDAY, MARCH 18.

Society of Antiquaries.—M. Gaillard on "A Manufactory of Flint Implements at Beger, Gallienne." 8.30 p.m.

St. Paul's Ecclesiastical Society.—Mr. Charles Browne on "The Knights Templars." 7.30 p.m.

Dundee Institute of Architecture.—Mr. W. Mackintosh on "Environment." 7 p.m.

Edinburgh Architectural Association.—Mr. Hippolyte J. Blanc on "A Few Characteristics of Scottish Ecclesiastical Architecture." 8.30 p.m.

York Architectural Association.—Mr. Walter G. Penty on "Terra-cotta." 7.30 p.m.

## FRIDAY, MARCH 19.

Society of Medical Officers of Health.—Dr. Louis Parkes on "The Sanitary Condition of Poor Districts in the Metropolis, with special reference to their water-closet accommodation." 7.30 p.m.

University College.—Professor C. T. Newton, C.B., on "Greek Myths Illustrated by Fictile Vases and other Monuments." III. 4 p.m.

## SATURDAY, MARCH 20.

St. Paul's Ecclesiastical Society.—Visit to the Charterhouse. 8.15 p.m.

# Miscellaneous.

## The New London Hospital Medical College.

On Tuesday last the corner stone of the new buildings was laid by Mrs. William James Thompson, the wife of the Chairman of the College Board. The college, which is being almost entirely rebuilt, is to be carried out in a free treatment of the Renaissance style, the architectural features being in red brick, the building generally being faced with yellow bricks. The building will, when the works are completed, be well fitted for the high position the college holds among medical schools, being attached to the largest general hospital in the kingdom. The library will be an especially fine room, and the extra cost of decorating it is borne by subscriptions from the staff and other friends of the college, and in future all prize-givings, &c., will take place therein. The building is being carried out from the designs of Mr. Rowland Plumbe, architect; and the builder is Mr. W. Goodman, of Hartham Works, Hartham-road, Holloway, N., who have just completed the new Nursing Home, which has been built by the hospital authorities to accommodate over 100 of the nurses and probationers. Mr. Thornhill, the surveyor to the hospital, is acting as clerk of the works.

Obituary.—Mr. G. Bouverie Goddard, an animal painter, whose numerous works have from time to time been favourably noticed in these columns, died at his residence, on Brook Green, Hammersmith, on Saturday, the 6th inst., after a short illness, due to exposure to this bitter weather. He will be remembered best by his large picture of Lord Wolverton's Bloodhounds, which was exhibited in the Royal Academy rooms in 1875, and his "Struggle for Existence," bought from the Academy walls by the trustees of the Liverpool Walker Fine Art Gallery. His later works, "Rescued" and "Love and War," showed him to have attained a mastery over the technique of his art which promised him a successful career as a painter of the special class of subjects to which he had devoted his talents. He was but fifty-two years of age at his decease.



**The London Parcels Delivery Company's New Offices and Stables.**—A new block of buildings for the London Parcels Delivery Company, consisting of offices, stables, and vans, has just been erected in Rolls-place, Fetter-lane, on a vacant plot of land immediately to the west of the new Birbeck Institute. The Rolls-place frontage is about 40 ft. in length, the premises being carried to a depth of upwards of 100 ft. northward, in the direction of Bream's-buildings. They consist of a deep basement, together with ground and two upper floors. The ground-floor portion of the frontage is carried up by massive piers in blue Staffordshire brick, the upper storeys being faced with stock brick. About one half of the area of the ground-floor is intended for offices, and the remaining portion to the rear for the Company's vans, access being obtained by a central gateway. The first floor will be occupied as stables, whilst the second floor will be appropriated as fodder-stores. All the floors, from the basement upwards, are supported on iron columns; and, as a precaution against the outbreak of fire, every floor is fireproof, as well as the roof of the building. Mr. W. S. Witherington is the architect, and Messrs. Patman & Fotheringham are the contractors. The cost of the building will be about 6,000l.

**Extensive New Suburban Building Undertakings.**—Several extensive building projects are at present in course of development in the neighbourhood of Earlsfield, Garret-lane, Wandsworth. The Maxwell Farm Estate, belonging to Magdalen College, Oxford, containing 240 acres, extending from the boundary of the London and South-Western Railway on the north, to Barnetwood-lane on the south, and stretching from its western boundary in Garret-lane to Trinity-road, and the high ground in the neighbourhood of Wandsworth County Prison, on the east side, is about to change its present agricultural character, the owners having decided to lay it out for building purposes. Between five and six miles of roads will be formed on the estate by the College authorities. It is estimated that the estate will admit of the erection of no less than 6,000 houses. On the north side of the railway an estate, having its frontage in Earlsfield-road, and stretching northwards in the direction of St. Anne's Hill and Wandsworth Old Town, has been purchased by the British Land Company, who have laid out several roads for the erection of upwards of 600 houses.

**The War and Admiralty Office.**—Referring to the memorial of the Institute on this subject (see *Builder* for last week, p. 367), the *Saturday Review* says:—"None too soon, but, we should trust, not hopelessly too late, the Royal Institute of British Architects has bestirred itself in the discharge of duties for which it exists, and struck a blow to save London from a great architectural calamity. The question is not one of better or worse, but of the creation or rejection of that great main avenue of London, an avenue of varied interest and of unequalled historical association, of which the eastern terminus would be St. Paul's, then Fleet-street and the Strand, then Charing Cross, and then the leafy Mall and Buckingham Palace. All these familiar names and famous spots would be, were the scheme of the Institute to be adopted, brought into one street. Is this an occasion to palter and huckster?"

**Woodworking Machinery.**—Messrs. A. Ramsome & Co., of Stanley Works, Chelsea, have sent us their new illustrated catalogue of patented and improved woodworking machinery manufactured by them. It consists of upwards of 200 pages, and is very fully illustrated. The letterpress descriptions are copious and clear, and the catalogue will certainly be of great assistance to intending purchasers and users of woodworking machines, which are now exceedingly numerous and varied in their powers. The catalogue will be found very useful for reference in builders' offices.

**The Hyde Park Corner (New Streets) Bill.**—In the House of Commons last week this Bill was read a second time and referred to a Select Committee. Mr. Leveson-Gower, in moving the second reading of the Bill, explained that the necessity for its introduction had been brought about by the changes which were made at Hyde Park-corner in 1883. Usually new streets were maintained by the parish in which they were situated, but in the present case difficulties arose.

**Voussoir Arches.**—At the Students' meeting of the Institution of Civil Engineers, held on Friday, 26th ult., Mr. W. H. Barlow, F.R.S., past-President, in the chair, Mr. H. A. Cutler read a paper on the "Stability of Voussoir Arches." The author asserted that at the commencement that the mathematical analysis of stresses, though more strictly accurate, is in most cases so complicated that the graphic method is preferred, not only for its simplicity and expedition of solution, but also for the readiness with which errors may be detected by it. The factor of safety required in practice so limits the application of theory that rigid accuracy in the determination of stresses is unnecessary. The tenacity of mortar being disregarded, the voussoir arch is not capable of resisting a bending moment, and may be considered as hinged at every bed joint in the arch ring. To investigate the stability of an arched structure by the graphic method, it is first necessary to find the correct curve of equilibrium for the dead load, or weight of the structure, and then assume the live load acting on one half the arch, while the remaining half is unloaded, and to construct a second curve, both of which should satisfy certain conditions. In voussoir arches, in almost all cases, both the dead and moving load may be considered as acting vertically. When the curve of equilibrium does not fall within the arch-ring a bending moment is produced, tending to increase the curvature of the arch lying inside the neutral line, and to diminish it if lying outside. Voussoir arches not being capable of resisting a bending moment, the condition to be fulfilled is that the curve of equilibrium must practically coincide with the neutral line. The arch would not collapse so long as the curve was everywhere within the depth of the arch-ring, but when close to the edge nearly all the strain is taken through a small portion of the voussoir. Prof. Rankine limited the curve of equilibrium to the middle third of the arch-ring, which may be accepted as a simple practical rule. The curve of equilibrium is found by fixing the points in the curve somewhere within the middle third, at the crown and springing. If the deviation of the curve from the neutral line be not within the limit at every other point, either the loading, the curve of the arch, or the depth of the voussoir must be altered.

**The London Sewage Question.**—At the meeting of the Metropolitan Board of Works this Friday, March 12th, the Works and General Purposes Committee will present a report detailing the several steps taken for the precipitation and deodorisation works in connexion with the metropolitan sewage, and recommending that letters, founded upon the Report, be addressed to the Secretary of State and the Erith Local Board of Health in reply to their communications on the subject. Also recommending that the Engineer and Chemist be authorised to incur the working expenses necessary for the treatment by precipitation, &c., of nine millions of gallons of sewage daily at Crossness, such expenditure not to exceed the sum of 7,000l.; and that the necessary wooden tanks, &c., required for deodorising purposes be erected at various points on the lines of main sewers within the metropolis, at a cost of about 1,000l.—At the last meeting of the Board, Mr. Fardell called attention to the subject, on the ground of urgency, in view of the approaching summer; but for presuming to suggest that the Committee might at any rate report piecemeal, like some Royal and Parliamentary Commissions, he raised quite a hornet's nest about his ears, although, as a sympathiser suggested, his only desire was to "oil the wheels" of the Committee, and, consequently, to accelerate their motion. At the same meeting of the Board the further consideration of the Report of the Special Purposes and Sanitary Committee on the Cleansing and Ventilation of Sewers, already noticed by us, was again deferred for a period of six weeks.

**Relief to the Unemployed.**—Owing to the prevailing distress Messrs. Perry & Co., builders, Tredegar Works, Bow, have inaugurated an unemployed relief fund, which is to last several weeks. Their employees have responded liberally to it, the firm adding their weekly contribution. A number of cases have been investigated by the committee appointed, the result being that relief is afforded expeditiously.

**Sanitary Institute of Great Britain.**—The Autumn Congress and Health Exhibition of this Institute will be held in the City of York in September next.

**Royal School of Mines.**—Professor Warrington Smyth, F.R.S., in concluding his lectures on mining, in the theatre of the Geological Museum, Jermyn-street, said, there can now be no doubt that the Newcastle roads, as the tramways were called, were in use long before the introduction of iron rails, wooden beams being employed; the wear and tear there soon caused them to lay an iron plate on the top. About the same time, Mr. Curr, of Sheffield, proposed various improvements in underground transport. Among these was the laying down of tram plates,—a simple iron plate with a flange to it,—which was so great an improvement that one horse could then draw several carriages. The rails were first of a very simple character, merely a bar of iron let into a slot; in those broad wheels run, but the wear is so considerable that where there is a large amount of material to be carried the rails approach to the kind in use on surface railways. Nothing, perhaps, is more frequently employed on mining railways than the bridge rail so familiar on the Great Western Railway; the T-headed rail and the double T-headed are also sometimes used; while another form often adopted is that of a T-rail, with a broad base, in which are a number of holes for spiking it down. These rails weigh 12 lb. to 15 lb. to the yard, or, where special strength is required, as much as 25 lb. A common gauge for underground mining railways is 2 ft., in other cases 18 in., while in others again, as in the ironstone mines of the North, where they work with large quantities of timber, it may be only 12 in. In conclusion, the lecturer took occasion to impress upon the students the necessity in all mining operations of a thorough knowledge of geology and mineralogy, by which, on the one hand, we learn to recognise what are the best districts in which to search for mineral, and on the other, to recognise the minerals themselves, as also those with which they are usually associated, and particularly in order to determine what is the relation between two sets of rocks.

**Housing the Working Classes.**—The nineteenth annual general meeting of the Artisans', Labourers', and General Dwellings Company, Limited, was held on Tuesday, 11th inst., Mr. Ernest Noel, M.P., presiding. The report showed that the rental for the year 1885 amounted to over 90,000l., the net revenue being 61,494l., out of which interest dividend upon the preference and ordinary capital amounting to 28,621l., had been paid. It was now proposed to pay a dividend of five per cent. on the ordinary share capital for the second six months of the year, carrying over 4,000l. of revenue to reserve, and 1,141l. to next year's accounts. The increase of capital during the year had been 62,450l.; the total amount paid up to 31st of December was 1,234,310l., the authorised capital being 1,000,000l. in ordinary shares, and 750,000l. in preference shares 4 per cent. The completed estates of the company in London are Shaftesbury Park, S.W., at Queen's Park, W., comprising nearly 3,400 separate houses. At Noel Park, N., the new estate of the company, work had progressed so that at the close of the year 974 houses were completed, 680 being let and occupied. The estate when completed will comprise 2,600 houses. The directors have acquired a good site of over an acre in Lisson-grove for the purpose of erecting block-buildings as dwellings for the Industrial Classes. The report of accounts having been adopted, and the dividend of five per cent. declared, the retiring directors and auditors were re-elected, and vote of thanks concluded the proceedings.

**Tunbridge Wells Water Supply.**—In the *Builder* for the 19th of December last, p. 81, we reported the completion of the new storage reservoir at Pembury, and printed the speech of the engineer (Mr. Brentnall) describing the work, in which there were some departures from ordinary practice in carrying out such undertakings. We are sorry to learn from the *Tunbridge Wells Gazette* that a month ago was discovered that there was a leakage in the reservoir, and, on the reservoir being emptied several cracks were found in the asphalt forming the bottom of the reservoir.

**A Knighthood for an Engineer.**—It is stated that the Queen has signified her intention to confer the honour of knighthood upon Mr. Charles Douglas Fox, of Coombe Springs, Kingston-on-Thames, in connection with the engineering work of the Mersey Tunnel.



**Gift to the Wolverhampton Art Gallery.**  
The *Wolverhampton Chronicle* announces that a new gallery picture has been offered to the town through his Worship the Mayor, by Mr. Councillor Ross. It is the work of John Wilson, sen., B.S.A. The subject is a stormy sea seen from a wild shore near the Bass rock.

**PRICES CURRENT OF MATERIALS.**

TIMBER.			
	£.	s.	d.
Greenheart, B.G. ....	ton	6	0
Lat. E. I. ....	ton	12	0
Logwood, U.S. ....	foot cube	0	2
Sh. Canada ....	load	3	0
Red Pine ....	load	3	0
Red Pine, 2nd. ....	load	3	0
Red Pine, 3rd. ....	load	3	0
Red Pine, 4th. ....	load	3	0
Red Pine, 5th. ....	load	3	0
Red Pine, 6th. ....	load	3	0
Red Pine, 7th. ....	load	3	0
Red Pine, 8th. ....	load	3	0
Red Pine, 9th. ....	load	3	0
Red Pine, 10th. ....	load	3	0
Red Pine, 11th. ....	load	3	0
Red Pine, 12th. ....	load	3	0
Red Pine, 13th. ....	load	3	0
Red Pine, 14th. ....	load	3	0
Red Pine, 15th. ....	load	3	0
Red Pine, 16th. ....	load	3	0
Red Pine, 17th. ....	load	3	0
Red Pine, 18th. ....	load	3	0
Red Pine, 19th. ....	load	3	0
Red Pine, 20th. ....	load	3	0
Red Pine, 21st. ....	load	3	0
Red Pine, 22nd. ....	load	3	0
Red Pine, 23rd. ....	load	3	0
Red Pine, 24th. ....	load	3	0
Red Pine, 25th. ....	load	3	0
Red Pine, 26th. ....	load	3	0
Red Pine, 27th. ....	load	3	0
Red Pine, 28th. ....	load	3	0
Red Pine, 29th. ....	load	3	0
Red Pine, 30th. ....	load	3	0
Red Pine, 31st. ....	load	3	0
Red Pine, 32nd. ....	load	3	0
Red Pine, 33rd. ....	load	3	0
Red Pine, 34th. ....	load	3	0
Red Pine, 35th. ....	load	3	0
Red Pine, 36th. ....	load	3	0
Red Pine, 37th. ....	load	3	0
Red Pine, 38th. ....	load	3	0
Red Pine, 39th. ....	load	3	0
Red Pine, 40th. ....	load	3	0
Red Pine, 41st. ....	load	3	0
Red Pine, 42nd. ....	load	3	0
Red Pine, 43rd. ....	load	3	0
Red Pine, 44th. ....	load	3	0
Red Pine, 45th. ....	load	3	0
Red Pine, 46th. ....	load	3	0
Red Pine, 47th. ....	load	3	0
Red Pine, 48th. ....	load	3	0
Red Pine, 49th. ....	load	3	0
Red Pine, 50th. ....	load	3	0
Red Pine, 51st. ....	load	3	0
Red Pine, 52nd. ....	load	3	0
Red Pine, 53rd. ....	load	3	0
Red Pine, 54th. ....	load	3	0
Red Pine, 55th. ....	load	3	0
Red Pine, 56th. ....	load	3	0
Red Pine, 57th. ....	load	3	0
Red Pine, 58th. ....	load	3	0
Red Pine, 59th. ....	load	3	0
Red Pine, 60th. ....	load	3	0
Red Pine, 61st. ....	load	3	0
Red Pine, 62nd. ....	load	3	0
Red Pine, 63rd. ....	load	3	0
Red Pine, 64th. ....	load	3	0
Red Pine, 65th. ....	load	3	0
Red Pine, 66th. ....	load	3	0
Red Pine, 67th. ....	load	3	0
Red Pine, 68th. ....	load	3	0
Red Pine, 69th. ....	load	3	0
Red Pine, 70th. ....	load	3	0
Red Pine, 71st. ....	load	3	0
Red Pine, 72nd. ....	load	3	0
Red Pine, 73rd. ....	load	3	0
Red Pine, 74th. ....	load	3	0
Red Pine, 75th. ....	load	3	0
Red Pine, 76th. ....	load	3	0
Red Pine, 77th. ....	load	3	0
Red Pine, 78th. ....	load	3	0
Red Pine, 79th. ....	load	3	0
Red Pine, 80th. ....	load	3	0
Red Pine, 81st. ....	load	3	0
Red Pine, 82nd. ....	load	3	0
Red Pine, 83rd. ....	load	3	0
Red Pine, 84th. ....	load	3	0
Red Pine, 85th. ....	load	3	0
Red Pine, 86th. ....	load	3	0
Red Pine, 87th. ....	load	3	0
Red Pine, 88th. ....	load	3	0
Red Pine, 89th. ....	load	3	0
Red Pine, 90th. ....	load	3	0
Red Pine, 91st. ....	load	3	0
Red Pine, 92nd. ....	load	3	0
Red Pine, 93rd. ....	load	3	0
Red Pine, 94th. ....	load	3	0
Red Pine, 95th. ....	load	3	0
Red Pine, 96th. ....	load	3	0
Red Pine, 97th. ....	load	3	0
Red Pine, 98th. ....	load	3	0
Red Pine, 99th. ....	load	3	0
Red Pine, 100th. ....	load	3	0

**TIMBER (continued).**

	£.	s.	d.
Rose, Rio .....	ton	7	0
Bahia .....	ton	7	0
Box, Turkey .....	ton	5	0
Satin, St. Domingo .....	ton	0	0
Porto Rico .....	ton	0	0
Walnut, Italian .....	ton	0	0

**METALS.**

	£.	s.	d.
Iron—Pig in Scotland .....	ton	1	19
Bar, Welsh, in London .....	ton	4	15
" " in Wales .....	ton	4	7
" " Staffordshire, London .....	ton	5	15
Sheets, single, in London .....	ton	7	10
Hoops .....	ton	8	5
Nail-roads .....	ton	5	15

**COPIERS.**

	£.	s.	d.
British, eke, and ingt. ....	ton	43	10
Best selected .....	ton	44	10
Sheets, strong .....	ton	50	0
" " India .....	ton	48	0
Australian .....	ton	45	0
Chili, base .....	ton	41	17

**YELLOW METALS.**

	£.	s.	d.
Lead—Pig, Spanish .....	lb.	0	4
English, com. brands .....	lb.	13	5
Sheet, English .....	lb.	14	10

**SPRINTERS.**

	£.	s.	d.
Silician, special .....	ton	14	17
Ordinary brands .....	ton	14	10
Tras .....	ton	0	0
Billiton .....	ton	0	0
Australian .....	ton	92	10
English ingots .....	ton	98	0

**ZINC.**

	£.	s.	d.
English sheet .....	ton	17	0

**OILS.**

	£.	s.	d.
Linseed .....	ton	20	12
Cocoon, Ceylon .....	ton	29	0
Copra .....	ton	28	0
Palm, Lagos .....	ton	0	0
Palm-nut kernel .....	ton	33	10
Repeased, English pale .....	ton	23	5
" " brown .....	ton	21	5
Cottonseed, refined .....	ton	17	0
Tallow and Oleine .....	ton	25	0
Lubricating, U.S. .....	ton	8	0
" " Refined .....	ton	8	0

**TURBINES.**

	£.	s.	d.
American, in casks .....	cwt.	1	6
Tax—Stockholm .....	barrel	0	10
Archangel .....	barrel	0	12

**CROYDON.**—For additions to the Public Baths, for the Corporation of Croydon. Mr. Thos. Walker, Borough Engineer. Quantities by Mr. Robert Ridge, Katharine-street, Croydon:—

Gregory & Findley .....	£1,100	0	0
Graves & Co. ....	1,075	0	0
Holloway .....	985	0	0
Barton .....	865	0	0
Genny .....	862	0	0
Dickinson .....	848	0	0
Walker .....	817	0	0
Bryan .....	825	0	0
Page .....	925	0	0
Maiden & Harper .....	917	0	0
Deacon .....	875	0	0
Smith & Bullied .....	859	0	0
Sanders .....	830	0	0
Roberts .....	825	0	0
G. N. Wyatt & Co. (accepted) .....	777	0	0

**FRINTON.**—For drainage in Field-road, Frinton, near Clacton-on-Sea. Mr. E. C. Homer, surveyor, London:—

Dixon & Co. ....	£445	0	0
N. Waterman .....	380	0	0
W. G. Gillingham .....	343	0	0

**FULHAM.**—For stables, &c., Star-lane, Fulham. Mr. B. J. Capell, architect:—

Scrivenor & Co. ....	£2,588	0	0
Holliday & Greenwood .....	2,533	0	0
W. Shurmer .....	1,599	0	0
Catmur .....	1,965	0	0
Jackson & Todd .....	1,847	0	0

**HADLEY WOOD.**—For six houses on the Beech Hill Park Estate. Mr. Edwin T. Hall, architect, Moorgate-street:—

Foster & Dickson, Rugby .....	£7,150	0	0
-------------------------------	--------	---	---

**HIGHGATE.**—For the erection of channel end to St. Augustine's Church. Mr. J. D. Sedding, architect, Oxford-street. Quantities by Messrs. Nixon & Raven, Westminster:—

Avis .....	£4,771	0	0
J. & J. Greenwood .....	4,370	0	0
Mowlin & Co. ....	4,153	0	0
Bons .....	3,859	0	0
Dove .....	3,825	0	0
Stimpson & Co. ....	3,630	0	0

**ISLINGTON.**—For rebuilding Nos. 511 and 513, Liverpool-road, Islington, for Mr. T. Yardley. Messrs. George Carter & Son, architects, Holloway-road:—

Riches & Mount, Battersea .....	£1,308	0	0
Parker, Peckham .....	1,190	0	0
Haines, Harrow .....	1,183	0	0
Garrud & Son, Hackney-road .....	953	0	0
Boreham, Bride-street .....	940	0	0

\* Accepted. † Withdrawn.

**ISLINGTON.**—For the extension of shop and stables for Mr. J. Walkley, Elthorne-road. Messrs. George Carter & Son, architects, Holloway-road:—

Baker, Hornsey-rise .....	£443	0	0
Beaver .....	312	0	0
Norris & Luke (accepted) .....	231	0	0

**LONDON.**—For making certain alterations to No. 87, Leadenhall-street, City, for the Egyptian Cigarette and French Government Tobacco Company. Mr. H. I. Newton, architect, Queen Anne's-gate, S.W.:—

Cook .....	£441	0	0
Godden .....	435	0	0
Burman & Sons .....	425	0	0
Bryant (accepted) .....	374	0	0

**LONDON.**—For painting, repairs, &c., at the Public Baths and Washhouses, Endell-street, St. Giles', W.C. Mr. J. Waldram, surveyor. Quantities not supplied:—

Ansell .....	£1,182	0	0
Hensman .....	724	15	20
Stiles & Son .....	698	18	Nil.
Stokes & Son .....	665	14	10
Munday & Son .....	635	39	33
J. Hicks .....	620	25	Nil.
Gover & Son .....	615	19	30
J. B. Arford .....	609	17	10
Surveyor's estimate .....	659	39	22

\* Accepted. † Withdrawn.

**CONTRACTS AND PUBLIC APPOINTMENTS.**

*Epitome of Advertisements in this Number.*

**CONTRACTS.**

Nature of Work, or Materials.	By whom required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
* Premises, for Sewage Works .....	Portsmouth Y. M. C. A.	C. W. Bevis	March 17th	xiii.
Salte Paving and Concrete .....	Mile End Vestry .....	Official	do.	xviii.
d Paving and Concrete .....	Vestry of St. James's, Westminster .....	do.	March 18th	xvi.
d Watering .....	do.	do.	do.	xvi.
st Cleaning and Dust Collecting .....	Vestry of St. Martin-in-the-fields .....	H. Jacques	do.	xiii.
* Contracts .....	do.	do.	do.	xviii.
ty of Building Materials .....	Admiralty .....	do.	March 19 to 30	ii.
ce and Materials .....	H. M. Convict Prisons .....	do.	March 20th	ii.
e and Shop, Cambridge Heath .....	Hornsey Local Board .....	T. De Courcy Meade	March 22nd	do.
iding Premises, Queen Victoria-street .....	Mr. Burrows .....	do.	do.	xviii.
Streets Works .....	do.	do.	do.	xviii.
st .....	Cromer Local Board .....	do.	March 23rd	xviii.
ite Footway Pavement .....	St. Giles's, Cambridge	J. C. Mellis	do.	xviii.
Pavement .....	Gen. Marine Local Co.	Official	March 24th	xviii.
Police Station .....	Strand Board of Works	do.	March 26th	xviii.
* Bridge .....	Com. of Sewers .....	do.	do.	xviii.
age Works, &c. ....	County of Suffolk	F. Whitmore	March 29th	xviii.
* Repairs and Materials .....	Colne and Marsden L. E.	H. Bancroft	do.	xviii.
Sinking, Southwold .....	Com. of Sewers, Lincoln	J. W. Barry	do.	xviii.
in Granite .....	War Department .....	do.	April 1st	xviii.
ng Factory, Stroud .....	Ramsey Local Board .....	Smith & Austin	April 2nd	xviii.
ing Materials .....	do.	Official	do.	xviii.
ing Six Houses .....	War Department .....	H. A. Cheers	Not stated	xviii.

**PUBLIC APPOINTMENTS.**

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page.
ng Surveyor .....	Eastbourne Corporation	150l.	March 22nd	xvi.
y Executive Engineer .....	Bombay Municipality	800 Rupees Monthly	March 23rd	xvi.
nt Surveyors .....	Civil Service Com.	Not stated	March 26th	xvi.

**TENDERS.**

XTON.—For alterations and additions to 1 and 2, age-buildings, Brixton-road, for Mr. A. Philips. W. Stevens, architect, New Bridge-street:—	£237	10	0
ter .....	123	0	0
st .....	173	0	0
ntrell (accepted) .....	173	0	0
MLEY (Kent).—For additions at "Woodlands," T. A. Mitchell, Mr. E. Newton, architect:—	£1,583	0	0
Adcock .....	1,434	0	0
idee & Harper .....	1,434	0	0
J. Arnaud & Son (accepted) .....	1,434	0	0
ve (withdrawn) .....	1,397	0	0

**BUCKHURST HILL.**—For the erection of shops, Queen's-road. Mr. E. C. Homer, surveyor, Mansion House Chambers:—

Dixon & Co. (accepted) .....	£3,600	0	0
------------------------------	--------	---	---

**CLAPTON.**—For the erection of three shops at Hill-street, Upper Clapton, for Mr. Andrew Hart. Mr. J. H. Waldram, architect. Quantities supplied by Mr. H. J. Trusclevell:—

Munday & Son .....	£2,850	0	0
J. B. Arford .....	2,574	0	0
Mortor .....	2,447	0	0
Ansell .....	2,400	0	0
Shurmer .....	2,373	0	0
Glover & Son .....	2,137	0	0
J. Hicks .....	2,131	0	0

[Architect's estimate, £2,185.]

**LONDON.**—For works at the City of London Brewery Mr. J. Jewhurst, architect:—

W. Shurmer	485	0	0
Wontner Smith	480	0	0
Burch & Co.	475	0	0
Dixon & Co.	462	0	0
Spencer & Co.	450	0	0
Jackson & Todd	449	0	0



LONDON.—For building a new dining saloon at the rear of 25, Chancel-street, Euston-road, for Messrs. Beggioni Bros. Mr. Robert Willey, architect, Ludgate-hill:—

Marks .....	£940 0 0
Ryder .....	82 0 0
Penny & Durrant .....	757 0 0
Turtle & Appleton .....	675 0 0
Jones & Sons (accepted) .....	580 0 0

LONDON.—For rebuilding No. 374, Euston-road. Mr. Robert Willey, architect, Ludgate-hill:—

Woodward .....	£1,600 0 0
Rhodes (accepted) .....	1,453 0 0

LONDON.—For works at the Marquis of Anglessa public-house, Devonshire-street, Lisson-grove. Mr. R. A. Lewcock, architect, Bishopsgate-street:—

Heath .....	£268 0 0
Winn .....	98 0 0

LONDON.—For works at the Jolly Butchers, 261, Old-street. E.C. Mr. R. A. Lewcock, architect, Bishopsgate-street:—

Heath .....	£213 0 0
Ni bolts .....	212 8 6
Paddon, jun. ....	173 0 0
Williamson .....	161 0 0
Vaughan & Brown .....	74 12 8
Winn .....	73 0 0
Steadman .....	71 0 0
Hodge & Co. ....	70 4 6
Christan .....	69 17 0
Price .....	64 9 0

NEWPORT (Mon.).—For infants' school, boundary walls, office, &c., at Fanteig, for the Llanvachra Upper School Board. Mr. E. A. Lansdowne, architect, Quantities by the architect:—

T. Foster, Abercromby .....	£1,350 0 0
Jones & Co., Gloucester .....	1,128 0 0
W. Linton, Newport .....	1,085 0 0
Blackburne, Newport .....	1,032 0 0
C. Reed, Newport .....	1,045 0 0
G. Brind, Newport .....	1,040 0 0
H. Parfitt, Cwmbran .....	855 0 0
Jones & Son, Newport .....	878 10 0
Morgan & Evans, Pontypool .....	876 14 0
Wm. Price, Newport .....	871 9 0
J. Burgoine, Blaenavon .....	859 11 0

NEWPORT (Mon.).—For proposed new church, Sallors' Home, and Institute, Temple-street, Newport (Mon.). Messrs. Habershon & Fawcener, architects:—

D. C. Jones & Co., Gloucester .....	£3,387 2 1/2
Wm. Church, Bristol .....	2,900 1 1/2
Stevens & Bastow, Bristol .....	2,819 1 1/2
Mantle & Brown, Newport .....	2,809 1 1/2
David Davies, Cardiff .....	2,850 1 1/2
John Linton, Newport .....	2,790 1 1/2
Chas. Miles, Newport .....	2,721 1 1/2
W. M. Blackburn, Newport .....	2,803 1 1/2
Jones & Son, Newport .....	2,497 1 1/2
W. Price, Newport .....	2,619 1 1/2
A.—Church and Institute. B.—Sallors' Home.	

RAMSGATE.—For alterations and additions to No. 15, Effingham-street, Ramsgate, for Mr. R. Hodgman. Mr. E. L. Elgar, architect:—

C. Horne .....	£320 0 0
W. H. Part .....	285 0 0
Newby Bros. ....	284 15 0
B. J. Cowell .....	275 0 0
T. Elgar .....	264 0 0
White Bros. ....	261 0 0
H. Bowman .....	248 0 0
W. W. Martin (accepted) .....	240 0 0

STOCKWELL.—For alterations to 49, Binfield-road, for Mr. R. Greening. Mr. J. W. Stevens, architect, New Bridge-street:—

Lamprell (accepted) .....	£234 0 0
---------------------------	----------

UXBRIDGE.—For two cottages at Uxbridge, for Mr. Vasey (Bricks found). Mr. G. Eves, architect, Uxbridge:—

Hardy .....	£158 0 0
James .....	150 0 0
Hendey (accepted) .....	136 10 0

WOOD GREEN.—For St. Paul's Schools, for the Rev. G. B. Cox. Mr. C. G. Wray, architect. Messrs. Lindsay & Giffard, surveyors:—

Taylor .....	£1,325 0 0
Perry .....	1,177 0 0
Sykes .....	1,132 13 6
Williams .....	1,132 0 0
Barford .....	1,075 0 0
Staines & Son .....	1,024 0 0
Woodward .....	965 0 0

YARMOUTH.—For concrete and granite footways, for the Great Yarmouth Urban Sanitary Authority. Mr. J. W. Cockrill, Borough Surveyor. Quantities by the Borough Surveyor:—

Robson, Sharnbrook .....	£4,331 0 0
G. Walker, Leeds .....	4,329 7 4
Bruntion, London .....	3,990 5 6
Stuart & Co., Edinburgh .....	3,750 0 0
Macleod & Co., Stratford .....	3,610 19 10
Cordingley & Sons, Bradford .....	3,570 0 0
Mickay, Bradford .....	3,480 0 0
Marshall, Brighton .....	3,408 11 7
Barnard, Great Yarmouth .....	3,400 0 0
Retheridge, Harleston .....	3,360 0 0
Willison, Newcastle .....	3,245 0 0
Cartz, London .....	3,050 0 0
Hal, Rugby .....	2,983 8 9
Hindley & Wood, Manchester .....	2,948 0 0
Albison, Sunderland .....	2,449 0 0
Duffy & Sons, London and Great Yarmouth .....	2,367 16 2
Bray, Great Yarmouth .....	1,639 0 0
[Borough Surveyor's estimate, £3,081.]	

SPECIAL NOTICE.—Lists of Tenders frequently reach us too late for insertion. They should be delivered at our office, 46, Catherine-street, W.C., not later than Four p.m. on THURSDAYS.

#### TO CORRESPONDENTS.

Registered Telegraphic Address, "THE BUILDER, LONDON."

J. C.—Amateur. We have no space for notices, notices, notices made anonymously. Liverpool. "The Builder" is a weekly paper. A. W. B.—M. J. B.—G. J. B.—A. B. C.—E. B. F.—G. (yes). All statements of fact, if they are, must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline publishing out books and giving notices. Note. The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

No notice undertake to return rejected communications. Letters or communications of any kind (news items) which have been duplicated for other journals, are NOT DELETED.

All communications reaching the Editor and all matters should be addressed to THE EDITOR of THE BUILDER, and not to the Publisher.

#### PUBLISHER'S NOTICES.

Registered Telegraphic Address, "THE BUILDER, LONDON."

CHARGES FOR ADVERTISEMENTS.

TRADE AND GENERAL ADVERTISEMENTS.

Five lines (about fifty words) or under .....

Each additional line (about ten words) .....

Terms for Series of Trade Advertisements, also for special Advertisements on front page, Competitions, Contracts, Sales by Auction, &c. may be obtained on application to the Publisher.

SITUATIONS WANTED.

FOUR Lines (about THIRTY words) or under .....

Each additional line (about ten words) .....

PREPARATION IS ABSOLUTELY NECESSARY.

\* Stamps must not be sent, but all small notices should be sent by Cash in Registered Letter or by Money Order, payable at the Post-office, Covent-garden, W.C. to

DOUGLAS FORDRINGER, Publisher.

Addressed to No. 46, Catherine-street, W.C.

Advertisements for the current week's issue must reach the Office before THREE o'clock p.m. on THURSDAY.

The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c. left at the Office in reply to advertisements, and is only responsible for the loss of COPIES ONLY should be sent.

SPECIAL.—ALTERATIONS IN STANDING ADVERTISEMENTS or ORDERS TO DISCONTINUE same, must reach the Office before TEN o'clock on WEDNESDAY morning.

PERSONS Advertising in "The Builder" may have Replies addressed to the Office, 46, Catherine-street, Covent-garden, W.C. free of charge. Letters will be forwarded if addressed envelopes are sent, together with sufficient stamps to cover the postage.

#### TERMS OF SUBSCRIPTION.

"THE BUILDER" is supplied gratis from the Office to residents in any part of the United Kingdom at the rate of 1s. per annum. To all parts of Europe, America, Australia, and New Zealand, 5s. per annum. To India, China, Ceylon, &c. 20s. per annum. Remittances payable to DOUGLAS FORDRINGER, Publisher, No. 46, Catherine-street, W.C.

#### Best Bath Stone, for Winter use.

WESTWOOD GROUND,

Box Ground,

Combe Down,

Corsham Down, and { Summer

Farleigh Down. { Dried.

RADELL, SAUNDERS, & CO., Limited,

Corsham, Wilts. [ADVT.]

#### Box Ground Stone

is the best for use in all exposed positions

being a well-known and tried Weather Stone.

50,000 ft. cube in stock.

P I C T O R & S O N S,

BOX, S.O., WILTS. [ADVT.]

#### Doubling Freestone.

The stone from these quarries

is known as the "Weather

Beds," and is of a very

crystalline nature, and is

undoubtedly one of the most

durable stones in England.

It is of the same crystalline

nature as the Chelchyn Stone,

but finer in texture, and more

available for the moulded work.

HAM HILL STONE.

Greater facilities have been provided for

working these quarries, and the stone can be

supplied in large quantities at short notice.

Prices, and every information given, on

application to CHARLES TRASK & SONS,

Norton-sub-Hamdon, near Ilminster, Somerset.

London Agent—Mr. E. WILLIAMS,

16, Craven-street, Strand, W.C. [ADVT.]

Doubling Free Stone For prices, &c., ad-

dress S. & J. STABLE,

Quarry Owners, Stone

and Lime Merchants,

Stoke - under - Ham,

Ilminster. [ADVT.]

(Ground or Lamp),

Ham Hill Stone! Ham Hill Stone!

For Ham Hill Stone of best quality and work-

manship, apply to JOHN HANN & SON, Quarry

Owners, Montacute, Ilminster. Established

1837. Agents, MATTHEWS & GEARD, Albany

Wharf, Regent's Park Basin, N.W. [ADVT.]

Asphalte.—The Seyssel and Metallic Lava

Asphalte Company (Mr. H. Glenn), Office, 88,

Poultry, E.C.—The best and cheapest materials

for damp courses, railway arches, warehouses

floors, flat roofs, stables, cow-sheds, and milk

rooms, granaries, tun-rooms, and terraces. [ADVT.]

Asphalte.

Seyssel, Patent Metallic Lava, and

White Asphaltes.

M. STODART & CO.

Office:

No. 90, Cannon-street, E.C. [ADVT.]

EVERY DESCRIPTION OF

SEASONED WOODS AND VENEERS IN

EXTENSIVE QUANTITIES.

B. J. HUDSON & SONS,

Millbank Sawmills, Grosvenor-road, S.W.;

Whitfield-street, W.;

And Store-street, London, W.C.

Telephone No. 3,152, and Private Wire con-

necting Business Premises.

## BANNER VENTILATORS.

The Strongest Exhaust Ventilators for all Buildings, Public Halls, Churches, Billiard-Rooms, &c.

HIGHEST PRIZES at all the most important Exhibitions.

## BANNER SYSTEM OF SANITATION AND SANITARY APPLIANCES

WERE AWARDED AT THE

International Health Exhibition, 1884, One Gold Medal, Three Silver Medals, and One Bronze.

For further Particulars and Prices apply to

BANNER BROS. & CO. Sanitary and Ventilating Engineers,

11, BILLITER SQUARE, LONDON, E.C.

# The Builder.

VOL. L. No. 2330.

SATURDAY, MARCH 20, 1886

## ILLUSTRATIONS.

New Examination Halls for the Royal Colleges of Physicians and Surgeons, on the Thames Embankment.—Mr. S. Salter, Architect .....	442-441
Birmingham Law Courts Competition.—Sketch Design submitted by Mr. J. P. Seddon and Mr. J. Coates Carter, Architects .....	444-445
Birmingham Law Courts Competition.—Sketch Design submitted by Mr. H. H. Statham, Architect .....	448-449
Views of Compton Wynyates, Warwickshire: Illustrations to a Paper on "Architectural Photography by Amateurs" .....	452-453

## CONTENTS.

Worth's "History of Devonshire" .....	429	Examination Hall for the Colleges of Physicians and Surgeons .....	458	Proposed United Arts Club .....	458
The New Railway Bill .....	430	Birmingham Assize Courts: Sketch Competition Designs .....	458	Sewer Ventilation .....	463
Architectural Drawings at the Royal Scottish Academy .....	430	Compton Wynyates .....	458	The Student's Column: Our Building Stones.—II. ....	459
Concrete .....	431	Free Lectures to Artisans at Carpenters' Hall: The Architecture .....	458	Recent Patents .....	459
Royal Institute of British Architects: Some American Methods .....	432	of City Buildings .....	457	Recent Sales of Property .....	459
Architectural Photographs by Amateurs .....	434	Architectural Societies .....	457	Meetings .....	460
	435	The Disposal of the Metropolitan Sewage .....	457	Musellianism .....	460
		Architectural Association Visits .....	458	Prices Current of Building Materials .....	460

### Worth's "History of Devonshire."

**W**ORTH'S "History of Devonshire" is a new publication which is so entertaining as a county history, so comprehensive, so various, embracing every subject that can interest a reasonable man,—history, religion, politics, science, art, literature, folk-lore, superstition, and touching lightly upon all. The old folios of our learned forefathers, with their sweet credulity, their appetite for the marvellous, their complacent garrulity about battles, their vehement patriotism and loyalty, and their ever-ready explanations of the inexplicable, have delighted generations of readers. Even now, in its modern and mutilated form, shorn of its peculiar charms, and leered through the fine sieve of a sceptical generation, the county history holds a high place in our affections. With what a wide variety does it admit all subjects within its hospitable covers! How truly catholic is its range,—a vast trajectory, an infinite curve, reaching from yesterday to the "first syllable of recorded time" and beyond, to epochs pre-glacial, inter-glacial, pre-glacial, too remote for the companionship of the halcyon imagination. British, Roman, Saxon, Danish, Norman hosts, in vast processions, pass by in melancholy pomp; and warriors, in quick succession, cross the historic stage like phantoms in Macbeth's vision. The rages of war, the triumphs of peace, alternately alarm and elate us as we follow the meagre record. Deeds of personal prowess and our chivalrous sympathies. The wit and wisdom of twenty generations are, for our edification, crystallised into proverbs. The rant of the monk, the cry of the poor, and sighs of hapless lovers, are audible in every age, and over all alike death, "pallid death," lies the inexorable doom. It is a book for every mood, and all occasions of study or leisure, yielding a generous return for invested time. The author is independent of rule and friction. He may linger lovingly over his subject and present it to us with elaborate detail, or pass swiftly from point to point "with the motion of a pewterer's hammer." The abruptness of his transitions does but give briskness to his narrative. He always has, moreover, the most interesting of all the counties as a field of his peculiar labours. In the present volume he deals with one which is "all but the

largest in the kingdom, which has afforded the earliest traces of man in these islands; which has never, from the dawn of recorded history, occupied a secondary place in the national life; which again and again in the hour of England's need has found the man" (who surely ought to be rewarded with a capital M); "whose worthies century by century claim the first rank in every class,—soldiers, sailors, lawyers, divines, inventors, poets, artists, explorers, statesmen, men of science. . . the history of such a county is the history of England," &c., &c. This is the true temper of your county historian; let us see how the author of this history of Devonshire, the land of deep valleys, has acquitted himself. In the first place, his book is without a map, and this we take to be an inexcusable fault. We will waive the time-honoured engravings of the "principal seats," the coats of arms, remarkable inscriptions, &c., not without a sigh; but a map is absolutely essential to a well-regulated county history. Failing that, we should at least have such a description of the county as would enable the reader mentally to supply the omission. We are not possessed by any morbid craving for mere statistics; but we feel that we have a right to know the area of the district dealt with, its population, soil, main divisions, length of seaboard, its maritime and topographical features, &c., all of which might have been projected in a word-picture if not on a map. The flora, if not the fauna, of Devonshire, should certainly have a chapter to itself. The author has after much deliberation elected for an order "mainly topographical," taking separately such prominent places as Exeter, Plymouth, Tavistock, Crediton, and treating in separate sections of the history and peculiarities of each. In other words, his is not a history of the county as a whole, but of the individual lives of the chief places in it. The narrative loses in breadth and continuity by this treatment, which, moreover, involves a great amount of otherwise avoidable repetition. The whole work suffers somewhat from this fragmentary method of dealing with the subject. The architecture of the county, to wit, is not presented at one view, but in isolated references to individual examples, and those who desire to obtain a general idea of the special characteristics which differentiate the architecture of our principal western county will not find it in the present history. But they will pick up a good deal of desultory information on that and many other subjects,—stray facts about geology, genealogy, climate, historical vicissitudes, local customs, place-names, interspersed with biographical notices of famous Devonians of all times and conditions, from Ælfred,—if, indeed, he were a Devonshire man,—to Sir

John Bowring. The first and last chapters depart, however, from the general scheme: one gives in a connected form the early history of Devonshire, and the other its dialect and folk-lore; and these will, we venture to think, be read with greater interest than any of the others. The prominent facts connected with the early history of the county are its very partial occupation by the Romans, only one Roman station of note,—to wit, Exeter,—being within its confines; and the peaceful colonisation of the county by the Saxons who "annexed" it without conquering it, and finally ousted the Celtic population cuckoo-fashion, driving them westward, and re-settling the evacuated country somewhere between the year 710 and 823. "The constitution of Devon is," says Mr. Worth, "purely Saxon. Each of its hundreds has a Saxon name, and each of its municipalities originated in a Saxon community."

In the chapter on dialect and folk-lore the Devonshire speech is claimed to be "the true Classic English. The English of Ælfred's time is the groundwork of modern English; in his day it was the polite, the courtly, the literary, in fact, the standard form of speech; and Ælfred, a West countryman, spoke *most likely* in Devonshire style." Until 1100 the language of Ælfred, or Ælfred, remained the only written English. It was to the accident that the great writers of the fourteenth century, the first to have their writings disseminated by the newly-invented printing-press, were Midland men that the fixed or book language varied from that of the Saxon king, Chaucer's "well of English undefiled" not having the true antique savour. Some compensation for the wrong thus done to the Western dialect was made when the heroes of Elizabeth's reign,—mostly West countrymen,—brought their local dialect to the court and again made it fashionable, "making its rugged sounds dear to all who valued stoutness of heart, and especially to the great queen herself." It appears to have been always the fact that in the really Classic English of Devonshire "everything is *he* except a Tom-cat, and that is a *she*." The true native dialect is now most marked in the Dartmoor district, although it may still be heard in Exeter; but along the Tamar it has been adulterated with Cornish idioms, and Plymouth, "the Cornishman's London," has further sophisticated the current speech by an alien Irish element. The etymology of the Devonshire place names is particularly interesting, and must be followed by the curious reader in the book itself. Superstition has maintained a stronghold in the West, living animals having within memory been burned alive to avert the loss of others; puppies are still buried in a



field to cleanse it of weeds; toads are cruelly destroyed as emissaries of Satan; and the sun is firmly believed to dance on Easter morning. Sir Francis Drake, the foremost of Devon's worthies, is reputed to have worked by magic, firing a cannon-ball through the earth to prevent his wife committing bigamy; and it is still believed that if you have the courage to call him by beat of his old drum he will promptly obey the call.

As usual, sad stories of the cruelties practised upon old women who were reputed witches re-appear,—the last execution of the kind but one in the kingdom taking place at Bideford in 1682; and the tragedy is darkened by the fact that the poor creatures almost invariably confessed their guilt, and gave circumstantial accounts of the devil's appearance to them "as a gentleman," "a lion," and so forth. Three of the most "old, decrepit, despicable, miserable creatures" that an eye-witness ever saw were hanged at Exeter as a consequence of their own confessions against themselves in 1695. And it is humiliating to find that, although the cruel laws against witchcraft have been repealed, and a poor woman may now be old and ugly without being hanged or burned for it, the belief in witches and their powers for evil is still strong in the West.

A large part of the work is naturally taken up with incidents connected with the civil wars and the Rebellion; and in those troublous times, by one misadventure and another, the old halls and mansions, which were numerous in the county, were either wholly destroyed or irremediably ruined.

They are not described at such a length as we could desire; but although little is said about them, they are evidently touched upon with competent knowledge of their characteristics, dates, and their proper places in the annals of our domestic art. Ford Abbey, a remarkable example of monastic building adapted to domestic wants, partly, it is said, by Inigo Jones, and fresh in the memory of every one who has seen it, lovely in its partial decay, from the banks of the beautiful river Axe, has a little more attention bestowed upon it; but, as a rule, a sort of hasty guide-book reference is all that the author can afford.

With the anecdotes connected with the history of each town, the personal gossip, the local worthies, the strange customs, the survival of otherwise obsolete forms of land tenure, and the multitude of interesting facts bearing generally upon the county and its doings from time immemorial, we have no space to deal. We have much to thank the author for; but from our own particular point of view much is wanting to make his history perfect. It may be read as a critical commentary on earlier folios; but though it may usefully correct them in points wherein they were misdirected, it cannot be accepted entirely in substitution of those delightful, though perhaps desultory and somewhat inaccurate, treatises.

#### THE NEW RAILWAY BILL.

**T**HE measure just introduced by Mr. Mundella dealing with railway and canal traffic is a bold and honest attempt to grapple with a question of great complexity and difficulty. This was recognised by all parties in the House, and the right hon. gentleman's effort is evidently better appreciated than any previous attempt in this direction. Of course, he had the benefit of the experience of his predecessors (which he acknowledged most fully), and, moreover, was aware of the objectionable features in previous measures which rendered them unacceptable. There is very much in the Bill that was to be found in that prepared by Mr. Chamberlain in 1884. Indeed, some points that provoked the greatest opposition on that occasion are incorporated here, though in a somewhat different form. Some are based upon the Reports of the different Committees which have from time to time investigated the subject; while in others,—in spite of the statement of Mr. Jeffries, C.E., quoted in our "Notes" of the 6th inst., that the opinions of Americans on such matters are unheeded on

account of prejudice,—Mr. Mundella admits that he is following precedents set by the legislation of the United States.

The first part of the Bill deals with the Railway Commission. The functions of this body were treated of at length in our issue of May 23rd last, when it was remarked that it had proved itself of sufficient value to be constituted a permanent tribunal. We are glad to see that this is provided for by the Bill, the Commission being made a permanent Court of Record. It is to be further strengthened by the appointment of a Judge of the High Court as Chief Commissioner. Although the general opinion of the House was that the judgments of the Commissioners had given satisfaction, Sir J. Pease complained that in some cases they had acted weakly. That some of their decisions have not been effective is due more to their uncertain tenure of office, and the liability of their decisions to reversal, than to any lack of ability to appreciate and adjudicate upon the causes brought before them. With a Judge as President, however, the decisions of the Court will have a force which should have the effect of precluding appeal, and thus simplifying the cases brought before it. Indeed, no appeal will be allowed except upon questions of law. Mr. Mundella hopes, however, to introduce a system of arbitration by which litigation may be, to a great extent, avoided. The proposal is to empower the Board of Trade to receive complaints from persons who consider that they are being treated in an oppressive or unreasonable manner, and, if they think there is reasonable ground for complaint, to call upon the railway company for an explanation. A competent person is to be appointed to confer with the complainants and the railway company, and endeavour to arrange an amicable settlement. Reports of such proceedings, with observations thereon, are to be submitted to Parliament, and would furnish valuable aid for further legislation. This idea is borrowed from the Americans, who have found it answer admirably. The publicity thus given to different complaints and to the arguments on both sides must be very useful to the public as well as to Parliament, and the system is guarded against abuse by the imposition of a small fee on receiving complaints. Sir R. Webster, while agreeing with the principle of negotiation, where practicable, expressed a certain amount of scepticism as to the probable efficacy of this arrangement; but, to the legal mind, perhaps, arbitration does not so readily commend itself as to others. Another useful provision is that giving a *locus standi* to councils, chambers, associations, &c. This clause is most comprehensive and valuable, especially as the decision of the Commissioners on this point allows of no appeal, and public bodies are allowed to apply corporate funds to any expense incurred in bringing cases before the Court.

The most important clause is that dealing with the rates and charges. It requires every railway company, within twelve months from the commencement of the Act, to submit to the Board of Trade revised specifications and schedules of their maximum rates and charges. Mr. Mundella showed that the Act of 1845 gave the House the right to demand this, and to exercise control over the rates, and impose such conditions as it may consider desirable. To meet the "terminals" difficulty,—the rock upon which so many attempts to settle the railway rate question has split,—it is provided that where such charges are proposed to be made, the circumstances and nature of the charge are to be fully stated. The Board of Trade will make the new classification and schedules public, and receive representations from any parties against the proposals. The Department will then undertake their final revision, and submit them to the House. Most of the railway companies have such classifications and schedules already prepared, and we may take it for granted that they will re-introduce those which the House declined to consider last year. The present measure is so far on the lines of that prepared by Mr. Chamberlain that it throws upon the companies the onus of bringing forward new classifications, &c.,

but, whereas he would refer them to the Railway Commissioners for revision, Mr. Mundella considers that the Board of Trade ought to undertake this work. Again, Mr. Chamberlain's plan for dealing with the terminals was to insert a clause worded as follows:—"It shall be lawful for a railway company to charge a reasonable sum for such terminal, subject, in case of dispute, to the sanction of the Commissioners who may prescribe the manner in which the scale of such terminals shall be published." Although it was further provided that "the provisions of this clause as to terminals shall not apply to any railway company until their revised classification and rates have been approved by Parliament," the traders naturally took fright at the indefinite power which (subject to costly appeal) the companies would thus possess with regard to terminals. In the present case they must first show that they may reasonably claim them, and give all details and particulars, and then take the decision of Parliament. There is plenty of time given for the preparation of these particulars, for the twelve months' grace dates from the 1st of October next.

The burning question of undue preference is dealt with as follows:—"On proof of inequality in charges the burden of showing that it does not constitute any undue preference shall lie upon the railway company. The question is to be decided by the Commissioners, and they are to have power to take into consideration whether reduced charges are necessary for the purpose of securing the traffic in respect of which they are made. This is in recognition of the principle enunciated by the Committees of 1867 and 1872, who came to the conclusion that it is impossible to draw a hard-and-fast line as to equality in charges, as special circumstances frequently call for special rates, which do not operate to the prejudice of any person or class. Of course, if such prejudice is shown to result from this practice it will not be allowed to continue. It is quite as impracticable to make equal mileage rates binding under all circumstances, and it is provided that the companies may charge "group" rates where it is found desirable. In this also the rights of the public are safe-guarded, for it will not be allowed where it would favour any particular person to the prejudice of another.

The remaining provisions of the Bill deal with statistics, methods of proceeding, definitions of terms, &c., and are of little public interest. As Mr. Mundella stated, it appeared that many of the grievances to which such prominence has recently been given could have been remedied by existing Acts, while others (as we recently took occasion to remark) could not be substantiated; but the present measure aims at simplifying proceedings by defining more clearly the rights and powers of the companies. The favourable reception given to the first reading of this Bill augurs well for its success, though there will doubtless be objections raised to some of its provisions when it is considered in detail. A thoroughly satisfactory solution of the many vexed questions involved cannot be looked for in a single measure, but it seems calculated to do much towards settling some of the most pressing of them.

#### NOTES.

**T**HE rejection of the vote of 50,000 added by the House of Commons last week for the maintenance of the London Parks leaves them at present without any fund. This will, it seems, be met by a Bill handing the control over to the Metropolitan Board of Works of those which are not so-called Royal Parks, and enacting that the cost shall be defrayed from the rates, and obtaining a fresh vote for the Royal Parks. In theory there can be no doubt that London should pay for its own parks; there is no more reason why the country at large should pay for Battersea Park than for Sefton Park, at Liverpool. On the other hand, it must be admitted that the Metropolitan Board of Works have quite sufficient on their hands at present without the London



parks being added, and the ratepayers have far too little direct control over the expenditure of the Metropolitan Board of Works for it to be altogether satisfactory to see them entrusted with the collection and expenditure of the park funds. However, the House of Commons have so bid, and there is no more to be done except for Londoners to take care that whatever body looks after its parks in future they shall at once be watched over with care and intelligence and without extravagance as well as without cheseparing.

THE Metropolitan Board of Works cannot justly be accused of undue haste in their procedures for defecating the Thames. The treatment of 9,000,000 gallons a day, for which one of the reservoirs at Crossness is to be set aside, is, no doubt, an experiment on a large scale. But as far as the pollution of the river is concerned, the result of this treatment, supposing its success to be perfect, will only reduce the daily contamination by less than 6½ per cent. Further, assuming the satisfactory treatment of the 9,000,000 daily gallons, for which the sum of 8,000l. is allotted, to be such as to lead to the application of the same process to the 140,000,000 gallons of daily flow of sewage, the proportionate cost will be 125,000l. a year. Nor is this all. The Works and General Purposes Committee report with great truth that the dealing with the "sludge" is a matter of difficulty, because of the enormous volume of London sewage. If this product be formed at the same rate, in proportion to the volume of sewage, that obtains at Birmingham, it will amount to upwards of 4,000 tons a day. And the daily volume of the sewage is increasing by about 2½ million gallons per year. When we are told, with regard to this prodigious mass of semi-fluid, that "it could be pressed and burned or otherwise disposed of," and that there is every reason to believe that by the admixture of chemicals it would be deodorised, and the offensive appearance removed, it is clear that little is as yet certain except heavy cost. To redeem the Thames from the contamination of a common sewer is, no doubt, an imperative necessity. But if this is done, as now appears to be contemplated, by the manufacture of a million and a half tons of sludge per annum, it may well be thought that the unfortunate experimenters are somewhere "between the devil and the deep sea."

THE debate on the taxation of ground-rents in the House of Commons on Tuesday last was not a particularly business-like performance. There was a general consensus of opinion that the ground landlord at present is improperly exempt from local burdens, and there was a good deal of wild talk. But no attempt was made to show how the ground landlord is to be rated, and but a very feeble effort was made to the objection that if in future the landlord is rated he will ultimately be the occupier pay by extracting a higher rent. Mr. Moulton, who seconded the motion, answering the objection merely said that it was impossible any increase of taxation could be got out of the pockets of his tenants. When land is limited in extent in those cases where it is in request, people are obliged to pay current prices, and if in future ground landlords add to their rents the amount at which they are rated it necessarily follows that tenants must pay these increased rents. It is to be hoped that the Select Committee to which the question has been referred will find some way of dealing with the subject so that ground landlords and occupiers shall bear a more equal share of local burdens than is at present the case. Meanwhile, it is necessary to admit that though the taxation of ground-rents is desirable in principle it is not easy to reduce it to a rational form.

It is to be hoped that the question of labour statistics raised a short time ago by Mr. Laugel will not altogether be allowed to pass, for there can be no doubt but that a situation which laid itself out to give this kind of information would be of far greater benefit than would appear at first sight. The fact that so many countries have adopted the

system, more or less completely, is sufficient to show its practical utility, and it needs but little acquaintance with working-class affairs to see what a vast amount of knowledge might be brought to bear upon our own artisans. None are so insular as English operatives, or so firmly persuaded that they can do better work than those of any other nation; and it would be an admirable lesson if they could be made to see for themselves that the standard of perfection is approached much more nearly on the Continent than they appear to be aware; that Continental workpeople are contented to labour for much longer hours at a greatly lessened rate of pay; that much of the Continental, and all the American, machinery is as good, if not better, than our own; and that, in short, the English artisan has an incomparably easier time of it than most of his fellows abroad. The truth is that a good many of the difficulties that exist in labour matters are brought about by the workmen themselves; and if we examine dispassionately the past history of English labour it will be painfully evident how much loss of handicraft has been due to the men's intolerant and ill-advised haste in rectifying their supposed wrongs by strikes. The questions of emigration and plethora of labour are both of the last importance; and a well-devised organisation by which information on these points could be kept daily before all those who were interested, would be a wonderful smoother of differences, both for masters and men. In default of such, the latter naturally fall an easy prey to the agitators, who make it their business to tell just as much or as little as may suit their purpose; or, in other words, to instruct their hearers in the way that is best suited to set class against class.

THE Metropolitan Board of Works have incurred the displeasure of the theatrical and music-hall managers in respect of the duty imposed upon them with reference to the inspection of theatres. It is only right to say that this duty, so necessary in the interests of the public safety, was not sought by the Board, but was forced upon them by the Select Committee on the Fire Brigade appointed in 1877. This Committee was originally deputed to inquire into the working of the Metropolitan Fire Brigade, but its scope was extended to include means available for preventing loss of life in theatres, and a great deal of evidence was taken upon this latter subject. The Committee reported "that no new theatre or large music-hall in the metropolis should be finally licensed until certified that in respect of position and structure it satisfies all due requirements for the protection against danger from fire [sic in original], and that the Metropolitan Board should be the certifying authority. That with respect to existing theatres and halls, the Metropolitan Board should have power to call upon the proprietors to remedy such structural defects as appear to the Board to be the cause of special danger, and to admit of being remedied by a moderate expenditure, option being allowed to the proprietors to refer the whole question to arbitration." In the ensuing session of Parliament the Board introduced a Bill giving effect to the recommendations of the Committee, and this Bill became law as "The Metropolis Management and Building Act Amendment Act, 1878." The Committee further recommended that the Lord Chamberlain and the Justices should make regulations for the management of theatres and music-halls, but no such regulations have been made. By a Bill now before Parliament, however, and of which the second reading was moved by Mr. E. Rider Cook on Wednesday, the Board are, at the instance of the Lord Chamberlain and the Home Office, seeking powers to make such further regulations as may be necessary for the safety of the public. Of course "vested interests" are up in arms at the proposal, but the figures cited by Mr. Cook as to the condition of things prevailing before the Board looked into the matter are the best evidence of the necessity of some effective controlling power. To quote only one set of figures, the Board, according to

Mr. Cook, found that forty-one theatres had, between them, only forty-two staircases and fifty-seven exits.

THE Vestry of Chelsea have issued a report on the recommendations of the Metropolitan Board of Works as to the cleansing and ventilation of sewers, which contains some very practical criticism. Among points in it we note that the Vestry consider the proposal to prohibit trade establishments, such as breweries, from sending hot water into the sewers, "would practically amount to a prohibition of the trade." In regard to flushing, they calculate that to daily flush the sewers of their district with any practical effect would require a minimum of 6,000,000 gallons per day. The recommendation that householders might be induced to flush the drains simultaneously at a stated time they dispose of, as we did, by saying that it is vain to expect to be able to compel such a united action. A by-law to that effect could not be enforced, and would only be attended to by a few of the wealthier residents. The same argument applies to the proposal that householders should deodorise (not "deoderise," gentlemen of the Vestry; consult your spelling-books) their sewage separately; they could not be compelled to do it, and the cost of deodorising piecemeal at so many points would amount to an enormous aggregate. On the question of street ventilators the Vestry do not commit themselves to any decided opinion; they seem rather desirous to disagree with no one. They conclude by the suggestion that "it would be advisable for the Vestry to request the Metropolitan Board of Works to place a sum of money at the disposal of its Special Purposes and Sanitary Committee, in order that they may by actual experiment and record of various systems of sewer ventilation be enabled to make such recommendations as will secure a solution of this very complex and difficult problem."

A CORRESPONDENT writes,— "As there appears to be an intention to propose building the new and larger House in one of the open courts adjacent to the present chamber, it is well to at once urge the objections to such a mistaken and retrograde act. In these days, the public voice demands proper sanitary arrangements in all buildings. Among these the provision of the means for the access of ample light and of pure air takes precedence. If the plan of the Select Committee of 1867, which has been ordered to be reprinted for the assistance of Members of Parliament in the consideration of this question, should be adopted and carried out, the excellent sanitary arrangements of the late Sir Charles Barry would be seriously interfered with, and I cannot imagine him, could he be consulted, sanctioning an act so damaging to his greatest architectural work. Of course, if a new House of Commons must be provided somewhere within the limits of the present Palace of the Legislature, local difficulties will of necessity create some disadvantages and inconveniences. The architect, whoever he may be, will not be working upon a *tabula rasa*. But I venture to think that the idea at the very outset of closing up open courts originally intended for the sole purpose of supplying light and air to a building of which they form a part, and which are not an inch too large for that purpose, is a bad one. To adopt it, even for so important an object as a new chamber, will be to begin upon a wrong principle and to invite future disappointment."

MR. J. HENRY MIDDLETON, M.A., Ex. Coll. Oxon, F.S.A., who has just been appointed to the Slade Professorship of Fine Art at Cambridge, is a son of the late Mr. John Middleton, F.R.I.B.A., of Cheltenham, and after leaving Sir Gilbert Scott's office, he was for some time in partnership with his father. Besides his architectural work, Mr. Middleton is known as a writer of authority on schools of painting, metal-work, pottery, mural decoration, ecclesiastical, &c.; and articles on these and kindred subjects from his pen have appeared in the "Encyclopædia Britannica,"



and elsewhere, his latest and perhaps most important work being "Ancient Rome in 1885," published last year, and which we reviewed not long since. Mr. Middleton is at the present time the senior partner of the architectural firm of Middleton, Prothero, & Philo, of Westminster, Cheltenham, and Newport, Monmouthshire.

An influential local committee has been formed to promote a fund for placing the Atkins monuments recently re-discovered in St. Paul's, Clapham, in some conspicuous and fitting place, and the end of the north transept of St. Paul's Chapel has been spoken of. This place has the great advantage of being close to the original position of the monuments, being, in fact, but a few feet from the vault where they were found, and which is most probably below the position which they occupied in the former old parish church of Clapham. Still there are great drawbacks, from the fact that the space is contracted and dark, while the presence of a row of small windows, which may not be interfered with, effectually prevents the re-erection of the architectural portion of the tombs, of which there are ample data for very exact recovery of the original designs. It will be better to have the figures visible, rather than to be hidden from public view again, but still it will be matter for regret if the committee should be unable to carry out this important part of what is necessary, instead of merely refixing the monuments on bases containing the original inscriptions, but without the architectural canopies, as is now proposed. We gave a detailed description of the figures in the *Builder* on the 2nd of January last, p. 60. We are glad to hear that the suggestion, made originally in these pages, to take down the Hewer monument from the external wall of the church, where it is exposed to all weathers, and to refix it within the building, is likely to be carried out. We hope, too, that at the same time, the fragments of the monument of Bartholomew Clerke, Dean of Arches, which are actually in the heating-chamber, will also be brought into the church. These consist of two brass plates with inscriptions, and a single small kneeling figure, one of four which once adorned the monument, originally a characteristic composition of the time of Elizabeth.

DR. POLE'S letter on "Aerial Navigation," in the last number of *Nature*, is worth the attention of those who are interested in the subject. Dr. Pole is no visionary enthusiast, but one of the most clear-headed scientific men of the day, and he believes that the recent French experiments in balloon propulsion and steering, though only very partially successful so far, open up a distinct possibility of a future solution of the practical problem of air-ships.

IT is satisfactory to note that in spite of what has been said in some quarters as to the too severe demands made upon candidates for admission to Associateship of the Institute of Architects, in the conditions of the compulsory examination, no less than thirty-three candidates have applied for examination next week, and the Institute have had to make special provision to furnish accommodation for the candidates, by closing the Library to readers for three days next week. It is to be hoped the Institute may before long see its way to adopt Mr. Spiers's suggestion and acquire the Conduit-street galleries on the ground-floor for carrying on their increasing business.

THE exhibition of Mr. Holman Hunt's pictures at the room of the Fine Art Society has naturally attracted great public interest. It is impossible to look at this collection of works, showing immense labour and such serious purpose, without a regret that the artist's wonderful technical powers and unwearied labour are not supplemented by that *Je ne sais quoi* without which the breath of life cannot be breathed into a work of art. The sense of labour is never absent in looking at Mr. Hunt's work. Every detail is painted with the greatest care and minuteness, but seldom does the expression of the

work touch one with any force proportionate to the labour bestowed on it. Among those which reach their mark nearer than the rest are the wonderful piece of coast landscape and sunshine in the "Strayed Sheep," and the landscape in the "Hiring Shepherd," which can be looked into in all its details almost like actual nature. These works make one doubt whether Mr. Hunt's proper calling was not landscape. "Isabella and the Pot of Basil" is a fine work, only marred by the fact that the Isabella is so unlike any possible girl of the period assigned to the story. So much for painting ideal characters unswervingly from a model. "The Awakened Conscience" is one of the figure-pictures that tells its story best and most directly. The "Light of the World" is one of the most remarkable pictures of its class, and has had a hold on the mind of the public such as the painter may well be proud of; but it is a work that will lose much of its hold when the kind of sentiment to which it appeals has passed away; and the same may be said of "The Shadow of Death," a much less complete and typical work, however. The "Light of the World," like Rossetti's poem "The Blessed Damozel," struck a new chord. The collection includes the "Scene from the 'Two Gentlemen of Verona'" (remarkable for the admirable portrayal of Julia's anxiety at the impending discovery of her disguise); "Claudio and Isabella," in which Claudio looks quite mean enough for the proposal he made to his sister; a small duplicate of the "Christ and the Doctors," which is, perhaps, the artist's most successful work; and "The Scapgoat." The painter of these works will go down to posterity; but not in the first rank. Something is wanting. Genius has been described as "an infinite capacity for taking pains." Mr. Hunt's works give a decided negative to the definition. Pains-taking almost amounting to genius is there; but it is not genius.

#### ARCHITECTURAL DRAWINGS AT THE ROYAL SCOTTISH ACADEMY.

WHILE there is no building of importance illustrated in this year's exhibition, the designs, although none of them displaying extraordinary ability, may be considered as fair specimens of the architectural outcome of the period.

Of designs for churches the most noteworthy is that of the Coats Memorial, at Paisley, by Mr. H. J. Blanc, which was successful in the competition, and which we fully described at the time. Mr. J. M. Dick Peddie submits an interior view of the chancel of St. Mary's Church, Haddington, restored. This church is of the same period, and probably designed by the same architect, as the later portions of St. Giles's, Edinburgh. It is, however, all of the one style, and is more graceful in its proportions and detail than the metropolitan example. The nave is still used as the parish church, but the chancel and transepts are in a state of utter ruin, and not likely ever to be restored as suggested by Mr. Peddie. The central tower (called "The Lamp of Lothian") when surmounted by its open crown, was probably the finest example of its kind. The church, which possesses a rich and characteristic west doorway, is illustrated in "Billing's Ecclesiastical Antiquities."

The front elevation of New Parish Church, Bo'ness, by R. Thornton Shiells & Thomson, showing a lofty broached spire in the centre, flanked by octagonal-ended transepts beyond, which appear square-ended transepts, has a dignified aspect, but is somewhat commonplace as regards detail. The "Selected Design for New Church" (place not stated), by James Fairley, appears as an attempt to give importance to a small church by giving it all the features which may possibly be found in one of considerable dimensions, a mode of procedure very apt to impose upon a committee uninformed as to such matters.

The new spire, St. Paul's Parish Church, Galashiels, designed by Messrs. Hay & Henderson, occupies its position in a worthy manner. It has sufficient bulk for dignity and enough detail for picturesqueness. Mr. Thomas Leadbetter's Parish Church, near Linlithgow, is a fair example of an Early English church with spire, aisles, and transepts,

as conceived by a modern architect. Somewhat more pronounced is Mr. John A. Campbell's Free Church at Elie, Fifeshire, the spire of which is terminated by a small stone dome in a happy manner.

We have the usual contingent of mansions after the Scottish Baronial manner. Pitmedden, Aberdeenshire, has not suffered by the additions to it by Mr. Henry Wardrope, which show a thorough knowledge of the style. The House at Kilwinning, as designed by Mr. John James Burnet, is of a less ambitious type. The Tower of Lethendy, by Mr. Andrew Heiton, shows judicious selection and distribution of detail, and Kinlochmoidart, Invernesshire, by Mr. William Leiper, is equally felicitous, with rather more originality of treatment.

The latest phase of Scottish secular architecture is treated in a masterly manner by Mr. Sydney Mitchell, in the Hall at Well Court, Water of Leith. Well Court is a block of workmen's houses built for Mr. Findley of the *Scotsman*, and although quite new is a subject fit for the painter, both as regards composition and colour.

The central pavilion of the old Royal Infirmary of Edinburgh has been delineated in a worthy manner by R. Weir Schultz. It was designed by William Adams in the beginning of last century, and was destroyed a short time ago. Its destruction seemed inevitable, but we are pleased to observe that our suggestion as to the utilising of the fine old gateway on another site has been carried into effect.

The Parish Hall and Presbytery - room, Hamilton, by Mr. G. Washington Brown, is a modest and satisfactory building of Queen Anne type without any vagaries.

The street architecture of the new town of Edinburgh, notorious for its monotony, is now being relieved by the introduction of gabled elevations. One has sprung up adjoining the new premises of the Bank of Scotland in George-street. It is a strongly pronounced narrow front of Queen Anne type, with lanky columns supporting nothing.

At the west end of Princes-street a lofty tenement has sprung up, having double bulbous gables, and towards the eastern end of that street a space has been cleared, upon which is to be erected new premises for the Edinburgh Café Company. These premises, designed by Mr. H. J. Blanc, will form a marked feature in the line of street as seen from the Mound. The gable in this instance is bounded by straight lines, the flanks of the elevation are broad and solid, and in the centre, above the shop-front, a wide mullioned oriel is carried up through three stories, and a row of small square windows runs across at the springing of the gable. It is a most satisfactory manner of treating a narrow frontage. The Buccleuch Memorial and Science and Art School, Hawick, designed by Mr. James Fairley, jun., is a Classical structure upon a small scale, displaying a wealth of sculpture, which, if executed in a manner at all satisfactory, will form no inconsiderable item of the cost of carrying out the design into execution. New Premises, South St. Andrew-street, Edinburgh, designed by Knox & Hutton, are just completed, and are effective in their way, but the style, a sort of Neo-Grec, is hard and unsympathetic. Mr. Hamilton Beattie's preliminary design for the Edinburgh International Industrial Exhibition is of the accepted character of these glass and iron structures appropriated to such exhibitions. There is a dome, of course, and it is of a pleasing contour; the rest is rude and furrowed, appropriately treated.

Mr. John Le Conte makes a speciality of the architecture of Old Edinburgh, his drawing of the Canongate Tolbooth with Moray House, &c., contains two of the most remarkable facades in the Old Town. Mr. Ruskin pronounced the Tolbooth to be the finest thing remaining intact in the city.

**Proposed New West Front to Milan Cathedral.**—We recently announced that it was proposed to rebuild the western front of Milan Cathedral, and that an International competition would be held for the purpose of selecting designs. By the courtesy of Signor Magrigno, the Secretary of the Milan Institute of Architects, we are informed that the particulars of the competition are not yet ready, but it is expected that they will be published shortly and so soon as we receive them we will lay translation before our readers.



## CONCRETE.\*

I HAVE to-night to ask your attention to the means to be adopted for rendering buildings stable, and securing good foundations. This question of foundations is perhaps the most essential of any with which persons connected with buildings have to deal, for if the foundation be faulty, the superstructure, even if it should stand, will certainly suffer. It will be totally useless for the architect to design or for the deft fingers of the mason to elaborate the most delicate window-tracery, the most graceful piers and columns, the most stately towers and domes; or for the artist to enrich these creations with the most brilliant efforts of his genius, unless the edifice be founded so that no cracks or settlements occur to deface the decorations. In some localities, as, for instance, where rock crops up close to the surface, a natural foundation is obtainable which cannot be improved upon, but in the majority of cases, and especially in London and its neighbourhood, it is almost impossible to find a good natural foundation without digging to a depth that is practically out of the question on the ground of expense. Hence, it is necessary to form artificial foundations, and the material principally used for these is concrete.

Although the use of concrete as a building material is of comparatively recent date in this country, it was known and extensively used by many of the nations of antiquity. There is ground for thinking that the Greeks were not unacquainted with its use, especially in the Italian colonies of Magna Græcia, and, as far distant as Mexico, in many of those curious pyramidal buildings which are the remains of an unknown civilisation, concrete foundations have been discovered. But when we come to those grand old builders the Romans, whose *par excellence*, the scientific constructors and engineers of ancient times, we find that they used concrete to an extent with which nothing that has as yet been done in modern times can compare. One reason for this was that the Romans found ready to their hand the best natural materials that exist in the whole world for making good concrete, viz., the Travertine, the pozzolana, which is a fine sandy earth of volcanic origin, and a beautiful clean, sharp sand. The use of concrete by the Romans dates back as far as the time of the æge (i.e., anterior to 509 B.C.), and no less than five kinds of concrete walls are described by Mr. Middleton, who has recently devoted a great deal of careful attention to the methods of construction of the Romans. In addition to using concrete for foundations they used it without any facing for walls, which were constructed very nearly as described in Mr. Tall's Mr. Drake's patents, which were taken out a few years ago. Wooden posts were fixed in the ground about 3 ft. apart, and boards were nailed horizontally to the posts, and then the intermediate space was filled in with concrete in a semi-fluid state, and, as soon as this had set, the boards were moved one stage higher, and the concrete formed one perfectly solid mass, and some of these early Roman walls are solid and hard still that quite recently it has been found necessary to destroy them with dynamite in the course of improvements that have been made. Even when the Roman walls appear to be of brick or marble, it is in every case a mere facing or veneer, and the core of the wall is of concrete. They also largely used this material for constructing very extensive vaults supporting upper floors, staircases, ranges of seats, &c. Concrete also formed the basis of all the Roman roads, and in the early examples the slabs of stone laid on the concrete were much more closely jointed than was the case afterwards. There can be no doubt that the lasting use of the Roman concrete was due, in addition to the excellence of materials, to the skillful way in which it was made, and I shall now refer again to the method of making concrete adopted by the Romans. The French have been very great users of concrete, or, as it is there called, since the year 1820, the material has been used in enormous quantities in docks at Toulon, Marseilles, and others, and in the construction of the mole at Cherbourg and the breakwater at Cherbourg. In this country concrete was employed in very many ways, as for instance in the foundations

of Westminster Abbey and in the older portions of the substructure of St. Paul's; but its use died out, and for a long while the only method adopted for making stable artificial foundations in bad soils was pile-driving. Although Mr. Semple, of Dublin, in 1776, suggested the use of a mixture of sand, gravel, and quick lime for structural purposes, it was not till the beginning of this century that concrete was recognised as a building material. Colonel Pasley says that the first use of concrete for foundations was by Mr. Smirke at the Millbank Penitentiary in 1817, and there is a story that the discovery, or rather re-discovery, of the fact that lime would combine with gravel and form a sort of artificial stone, was a pure accident, owing to the upsetting of a barge-load of lime during the erection of Waterloo Bridge, when it was found that the loose gravelly bed of the river had been rendered hard and compact by the action of the lime.

Now what is concrete? It may be defined as an artificial stone, composed of a mixture of hard materials, such as ballast, flints, stone chippings, broken bricks, pottery, or iron slag, called the "aggregate," and a cementitious material called the "matrix," thoroughly combined together with a sufficient quantity of water. The value of the concrete depends almost entirely upon the quality of the cementitious material, whether lime or cement, and as it is most important that you should clearly understand the difference in the properties of various kinds of lime, I must make a short digression here in order to describe them.

You are, of course, all aware that lime is produced by burning limestones, and upon the constituents of the limestone depends the quality of the lime. First there are the rich limes produced from stones which are perfectly pure carbonate of lime, such as the upper and middle chalk formations and white statuary marble. Lime made from these stones is commonly called chalk lime, and is much used for mortar and concrete in country districts where chalk is plentiful. This lime when mixed with water commences to slack as it is called, i.e., it swells, hisses, gives off hot vapour, and falls into powder, and if it be then mixed with water it will always remain of the same consistency and never harden at all; and as it is soluble in fresh water, mortar made of chalk lime should never be used for external work, as the action of the weather will soon render the joints quite soft; and any one who has been present during the pulling down of buildings the mortar of which was composed of chalk lime will have noticed how easily the bricks are separated, and what a large amount of dust comes from the demolition. Then come the poor limes made from the argillaceous or clayey limestones, which contain, in addition to the carbonate of lime, various foreign substances, chiefly silica and alumina, and often a small quantity of oxide of iron. The existence of a small quantity of these foreign substances,—as in the Dorking, Halling, and Merstham limestones,—causes the lime made from them to show much less violent action when slacked, and enables it to set after slacking, but not under water. Next come the blue lias limestones, which contain a greater quantity of silica and alumina, and produce what are called hydraulic limes, which will set and continue to harden under water; and after these come the so-called natural cement stones found in the London clay formations at Harwich, Sheppey, and the Isle of Wight, or imports of Yorkshire in the clays of the colitic series. These contain even more silica and alumina, and from them used to be manufactured the Medina and Roman cements, which had the power of hardening under water very quickly. These cements enjoyed a high reputation for many years, but they are now almost entirely superseded by the artificial cements of which Portland is the type. You may take it roughly that rich limes contain over 90 per cent. of carbonate of lime; grey-stone limes, such as Dorking, about 80 per cent.; blue lias from 65 to 70 per cent.; and cements 40 to 50 per cent.

When it was a well-ascertained fact that for building purposes lime obtained from the limestones containing a considerable proportion of argillaceous earth was the best, the idea began to gain ground that an artificial cement could be manufactured by mixing chalk with various kinds of clay, and calcining the mixture. The first patent ever granted for the manufacture of an artificial cement of this kind,—called Portland cement from its resemblance when

set to Portland stone,—was taken out by a Mr. Aspdren, in 1824 (who describes himself as of Leeds in the county of York, bricklayer), but the manufacture was not placed on a really scientific basis till Colonel Pasley carried out his elaborate series of experiments during the years 1826 to 1836. As so often happens with scientific discoveries, it appears to have been by pure accident that he discovered, after many failures, the superlatively good qualities of the alluvial clay or mud of the lower basins of the Thames and the Medway; this clay, which has been deposited in the tidal waters of these rivers, containing exactly the right proportions of silica and alumina for combining with the chalk. It would take too long to describe in detail the manufacture of Portland cement, but briefly it is this: the chalk and clay, in the proportion, as a rule, of about 70 per cent. of the former to 30 per cent. of the latter,—though these proportions vary with the nature of the chalk,—are ground under rollers and intimately mixed together with a great quantity of water until the mixture is of the consistency of thin paste, which is allowed to settle. The water is drawn off, and the residue is left to dry. This is then cut out in lumps and taken to the kilns, when it is burned at a high temperature, and it is very important that the whole of the mixture should be thoroughly burned. The effect of the burning is to drive off all the carbonic acid gas, and to leave the mixture in the form of clinkers. These are then carefully ground to a powder under millstones of such a degree of fineness that it will all pass through the meshes of a sieve having 625 holes to a square inch. The weight of the ground cement should be as nearly as possible 1 cwt. per struck bushel, and the specific gravity 3.00. The essential difference between lime and cement is that lime slacks with the addition of water, while cement does not. Lime powder after slacking will not set if mixed up with water, unless sand be added to it, while cement will set at once, and equally well in the water and the air. The property of setting quickly and setting under water makes Portland cement of the greatest value, and its use for concrete is extending every day.

Now with regard to the aggregate. This may consist of ballast, stone chippings, broken bricks, &c., but the latter should never form the whole substance of the aggregate, and care should be taken that the pieces are not too large. In the case of ballast, it is most important that it should be clean and free from any admixture of loam or earthy substance. And there is one other point to be remembered, which is, that the concrete will be much stronger for the admixture of a small quantity of sharp sand, which will fill up the interstices between the pebbles, &c., and will make a much more solid mass of the whole.

Having thus described the materials of which concrete is composed, I now come to the mixing process, and this is a matter which is far too often neglected. We all know the good old rule-of-thumb way in which ordinary builders' labourers mix up the concrete: a heap of ballast and broken bricks is piled up, a certain, or rather very uncertain, quantity of lime is poured out on it from a sack, the water is added according to the discretion of the mixer, and the mass is quickly turned over, and wheeled and shot into the trench, and a very superficial examination is often sufficient to show numerous nodules of unslacked lime after it has been thrown in. Now this is a most unscientific and improper way of preparing concrete: the great essential is that the lime should all be perfectly slacked during the mixing of the concrete before it is thrown into the trench, and that exact proportions should be maintained.

For ordinary foundation purposes, if what is called stone lime be used, two measures should be prepared, the cubical contents of the one being four times that of the other. The large measure should be filled with ordinary ballast, and turned out on a boarded platform; to this should be added a small measure full of sand, and then a small measure full of lime: this will give the proportion of five parts ballast and sand and one of lime, and if this be well mixed and turned over after the water is added, which should be done gradually and in small quantities, it will make a very good concrete for ordinary purposes. If the ballast and sand, before the admixture of the lime, amount to a cubic yard, it will be found that about thirty gallons of water will be required to mix it thoroughly.

\* By Mr. John Slater, B.A., being the fifth of the first course of free lectures to artisans at Carpenters' delivered on Wednesday evening last.



This mixture should be then wheeled and thrown into the trenches,—not from a great height, as used to be considered essential, for, if so, the heavier particles tend to fall to the bottom first, and the mixture will not be so well amalgamated,—levelled, and rammed. The French method of making concrete, or *béton*, which is almost exactly the same as that adopted by the old Romans, is undoubtedly superior to ours. They invariably mix up the lime and sand to form good mortar first, and then mix in the pebbles with it. A heap of good stiff mortar is first prepared with a moderately hydraulic lime and sharp sand; are then spread out on a platform; over it is spread a barrowful of mortar; then a second barrowful of stones, and then another of mortar, and the whole is turned over with spades and dragged backwards and forwards with rakes till the pebbles have become thoroughly enveloped in the mortar, and the whole mass is then thrown into the trenches. An extra precaution against deterioration of the concrete by contact with loamy earth is adopted in the best work by covering the bottom of the trench with another layer of sharp sand. The washing of the ballast is an excellent thing, as it tends to clear it from any earthy particles that may have become mixed with it. There can be no doubt that this is a far more scientific method of making concrete than the former; if the mortar is well made, you get the pebbles more thoroughly amalgamated, and you ensure that the lime shall be thoroughly slacked before the concrete is spread; but it is also more expensive, and I should not consider it necessary to use this method in ordinary cases. But where the soil is very wet, or in any case where the stability of the foundation is of very great importance, I should always recommend the use of cement concrete. With ordinary care in mixing this, supposing the materials are of good quality, you know you can rely upon its setting quickly and forming a perfectly solid foundation, and you need be under no apprehension of having it spoiled by the inroad of water. The cost is more than that of lime concrete, but not so much more as the difference in cost of lime and cement, because you can use less cement proportionally. Six parts of ballast, one of sand, and one of Portland cement will make a concrete good enough for almost anything in the way of foundations. Care should be taken that not too much water is used. Faraday, the eminent chemist, said that in the production of concrete the great thing was the discreet and accurate use of water: if too much be used it will wash the cement away from the particles of the mass before it has time to become thoroughly indurated. If the trench in which the concrete is to be spread is not too deep,—that is, not above 18 in.,—my own opinion is that you will get a harder and more solid mass by filling it up at once to the full thickness, and not putting the concrete on in layers; but if you have to put the concrete 5 ft. thick, it must, of course, go on in layers. In any case, it will be much improved by being well rammed after levelling. In such a material as concrete there must be a large number of minute air spaces,—you can see them with the naked eye in concrete that has set,—and the act of ramming will drive out much of the interstitial air and make the particles of the mixture more compact, and the denser such a material is the stronger it is. Numerous experiments have been made to ascertain the loss of bulk in making concrete. Professor Hayter Lewis found that 27 cubic feet of Thames ballast mixed with 4½ cubic feet of lime and 40 gallons of water, made exactly one cubic yard of concrete; and in some tests made by the Royal Engineers, it was found that 27 cubic feet of broken stones, 9 cubic feet of sand, 4½ of Portland cement, and 28 gallons of water exactly made a cubic yard. The difference between the two experiments may be accounted for entirely by the presence of the sand in the latter case, because the probability is that if a measure containing a cubic yard were filled with broken stones or ballast, it would still hold 8 or 9 cubic feet of fine sharp sand, because the pebbles will not lie close. It is sometimes stated that concrete expands after being mixed; if it does, it is because it has been improperly mixed, and any expansion that takes place after mixing can only cause some disintegration to take place.

Hitherto I have spoken of concrete as used

for foundations only, but there are many other purposes for which this material can be employed. I suppose it is not much more than twenty years ago that building materials and labour, being at a very high price and by no means of very high quality, the idea began to gain ground that concrete might be used for the walls of buildings. I have already alluded to the fact that the Romans used it for these purposes, and that, too, although they only had lime, whereas we have Portland cement. But the mixing of the pozzolana, which I have previously mentioned, with the lime gave it many of the characteristics of a cement.

The Italian architect Palladio, writing 300 years ago, gives a very good account of the Roman method of wall construction. He says "The Ancients used to make walls called *reimpiauta*, i.e., filled up with ragged stones, which is also called *coffer-work*, taking planks and planting them edgewise in two rows, distant from one another the thickness of the walls and filling the space between them with cement, stones of all sorts, earth and mortar mingled together, and so on from course to course." This method of using concrete for walls is called *monolithic*, the concrete being simply poured, in a semi-fluid state, into the position required, to which it is confined by boards, and it sets in that position, so that the whole of the wall is one compact homogeneous mass. Another method is to form slabs of concrete by casting it in moulds and allowing it to set there, and the slabs are then taken out of the moulds and carried to the place required and used in the ordinary way, just like bricks or stone. The former system, if only ordinary care be taken, makes undoubtedly the strongest work, as there are no joints, either vertical or horizontal, and, moreover, no skilled labour is required in this construction, ordinary labourers being able to mix the ingredients and fill in as required. Several systems of apparatus have been invented for confining the concrete to the requisite thickness of wall, and for shifting the moulding boards from one stage to another, and many of these are of somewhat complicated a character, but it is very doubtful if any material advantage is gained over the simple plan of nailing the boards to the upright posts and filling in between. Walls thus constructed are really stronger than brickwork, drier, and more cheaply built, but great care must be taken in the preparation of the concrete: the cement must be of the best, the aggregate must be broken to the proper size, and the whole thoroughly well mixed. If these precautions are taken, the thickness of the walls may be about 20 per cent. less than with brick.\*

#### ROYAL INSTITUTE OF BRITISH ARCHITECTS.

##### SOME AMERICAN METHODS OF CONSTRUCTION.

The seventh ordinary meeting of the present session was held on Monday last, Mr. Ewan Christian (President) in the chair.

Mr. J. Macvicar Anderson (Hon. Secretary) intimated that the Council proposed to close the library during Tuesday, Wednesday, Thursday, and Friday next week up to six p.m., but it would be open in the evening as usual. This was necessary on account of the number of applicants (thirty-three) desirous of submitting themselves to the obligatory Examination, and as the Council did not know how to accommodate them otherwise than by giving up the library for that purpose. As the Council believed a good many other applicants would present themselves in the course of the present year, it was proposed to hold another examination, possibly in November next. At the examination held towards the end of last month in Leeds, eight professional architects had been examined, but the result had not yet been made public.

A letter was also read from Gen. Ponsonby, stating that her Majesty had given her sanction to the selection of M. Charles Garnier as Royal Gold Medalist for the year.

Mr. R. Phené Spiers asked whether there was a possibility of the Council acquiring the use of the downstairs galleries at any future time. There had been considerable difficulty from time to time in finding space for the hanging of the drawings submitted for the various prizes, and he believed these diffi-

\* To be continued.

culties were likely to increase in the future. It had been intimated that in consequence of the large number of candidates for examination, the library would have to be given up on certain days, while the two magnificent galleries downstairs were, so to speak, in the hands of outsiders.

The President.—If the numbers increase as we have heard this evening, we may hope that we shall be able to take the additional galleries; but at present it is a question of finance, and we cannot venture to do it until we are in better circumstances. The next thing I have to announce is that a special general meeting, to consider the Charter, will be held on Monday, April 5th, at seven p.m.; and that, in case of any adjournment, it will be continued on the next day at eleven a.m., and so on until terminated. We hope, if possible, to bring this question of the Charter to an end, and to get the opinions of the members of the Institute upon it. We do not want to have any delay.

Mr. John B. Gass (Bolton), Graduate, and Associate, and Holder of the Godwin Bursary and Medal for 1885, then read a paper on "Some American Methods," of which the following is an abstract:—

As holder of the Godwin Bursary, 1885, Mr. Gass visited many important cities in the United States and Canada, his tour extending over a period of three months. He found great practical benefit therefrom, and expressed his deep sense of obligation to Mr. Godwin, F.R.S., for his institution of the bursary, and to the many American architects and others for their courteous reception and willing assistance. The subjects treated on very fully in his paper, formed only a portion of his report. The most approved method of incombustible or fire-proof construction is a system of iron construction with hollow tile arches, the *voussoirs* having sides about 1 in. thick, and all the ironwork encased in ordinary or porous terra-cotta, specially made to suit positions, and plastered on top. Partitions or internal walls are made of hollow tiles which have good bearing power; a 5-inch hollow tile wall resists heat better than a 12-inch brick wall. Roofs are constructed of hollow tiles or porous terra-cotta slabs, supported by wrought-iron joists, and covered with various kinds of roofing. Underside of wooden joists and inside wooden frame houses are made fire-resisting by terra-cotta slabs plastered on face. This is being extensively used, and has stood severe tests. Ordinary brick arching in 4-ft. spans, resting on cross wrought-iron girders is still used, notwithstanding many disastrous failures. Concrete floors are occasionally used, in some cases as arching with corrugated iron soffit, in others with wrought-iron joists and flat soffit. Slow-burning or mill construction is in general use for all sorts of mercantile buildings, and affords excellent protection against fire spreading. Walls of brick, square columns of wood, not tapered, with cast-iron pintle between wooden beams, plank floor 3 in. to 4 in. thick, with hardwood laths in joints, flooring of 1½ in. hardwood boards with laths, laid over two thicknesses of rosin-sized sheathing paper or ½ in. mortar. No painting, varnishing, or filling on woodwork for at least three years after the building is finished. Where special danger of fire exists, woodwork is encased with bright tin. Roofs with similar construction to floor, with outer covering of tin, asphalt, tar, or gravel, cotton duck, &c. Double doors, with air space between, to prevent fire spreading; one door for closing in ordinary use, the other kept open by automatic fastening, which closes in case of fire. These doors made of two thicknesses, tongued and grooved boards, covered with bright tin, or made of strong iron. Wire cloth lathing kept 1 in. from the woodwork and ironwork, and plastered on top, is used for fire protection, as also are "Merrett" plaster, the basis of which is asbestos, and magnesite calcite, a saturated paper pulp. Brick walls to houses being generally furred with wood inside before plastering, "fire stops" of incombustible material are used at top and bottom on each floor to prevent fire spreading. In New York and other cities, outside fire-escapes are required on all tenement, flat, and apartment houses, office buildings, lodging-houses, and factories; stand-pipes, with nozzle in each floor, run up alongside the fire-escape. In great fires at Chicago and Boston, brick stood the best for walls, stone calced, limestone the best for walls, stone burned off, leaving the fronts in many cases burned off, leaving the brick backing standing one or two stories in height. Sandstones stood better than limestones.



but granite disintegrated very rapidly; artificial stones suffered less damage than natural stones, and mortar stood better than bricks. Cast-iron columns failed very badly, bringing down whole buildings, and the failure of floors was generally from the exposed ironwork. Telegraph-poles got charred, but stood where buildings around were completely destroyed. In conversations with several chiefs of important fire-brigades, it was noted that the terra-cotta block system, with all iron encased, was thought by them to be the nearest approach to a perfectly fireproof building; brick arching for floors and ironwork exposed universally condemned; slow-burning construction, with floors made watertight, advocated for mercantile buildings; some place in the roof that could be made to serve as smoke-outlet should be provided in buildings of large size; one wood door, covered with tin, better as fire protection than one iron door; but two iron doors, with air-space between, better than two wood doors. The "fire-protection" apparatus for mill buildings is very complete, well arranged, and regularly inspected by the officials of the Mutual Fire Insurance Companies. In addition to other apparatus, sprinkler systems are in general use. These are formed by parallel lines of pipes, extending across the rooms, near the ceiling, and connected with a good water-supply. In valve-sprinklers, rows of perforated pipes are fixed in sections, in which the water can be turned by valves in case of fire. Automatic sprinklers are various forms of apparatus set in motion by the fire itself, at first breaking out, and are brought to bear directly on the place where the fire exists, and so arranged that when any one is in motion, the flow of the water sets an alarm-bell in motion. They are attached to the water-pipes at frequent intervals, and depend on their action on a solder fusible at a low temperature, ordinarily at from 150° to 170° Fahrenheit. The Grinnell sprinkler is the most largely adopted, and others in use are the Armelee, Walworth, Victor, &c. From Mutual Insurance Company's returns, 1877 to 1885, in buildings protected by automatic sprinklers, there were 195 fires reported, with an average loss of 327 dollars per fire; in buildings not so protected, 553 fires, with an average loss of 794 dollars per fire. Ventilation and heating receive great attention in many parts of America; owing to the dryness of the atmosphere in the winter, and the greater evaporation from the body, it is necessary to keep a higher temperature in the rooms than is the case in England. At the Massachusetts Institute of Technology, Boston, there is a plenum pipe, high, under the whole of the basement of building, into which fresh air, warmed or not as required, is put under pressure of  $\frac{1}{2}$  in. water column. Air distributed from this to rooms through flues, 36 in. by 12 in., with steam oil-box at the bottom of each, the temperature and volume being regulated by the engineer on the basement. Inlets into rooms 8 ft. above the floor, and larger than the area of the inlet, so as to ensure slow movement. Outlet pipes have two apertures in the room, one a few inches from the floor and the other close to the ceiling—the former wholly used during hot season,—outlets discharge above the roof. The outlets are smaller than the inlets, so as to give pressure against the outside and prevent draughts. The whole system is under the control of the engineer, who maintains a temperature of about 65° in the rooms; he is furnished at evening with the weather prediction for the next twelve hours, and is responsible for the thermal condition of the building at the hour of opening, being under explicit orders as to steam and air supply for various conditions of weather. This system is successful and economical in working. At the Pittsburgh County Building and other places fresh air is taken from the top of the tower, passes over steam coils and rough water washer, put under pressure by fans in large ducts, and conveyed through flues into rooms, exhausted into chimney with smoke from boiler in centre. The systems adopted at the American Bank Note Building, State Hospital for Insane, Norristown, Pennsylvania; Roman Catholic Church, New York; and the Canadian Parliament Houses, Ottawa, were so described. The Baptist Church, Toronto, amphitheatrical in plan, and has floor saucer shaped. In the winter fresh warmed air is admitted to the church at the highest point in the floor; the foul air is extracted from the lower level through trefoil openings in each arch-end, and connected by small flues into the

main trunk in the basement, which is exhausted into large vent-flue, having the smoke-flue from hot-air stove in centre. There is roof ventilation for summer use. At McVicker's Theatre, Chicago, fresh air is taken from 60 ft. above ground, filtered, passes over steam coils in winter and ice-chamber in summer, forced into auditorium by fan through openings in ceiling. Extracted through openings in risers of floor and exhausted by means of fans. Air changed in auditorium every fifteen minutes. The system of down-current ventilation used with success, but not available where gas is burned. The extracts at floor level are ordinarily used in cold weather, however the warm air is admitted into rooms. Heating by indirect radiation often adopted for houses. The difficulties with, and objections to, steam heating are partially removed by the use of fractional valve. In the Canadian cities particularly, many steam-heating apparatus have been taken out and hot-water systems put in. In houses heated by hot-air, steel-plate furnaces are found the most satisfactory. There are open fireplaces in the best houses. The Morse sun-rays heater and ventilator is fixed outside the building, and acts when the sun is shining on the black and roughened outer covering. The progress of American architecture has been remarkable within the last few years, and though there is much that is bad, vulgar, and pretentious, it has begun to exhibit artistic and peculiar qualities of a very high order. The best specimens are scholarly and refined in detail, but adhere less slavishly to precedent than European work. New combinations are introduced, dictated by and growing out of the necessities of the building, without violating the character of the style. The best work is accordingly living and interesting, less the production of a dry-as-dust archaeology, and more in accordance with the true principles of all great architecture.

Mr. A. J. Gale (the first Godwin Bursar) proposed a vote of thanks to Mr. Gass. It was not at all an easy matter to go to America for the purpose of investigating its architecture, because there was so much to see, and a great deal of time was spent before the best examples were found. Mr. Gass was right in speaking of the help which American architects afforded to their English brethren who visited that continent, as they were gratified at their works being thus studied by Englishmen. He hoped this might not be the last occasion on which a Godwin Bursar went to America. The benefits arising from the reading of the paper and an inspection of the drawings on the walls could, however, be little compared with the benefit which such a Bursary conferred on its holder. He (the speaker) had not visited Canada, but he believed that the Canadian was not equal to the best American work. It was inadvisable to draw distinctions, but Mr. Richardson's work was universally good, and one of the most valuable things he was doing for the future of American architecture was his exertions in training men for the profession who would worthily succeed him.

Mr. John Slater, B.A., in seconding the vote of thanks, remarked that the members must have inspected the drawings and photographs on the walls with admiration, perhaps, in some few cases, not unmingled with a little awe. There was no doubt as to the value of the Bursary established by Mr. Godwin, who had foreseen the good architects would derive from finding out a little of the methods of American and Continental construction, and from learning that we in this country had no monopoly of excellence. The constructional methods of America seemed to show a boldness and breadth of aim, and a lack of conventionalism, which were really refreshing. Whether the lack of conventionalism in some of the artistic work was a subject for commendation must be a matter of opinion; but structurally, he believed, there could be no doubt about it. As to the fireproof system, the Americans were far ahead in that respect, and he could not help thinking that we might make our buildings far more fireproof than they were at no very great expense. The Americans also proceeded in a scientific manner with the question of the foundations, and in many cases they had to face greater difficulties than were met with in this country. In this connexion he should like to call attention to the excellent fireproof system which had been introduced by Mr. Lindsay, of the Paddington Ironworks, called "steel decking," which was being

used by Mr. Waterhouse at the National Liberal Club. It was impossible to read the professional journals of America, or the programmes of the various industrial universities and institutes of technology, without seeing what immense strides had been made in the matter of architectural education. Though a young nation, they had yet done infinitely more than our own in this respect. No doubt we had done a good deal, and the obligatory Examination was an instance of this, but we had not gone far enough, and this question of the education of students of architecture would have to be faced and fought out by the Institute in combination with other bodies. Mr. Slater then quoted the curriculum for an architectural student at the Massachusetts Institute of Technology, which was of a very comprehensive character, and contended that it was a disgrace that in England generally the architectural student had no such means of studying his profession as were available on the other side of the Atlantic. No greater benefit could accrue to the members of the Institute than to learn something of the methods of other countries, and to occasionally take stock, as it were, of their own deficiencies. With this object in view, he would venture to suggest that, as a number of honorary and corresponding members were on the roll of the Institute, some means should be adopted to make these gentlemen a little less honorary, and a little more corresponding. Great good would be done by getting them to give an occasional communication on the sort of work going on in their city, country, or district.

Mr. Alexander Payne asked if the drawings and photographs displayed on the screens could be kept up for some time?

The Secretary replied that the drawings would be on view all the week.

Mr. Rickman thought Mr. Gass had been wise in confining himself to a few results of his labours. In visiting Canada and the States one saw a very marked change from the architecture of this country. In the United States a class of buildings of our own date were to be seen, in connexion with which the architects had thrown aside survivalism, and had worked according to their own ideas. In spite of this, he found, when there, that he was not so shocked with the *bizarries* of their appearance as he had anticipated.

Mr. Phéné Spiers remarked that it might be interesting to say a few words as to the origin of much of the past architecture on the other side of the Atlantic. The American students had studied chiefly in France. Mr. Hunt, one of the oldest Corresponding Members of the Institute, was a student of the École des Beaux Arts, where Mr. Richardson had also studied at the time when he (Mr. Spiers) was there. In 1867 or 1868 Professor Ware visited this country to study English art, and subsequently went to Paris to lay down a scheme of architectural education for an Institute at Boston. This system had been introduced into the Institute of Technology at Massachusetts, and was also being introduced into another Institute at New York. From time to time during the last twenty years he (Mr. Spiers) had received the visits of many of Professor Ware's most promising pupils. Feeling that the education he was able to give them was not sufficient, the Professor advised them to spend a few years in Paris, and on their way they had invariably called upon him for advice as to the course they should pursue when in the French capital. The style, therefore, which those who founded that school had taken as their starting-point, had been modelled on French ideas, such as would be found in the Library of St. Geneviève, in the building of the École des Beaux Arts, in the Imperial Library, in the Stamp Office, and in various other buildings. If they bore this in mind, and looked at Mr. Richardson's drawings and photographs, they would see from whence he drew his inspiration. At the same time they would observe how the practical American had cannied the Byzantine or Neo-Grec style to be so materially altered, that it became to a great extent an original series of conceptions. The Harvard Law School showed a great amount of originality and peculiar refinement, mixed with extreme breadth and boldness. It would have been impossible, he believed, for an English architect to have gone to the extent Mr. Richardson had gone, as he would have had numberless critics pointing out how he had sinned against the laws of ancient art.



Mr. Spiers concluded by saying that he looked forward with much interest to the future of American architecture.

Mr. Hugh McLachlan (second Godwin Bursar) said that both in America and in Germany the questions of heating and ventilation were more thoroughly considered than they were in England.

Mr. Dawson having made a few observations,

Professor Kerr remarked that he had visited America forty years ago, and he had always taken great interest in everything connected with that country. In the matter of architecture, there were two roads in which America might be expected to make very considerable progress; one was in respect to ingenious construction, and the other in what might be called originality of design. The whole population of America seemed to grasp the necessity for new inventions, and when an invention was brought to bear fully upon any requirement, it appeared to be done, not in the rough-and-ready way to which we were accustomed, but in a precise and practical manner, which showed the Anglo-Saxon intellect at its best, in that particular sphere. In this country we seemed to be too greatly trammelled with old traditions, and did not appear to get beyond the instruction received at school; but the Americans threw all that to the winds, and struck out for themselves, whenever occasion required, some new contrivance. Mr. Spiers had referred to the influence of France, but the Americans occupied a peculiar position in regard to architectural design. They were the English of the future. Design was a much more difficult thing to deal with than mechanical contrivance, because it seemed to march with the ages in an independent career of its own. When he was there forty years ago Trinity Church, New York, was just finished, and was considered a very fine building, and Grace Church, at the other end of Broadway, had been finished with a crooked spire in cast-iron, painted to imitate granite. The then Editor of the *New York Herald* characterised this spire as being like a crocodile standing on its head, and this was the style of criticism which prevailed in England at the present day. Since then the Americans had made amazing progress, which, as Mr. Spiers had said, was largely due to French influence. The students came to London, got advice from Mr. Spiers, and saw what we were doing. Thus a sort of cosmopolitan style of architecture would gradually be evolved in America, where wealth was progressing more rapidly than in this country. The tendencies towards all the manifestations due to the profession of almost excessive capital were more fully exhibited there than here, and he believed their successors would find Transatlantic architects not dealing in sham Gothic or Neo-Grec, but in a modern American style of their own.

The President, in closing the discussion, said it was a great satisfaction to him to hear such a paper as this. It showed how far-reaching and useful was Mr. George Godwin's idea in founding the Bursary. When he was in America he saw a very great deal of work which disgusted him, but the impression he derived was that a great revolution was going on in matters of art, and that a period of good work was coming on.

The vote of thanks was then put, and cordially received; and Mr. Gass having suitably replied,

The President adjourned the meeting to the 29th inst., when a business meeting will be held to receive a communication from the Council in respect to the report of the Departmental Action Committee, recently printed in the *Journal of Proceedings*.

**Leeds.**—Plans for the proposed completion of Emmanuel Church, Leeds, at a cost of £1,200l., have just been unanimously adopted by the parishioners. One most important feature of the contemplated improvement, viz., the filling of the east window with Munich stained glass, has already been completed. The window consists of five lights, with a large rose above. The centre compartment represents the Good Shepherd; the other four compartments containing figures of the Evangelists,—their emblems being introduced in the lower panels and the pelican under the principal figure. The window has been presented by Miss Pegler in memory of her mother, the late Mrs. Charles Pegler, of Leeds; and has been designed and executed by Messrs. Mayer & Co.

#### ARCHITECTURAL PHOTOGRAPHS BY AMATEURS.\*

If an architect thinks seriously of starting a camera, what sort of camera should he get? What process should he use? What outlay on apparatus? Cost in time of a negative, and a print, and outlay for materials? Additional weight of baggage in travelling? What are the average results obtained by people who cannot wait for the very favourable moments, and can only practise the art at intervals? Kind friends, by supplying a large show of suitable photographs and of transparencies for the lantern, and by stating facts, have enabled me to answer such questions.

Mr. J. L. Robinson, of Dublin, the hon. amateur photographer to the Architectural Association Excursion, has contributed over 800 illustrations of English architecture taken during the excursions to the A. A. Library; and, bound in volumes, they are in much request. The example is worthy of imitation. Mr. J. C. Stenning, Mr. J. Clerk, Q.C., Admiral Maitland, Mr. Gifford, Mr. Seymour Conway, Lieut. W. P. Little, Mr. J. Gale, Mr. R. L. Cox, Rev. F. C. Lambert, and others have also enabled me to exhibit specimens of the work of able amateurs.

For our present purpose we may regard photographs as shaded diagrams showing the existing condition of old buildings,—grand, picturesque, well preserved, in decay, or in ruins,—to be used as aids to the study of architecture, archaeology, and topography; or as giving the expression, surroundings, and details of modern buildings; records of works in progress, records of constructive appliances, of the curiosities of other days and of the novelties of our own; and we will not indulge in needless regret over the limitations, or in aspirations after the possibilities, of the art. In order to justify to some extent a fairly complete and proportionate sketch it will be well to assume unimaginable ignorance,—of a density which not one of us would perhaps be vain enough to own to. By this device the answers to the special questions, put on behalf of an architectural amateur trembling on the brink, may be given in an orderly way.

**Processes.**—At the present time the gelatinobromide process has the greatest number of admirers. The wet collodion process, which up to 1879 was that universally in use, has been laid by. The glass was, for that process, coated with collodion (gun-cotton dissolved in ether), containing a small amount of bromide of ammonium, and was then immersed in a solution of nitrate of silver, and the bromide converted into bromide of silver. The invisible lines adjoining the blue portion of the spectrum have the power of producing chemical change, and darkening the bromide of silver. Only these portions of any light, distinguished as actinic rays (*actric, actinivoc* might be any ray, but some nomenclature is a necessity), produce permanent effect on the chemical condition of a negative. The highly-lighted portions of a scene reflect strong light and turn the corresponding portions of the negative black (sky and high lights), deep shadows remaining almost untinted. The operator usually prepared his plate just before using it, and fixed it at once.

His fingers, of course, touched the nitrate of silver (amar caustic), and when the light came upon them the coating turned black. Cyanide of potash was required to make the fingers fit to be seen. The photographer, who uses ready-prepared dry plates, congratulates himself on not requiring the services of that deadly drug. In using the wet collodion process for out-door work, it was necessary to carry about a portable dark room, or dark tent, and the chemicals required for rendering the plates sensitive, and those for developing them. This cumbersome addition to the baggage led to the use of collodion dry plates. The early ones were those in which glutinous matter, such as beer, treacle, glycerine, coffee, tea, or tannin, was used to act on the silver. Later on, nitrate of silver was dissolved in bromised collodion; being allowed to set, it was then well washed to remove the free salts of silver, and dissolved in ether. The plates were coated with this preparation, dried, and used as the gelatine plates are now; but the sensitiveness being less, the exposure varied from one to ten minutes. These collodio-bromide plates were brought to

great perfection by Colonel Stuart Wortley, and much used until gelatine plates were prepared.

The earlier attempts to use gelatine, by sensitising glass plates and paper coated with gelatine in the silver bath, were not satisfactory. The first attempt at the modern method was described by Dr. Maddox in 1871, and the process came into general use in 1879. Improvements have been steadily introduced during the six years last past; the art is a living art, and living at a great pace too. Gelatinobromide dry plates are now manufactured in large numbers, and supplied ready for use; millions of "commercial dry plates," as they are called, are produced every year for home use and export; they are sent away by the ton. The glass is coated with a viscid solution of gelatine, in which bromide of silver is held in a state of suspension; the sensitiveness of the plates,—as in the case of wet plates,—is in the bromide. Probably the majority of amateurs avoid the tedious labour of preparing their own plates. As, however, about two-thirds of the outlay for producing a finished photograph goes to providing the dry plate for the negative, enthusiasts do the work for themselves. They say, besides, that there are advantages beyond the money saving, in being taken behind the scenes, and getting knowledge of the nature of the plates which could not be obtained without this experience.

The glass commonly used is carefully selected crown glass, weighing about 15 oz. to the foot. The preparation of the solutions, which are to form the emulsion for a batch of plates, will take about three hours; the emulsion may then be left to set. On another day the soluble nitrates and bromide will be washed out by water, leaving only the insoluble bromide and iodide of silver in the emulsion. The emulsion being melted, filtered, boiled, and stirred, three to five hours may be agreeably spent, finishing up with the cookery. The boiling process may, however, be modified by using Professor Eder's method, in which the emulsion is not heated beyond 150°. This method is now almost universally applied, and shortens the time a good deal. The coating of the plates with the liquid is done with great rapidity; the emulsion stiffens upon the glass, and does not run off or move. After the plates have been put into a drying-box, arranged so as to allow plenty of dry fresh air to pass over them, they will be ready for use in from half a day to a couple of days. They will improve in many ways after being kept some time,—notably they will have no tendency to frilling which frequently happens with very new plates. The idea of any actinic light reaching the sensitive films is full of terrors. A second's exposure to a naked gaslight, even at the distance of several feet, produces a strong impression, which appears as fog in a negative. Ruby glass, the deepest shade is used in the dark room. Camera and lens tubes are lined with black velvet, and black cloth is put over the camera during exposure. Kept carefully in the dark and the dry, the plates will last for a long time,—perhaps, under favourable conditions, for ever,—but it is unnecessary to try the experiment.

The sensitiveness of the plates varying considerably, they are classed as ordinary, rapid, and instantaneous. It is supposed that the reason why gelatine plates are so much more sensitive than collodion is that the sensitive salts are in a finer state of division. The sensitiveness is at any rate increased as the division is carried still further by additional cooking of the emulsion. It is usual to indicate the sensitiveness of dry plates by a comparison with wet collodion plates. It is supposed that everybody has used wet collodion, though it has been less and less used for six years, which experts seem to look upon as several lifetimes,—an interesting example of survival. Ordinary plates have from twice to thirty times the sensitiveness of wet collodion plates; about ten or twelve times is recommended for ordinary work. Instantaneous plates, these are charged for at the rate of about one-fifth more than ordinary plates. For sea-pieces, crowds of people, races, and such scenes,—not found in the direct path of an architectural amateur,—an exposure of 1-200th part of a second is sufficient. The Oxford and Cambridge boat-race, with all the crowd on the bank and river, needs a very sensitive plate and short exposure. For trotting horses in various positions the exposure is put at 1-2000th part of a second. Such short

\* A paper by Mr. S. Flint Clarkson, F.R.I.B.A., read before the members of the Architectural Association on the 12th inst.



exposures require special lenses which admit more light than those used for ordinary work. The time of exposure of a succession of plates, all prepared with the same emulsion, will be varied to suit the hour, and the brightness, or the reverse, of the day. Experienced people know, without the labour of thinking, whether 150th part of a second or three seconds will be required for a special subject on a bright day; or whether it should be three or five seconds on a grey day; five or ten seconds on a dull one; ten minutes or half an hour in the inside of a building. The camera may be left to itself, by an eager well-occupied student, if the light is deficient, and the image is consequently coming on at an easy rate. It is satisfactory to know that, in such circumstances, two, three, or five minutes more or less exposure make practically no difference, as the plate may be developed so as to make the best of what proves to be an under or an over exposure.

The cost of the 150 plates, from which successful prints were obtained illustrating the buildings visited in the Banbury excursion, allowing 10 per cent. in addition for damages, would be 3l. 5s. Prepared cleverly, instead of being bought, they would come to about one-third of this amount, but the large expenditure of time has been hinted at above.

Prophetic persons state that the paper processes will in time supersede all others,—at any rate, for amateur work in the open,—on account of ease in carrying and in manipulation, no risk of breakage, rapidity of printing, and reduction of first cost. I have felt that to deal with the gelatine process, and to leave remarks in the paper processes to others, would be my safest course. Notwithstanding all the advantages claimed for paper, dry plates are more largely used every year. It is said that the army of amateurs using dry plates has become, within a few years, as large as it was twenty years ago, when the collodion process first became popular. To film-carriers or roll-holders have as yet inspired such general confidence as the gelatine plates, and there is, apparently, a suspicion that uncertainties in the manufacture of papers occur rather frequently.

Cost.—A camera,  $\frac{7}{8}$  in. by  $\frac{1}{4}$  in., a Ross's symmetrical view lens with diaphragms on the stem recommended by the Photographic Society, and three double backs or dark slides,—to take in all six sensitive plates,—should be required by an amateur when he is about to begin actual work in earnest. For these, with tripod, level, and other necessities, about 11l. will be required; on the chemicals and other apparatus for dealing with negatives and for printing at least 3l. must be expended in addition. "Quarter-plate,"  $\frac{1}{4}$  in. by  $\frac{1}{4}$  in., is sometimes recommended for the first start, just in order to get the hand in; but 5 in. by 4 in. is better. The first cost of this should be about

This meagre outfit is a minimum; but taken for in order that the first trials may be made with freedom; without any idea, at least, of possessions have made it difficult to go on. More lenses will be wanted for careful work afterwards. Instructions to beginners are given by arrangement with makers of apparatus, and there is a class at the Polytechnic, when the amateur starts on his first expedition, hoping, perhaps, rather than believing, that his slender store of knowledge will prove sufficient for the occasion,—his expenditure, if he is taken to a  $\frac{7}{8}$  in. by  $\frac{1}{4}$  in. camera and has been careful, will have amounted to about 17l. Leaving on one side first cost of apparatus (all costs incurred in travelling, &c.),—counting only the costs out of pocket for plates and chemicals,—a 5 in. by 4 in. negative will cost out 3d. by the time it is varnished and can be shown in the light of day. The first print will cost about 1d. For 10 in. by 8 in. the cost of negative may be put at 1s., and the first print at 3d. [The six small photographs reproduced in the *Builder* this week are from 5 in. 4 in. prints, and the larger one from 10 in. 8 in.]

It is not unusual, for people with many irons in the fire, to finish off the negative, take a 3d. print, and then entrust further reproductions to others. For six years the members of the Architectural Association have been supplied with admirable prints at a charge of 6d.: 10 in. by 8 in., and 3d. for 5 in. by 4 in.,—a very low price as such things go, to assistant's time and a working profit are, of course, included in these prices; and a hard-working amateur, who is liberal in gifts to his

friends, may be satisfied to take over these with his other rewards.

Notes as to Baggage.—For the Banbury excursion this session, four dozen 10 in. by 8 in. plates and ten dozen 5 in. by 4 in. plates were required. Two dry-plate cameras, dark slides and changing boxes, tripod, level, lantern, and the fourteen dozen of plates increased the ordinary traveller's baggage by about 65 lb. The risk of breakage of the plates,—if there is a steady hand, and if proper boxes, cases, &c., are used, may be very small,—during six annual excursions no important negative has been injured before the arrival at home. Still, glass is fragile,—and losses have happened in afterwork done in quasi-comfort in the dark room at home, and thereafter in rooms not dark. The 10 in. by 8 in. camera weighs 12 lb. with changing-box, tripod, and six plates,—twelve plates for it weigh about 7 lb. The 5 in. by 4 in. camera with six plates weighs only 7 lb.; it is not unfrequently looked upon as a suitable companion for a day's walk among the mountains. A dozen 5 in. by 4 in. plates weigh about 2 lb. If the resolve has been made that six 10 in. by 8 in. and eighteen 5 in. by 4 in. negatives shall be obtained within the day, it is necessary to start with 20 lb. of baggage; that is, two leather cases containing the cameras and changing-boxes,—the tripod, contrived to fold into a length of about 2 ft., may serve as a handy bâton.

Completing Negatives.—The ingenious automatic changing-box is a little luxury which, when holding a dozen plates, costs about 4l. 10s. A plate may be transferred from the box to the camera and back again, without the possibility of light affecting it or any plate in the box. From the dark slides of the changing-boxes the plates are transferred at the dead of night into packages by the light of a ruby lamp, and fresh films are put in ready for the toils of the morrow. Guiding minds do not recommend developing plates on a journey. They will be just the same at the end of the journey if kept safe from damp and light.

When home and leisure are reached, and the eager desire felt to behold and permit others to behold the fruit of the labours, the negatives must be developed, perhaps intensified or reduced, fixed, washed, and dried,—before a trial print can be taken. Varnishing is not absolutely necessary, but there is greater risk of injury without it. After a good print has been obtained the negative is warmed, coated with it is ready for the printing. Not reckoning time spent in doctoring, adding to or diminishing density, and supposing that a batch of negatives are treated at the same time, it is considered that each negative requires from ten to fifteen minutes of special attention, between the time of taking it out of the dark slide and putting the sensitised paper upon the varnished negative.

The negative, when the descent of the shutter left it in darkness, had received all the details in light and dark, but too faint to be visible,—the developing solution brings the latent image into sight, and in doing so changes the condition of the silver which has been acted upon by the light, making it insoluble in solvents which dissolve bromide of silver. If, for instance, a gelatine plate is exposed and not developed, but treated with hyposulphate of soda, all the silver salt will be dissolved, and a film of colourless gelatine will be left on the glass. The solution being poured upon the plate, and made to cover the whole of it, the first faint darkening will commence in about a quarter of a minute,—in about two minutes the whole plate (in a good negative) will be darkened, except those parts which represent blackness in the scene. It must remain till it appears denser than it is eventually to be, and practised skill can alone determine how long that must be. Of the two developing processes which are used for gelatine plates, the ferrous oxalate is considered the best for beginners, on account of its extreme simplicity and good results. More may be made of an inferior plate by the other process,—the time consumed will be about the same for each.

Development brings out the qualities of a plate which are required for printing; and fixing keeps it in the state to which it has been brought. After rinsing so as to get rid of the developer and stop that process from continuing, five minutes or so must be spent in an alum bath so as to harden the gelatine. Rinsing clears away alum from the surface, and the fixing solution is then used to take away such

portions of the sensitive salt of silver as were not acted upon by the light, and by the developing solution. After their removal the plate can be brought into the light of common day without injury or risk of change. Washing for at least half an hour in running water, or frequent changes of water, will be necessary in order to get rid of the hyposulphate of soda, used to get rid of the superfluous silver.

Printing.—A sensitive film is put upon paper; this paper is laid upon the negative; and the light strikes through the negative, and acts upon the film on the paper, in the same way as the light acted upon the film on the glass. The dark portions of the negative transmit little of the light, and thus there are light parts in the print; and vice versa. The preparation of the ready sensitised paper, which is so largely used, is at present a trade secret. In view of its cheapness, few amateurs now go to the trouble of preparing their own paper. It is sold ready for use at 13s. 6d. per quire; the cost of the paper for a 10 in. by 8 in. print is thus 2d.; for 5 in. by 4 in., 1d. The paper will keep good for a considerable length of time, either before printing or between printing and toning. Superior results are gained by very experienced photographers who sensitise their own paper; but they are obliged to print and fix on the same day on which they prepare the paper, as it turns brown in twenty-four hours.

In printing, the negative is placed in a pressure frame over a piece of the sensitised paper; the frame is so made that half the print can be examined, and the other half remain in contact with the negative, so that no change in the relative positions can take place. When the light has passed through and left a perfect impression on the paper, the negative is removed. The print is then washed in water, changed twice or three times. In order to give a more agreeable tone than the red of the print at this stage, an exceedingly thin film of gold,—as thin as a soap-bubble,—is deposited upon it, from the "toning-bath," composed of chloride of gold and acetate of soda. The tint depends in the length of time passed in the bath: a print passes from red to brown, then to purple, blue, and ends in a dull, flat, slate colour. It is usually advisable to remove the prints from the bath while the shadows are still a very warm brown, the half-tones just becoming purple or violet. After the toning, washing in water gets rid of the toning solution in the paper; if this is not done the toning goes on. A solution of hyposulphate of soda does for the print what a similar solution does for the negative,—that is, removes the silver which has not been acted upon by light, and thus fixes the print. After complete washing the hyposulphate is got rid of. It is the criminal responsible for the decay of so many admirable prints. Many ghostly shapes, becoming dimmer every year, had their time of pleasant force; for years the fixing solution has been, as a work of pure supererogation, destroying the silver.

Some architects have skill in attending to their ordinary work, and to the printing of photographs at the same time. A space on a wide desk, between a large window and a drawing-board, may be covered with pressure-frames by a Caesar-like person; and no time will be lost, nor any interest suffer. Each print will require about five minutes of special attention, from putting it on the negative to clipping it round,—sometimes more, for, with a dense negative and dull weather, it may take even two days before a good print is obtained.

Silver printing has been, and is, more largely used than any other process,—though there are others which have staunch advocates. Platinotype is said to be gaining ground. The results are permanent, the effect that of a good pencil drawing,—the surface of the paper dull, not glazed, and it is more easy to carry out than silver printing. On the other hand, it is more expensive, and an inferior negative will not yield a passable print.

Beginners are not likely to try the rapid printing papers, as they call for so much special knowledge in timing the exposures.

Fixed Prints.—A frame of these prints has been presented to the Association. A print on paper is floated in a warm solution of gelatine, then placed face downwards on clean glass, and pressed into contact in all parts with a squeegee or the hand. The surface becomes very fine: when dry they are trimmed, sized, and painted over on the back with oil colour or coated with black varnish. Treating a 10 in. by 8 in. print in this way will cost 6d. to 1s.



Transparencies are printed from negatives on ordinary dry plates. An exposure of from five seconds to a minute, according to the density of the negative, is given at a distance of 3 ft. from a gasburner,—all other light being excluded. They must be slowly developed, and fixed with fresh solution. An ordinary transparency for 3½ in. by 3½ in., printed from a negative, requires an outlay of about 3d. The wet collodion process is also largely used for transparencies, as gelatine is apt, unless very skillfully used, to give a more or less yellow tint, and impede the transmission of light through the glass.

**Miscellaneous.**—General maxims,—such as those which mention the virtues of patience, of keeping on learning, and of being amiable under failures,—are by common consent of the utmost value, especially to beginners in photography. An amateur will find that plenty of the discipline, which is the purpose of life and its occupations, is likely to come in his way. The sun will not shine for a whole day,—or, when the watch is not vigilant for a moment, will open a joint in a changing-box, and adorn each interesting negative with one or more comet-like forms,—or do some other playful deed. A plate with a view on it will be used again with strange results; the uncoated side of another plate will be turned towards the lens. A whole set of dry plates will prove, in an unexplained way, useless; and perhaps he will refuse to be comforted, although he prepared them himself. Chemical, green or red fog will appear on one or another of another set of plates; with, for variety, blistering, frilling, spots, streaks, scratchings, yellow veil, yellow fog, or halation. Prints which he has given away in the pride of his heart will turn up from time to time; and, each time in ghastlier pallor, accuse him of perfunctory washing.

The early days will, however, pass away with a decent rapidity. There are few things more pleasing than to observe the affectionate friendship between a capable old hand and his camera, tripod, and plates, all proved thoroughly during long practice; the instrument might be praised, in verse,—for seeming as eager as its master. This facility,—acquired with much difficulty, and so easily lost,—appears to some people very dangerous; they assert that, instead of remaining a good servant, the art often succeeds in bringing its master into subjection. Used as helps to study, and for the rapid collection of information for reference, there can be little risk. If a student sketches and measures none the less, and photographs as well, he has gained the service of additional hands and eyes. These remarks have been strictly limited to showing the cost in time and money of acquiring and making use of the services of such additional members.

The ethoxo light was used for the lantern by which the photographic slides were exhibited. Gas-bags, pressure-boards, weights, &c., always bulky and unsightly, and very often inconvenient to the spectators, were thus entirely dispensed with. Being under pressure of 600 lb. to the square inch, or forty atmospheres, sufficient oxygen gas is stored in an iron bottle only 4½ in. diameter and 2 ft. 2 in. long. A regulator, invented by Messrs. Oakley & Beard, of 202, Grange-road, S.E., was screwed upon the bottle so as to obtain the proper consuming pressure, and a portion of the gas passed direct to the jet, and another portion passed over ether, saturated with it, and then carried to the jet. The method of supplying gas to the jet proved very efficient,—the light being as steady as any before seen.

[Of the discussion which followed we will give a brief report in our next.]

#### Proposed New Clubhouse at Swansea.

The Conservatives of Swansea town and district have formed a limited company for the purpose of providing a clubhouse for the members of the party. Negotiations are nearly completed for the purchase of a suitable place,—45, Wind-street, which is freehold property,—upon which it is proposed to erect the clubhouse. Plans for the erection of the building, which have been prepared by Mr. T. P. Martin, architect, have been approved of.

**Surveyorship, Fulham.**—On Thursday, the 11th inst., Mr. F. W. J. Palmer, Assistant Surveyor to the town of Folkestone, was appointed Assistant Surveyor to the newly-formed Vestry of Fulham. There were 187 candidates for the appointment.

## Illustrations.

### EXAMINATION HALL FOR THE COLLEGES OF PHYSICIANS AND SURGEONS.

**THIS** building (of which we this week give view and plans) is to be erected by the Royal Colleges of Physicians and Surgeons of London, and will afford accommodation for the examination of six hundred medical students at one time. It is on the Duchy of Lancaster land, and faces the Victoria Embankment Gardens. It will be in the Italian style of architecture, and built of red brick and Portland stone. The basement is spacious, and contains rooms for museum, caretakers, &c. On the ground-floor are clerks' and secretary's offices, and waiting-room and examiners' room, and three large examination-rooms. On the first floor, one large examination-room, 100 ft. by 30 ft., capable of being divided in half; and also two other examination-rooms, each 60 ft. by 21 ft. The second floor has similar accommodation, and on the third floor are two large chemical examination-rooms and two anatomical examination-rooms. Lifts and other accommodation are provided on each side of the building.

Portions of the old Savoy Palace walls were discovered in excavating, and some old tiles and other articles have been discovered, and are deposited in the Duchy of Lancaster office.

The Queen has graciously offered to lay the foundation-stone on the 24th inst., which will be on the south end of the east wing, and will be of white Balmoral granite, with these words on it, gilt:—

VICTORIA,  
QUEEN OF GREAT BRITAIN AND IRELAND,  
EMPEROR OF INDIA,  
Laid with her own hand  
THIS FOUNDATION STONE,  
24th MARCH, 1885.

The trowel will be silver gilt, the mallet and level made from the old oak of the Savoy Palace.

The new building occupies the front portion of the land, and on the back the future extension is proposed to take place.

The architect is Mr. Stephen Salter, and the builders Messrs. Higgs & Hill, of South Lambeth. The amount of the contract is 25,070*l*.

### BIRMINGHAM ASSIZE COURTS. SKETCH COMPETITION DESIGNS.

ONE of the two sketch designs given this week was one of three submitted by Mr. John P. Seddon, of London, and Mr. John Coates Carter, of Cardiff, under the mottoes "Castor," "Castor and Pollux," and "Pollux." It resembles generally that of Mr. Waterhouse in the disposition of the courts. Internal areas are given in sufficient abundance to provide every room and each corridor with windows at the usual levels, as well as top lighting by skylights, so that every portion of the building would be supplied with air and light. Each court has the whole of the rooms required in connexion with it in convenient proximity, and those appropriated for witnesses immediately wanted, are, in each case, exactly opposite the doorway to the court by which they would have to enter. Those for the jury are upon the other side of the court in each case, as is desirable. There are separate entrances for the Bar and Judges, and a grand central entrance from Corporation-street for the public having business in the courts, and another distinct one for the common public, giving access to the galleries of the courts only.

J. P. S.

The other design, by Mr. H. H. Statham, is planned on the principle of classifying the various rooms in groups so that each corridor may have its own speciality. The magistrates' rooms and the officers and witnesses connected with their courts are all arranged on the right of the hall, the magistrates' executive departments being entirely combined around their special corridor. The third court is similarly treated on the left of the hall. At the top of the hall the right-hand passage gives access to the Criminal Court corridor, the left hand to the Civil Court corridor and to solicitors' rooms, the barristers holding the cross corridor at the top. The consultation-rooms are arranged and numbered along a "Consultation-room Corridor" on the left of the plan, so that the room named for an appointment could be at once found. The steps at the top of the hall lead to the level of

the judges' retiring-rooms and the sheriffs' room, which is placed between them, the offices of the Clerk of Indictments and Clerk of the Crown being close to the foot of this stair. The judges are provided with a perfectly distinct entrance and private corridor on the first-floor level, entering from the higher level at Newton-street and descending a few steps to the intermediate level of their rooms. The rooms for witnesses immediately wanted open directly into the Courts.

It was proposed to carry on ventilation and heating simultaneously, by mechanical propulsion of air through chambers intermediate between the ground-floor and the basement rooms, and in the large courts by basement passages; the air propelled by fans through water-sprays, and then through canvas sieves (removable and washable) and through the floors or through tubes into the apartments, the air being first warmed (in winter) by steam pipes placed in the air-chambers. Air extracts from the top of all courts and one-story rooms. The areas from which the air was drawn to be lined with glazed brick, and the air-ducts lined with cement to a smooth face; the whole system of air supply to be capable of easy and efficient cleansing. The extract from the central hall to be by an upcast shaft in the circular turret, the lower part of which contains a staircase.

A novelty in the arrangements is the suggestion of lifts from the prisoners' cells to the docks of the courts: a plan certainly more convenient than sending police and prisoners up a narrow winding staircase, and taking a much less room. An attempt has been made to give a special external treatment of the prison cell block, giving it a bastion-like character.

H. H. S.

### COMPTON WINYATES.

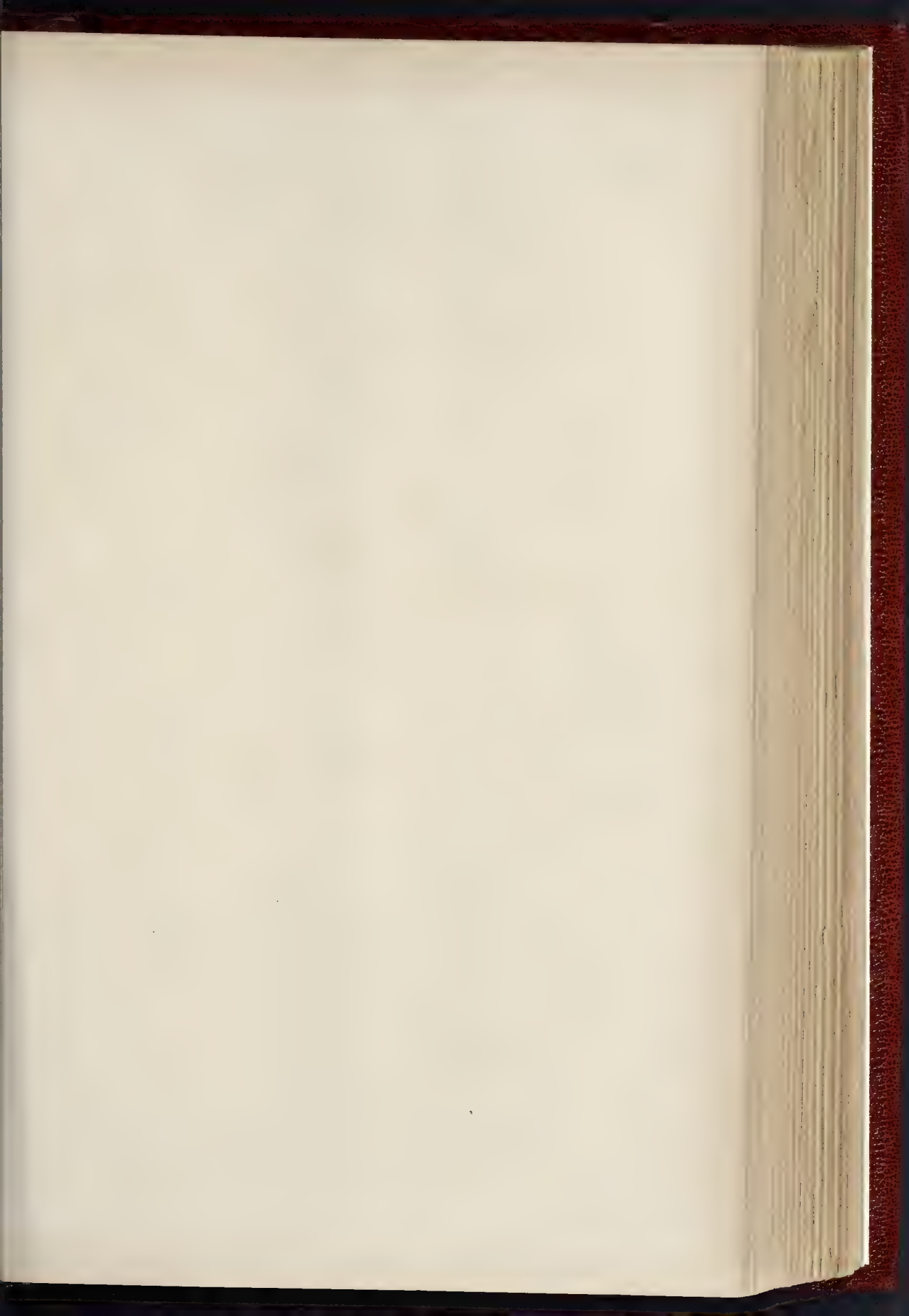
WE give this week seven illustrations of the charming house at Compton Winyates,\* reproduced from photographs taken by Mr. J. L. Robinson, of Dublin, the well-known architect who has for about eighteen years used photography as a help in studies of architecture. The photographs were among the large number shown by Mr. S. Flint Clarkson at the late meeting of the Architectural Association, when he read the paper printed elsewhere in this number.

Compton Winyates is the best accepted form of the name,—though Wyniates, Winyate, or other spellings are used occasionally,—it belongs to the Marquis of Northampton, and is at the present time used as a residence by Lord William Compton. Situated in one of the most westerly of the hollows in the high ground about a mile to the west of the division between Oxfordshire and Warwickshire, Camden, and no doubt the people of his time wrote of it as "Compton-in-the-Hole," to distinguish it from several other Comptons hereabouts. The high ground is, in fact, part of the line of hills, which some people call the northern extension of the Cotswolds. A tourist, with a liking for roads along hills might begin at Edgehill, the scene of the battle of 1642, which is about five miles north of Compton Winyates, and work down in a south-westerly and leisurely way by Brailles, the Rollerich Stones, and then by the true Cotswolds of Gloucestershire, through the middle of that county from Chipping Campden to Bath. In the early part of his journey would look down on the streams which go feed the Warwickshire Avon and would find at another Avon,—that which divides Somerset from Gloucestershire.

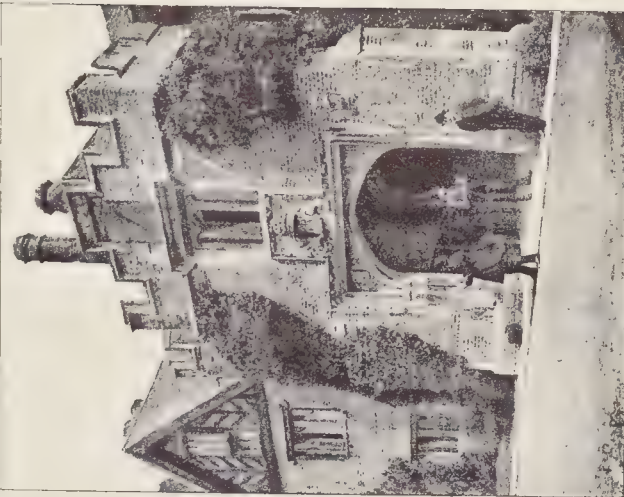
The waters from the quick slopes round Compton are received in a piece of water in the house, and go thence in a little stream, thence into the Stour, and then into the Avon, a river or two from Stratford. The lowest point in the rising ground round "the hole" is thus, of course, on the west,—the side from which the house is approached.

The distance from a railway station kept down the number of visitors. Kington is nearest, and it is said to be about nine miles by cross-roads through "the Feldon" to the west of the hills. Camden, writing bet 1607, put down pleasant words, which in old translation recall in our time the memory

\* We gave two or three sketches from this house at the time of the last Architectural Association excursion, and these photographs give more varied illustrations of it. Mr. S. Flint Clarkson had selected them as those which he wished published to illustrate his paper on "Architectural Photographs by Amateurs," they will be in place here.







ENTRANCE TO QUADRANGLE.



OFFICES.



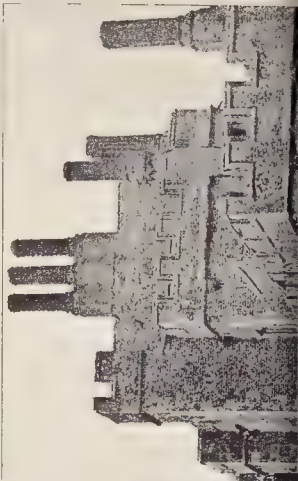
IN THE QUADRANGLE



HALL.



GABLE OF ENTRANCE FRONT INTERSECT THE TOWERS







IN THE QUADRANGLE.



ENTRANCE.



TOWER.

GENERAL VIEW FROM RISING GROUND.

BAY WINDOW OF HALL.

THE CHAPEL WITH SIDE OF TOWER BEHIND



TOWER.

CHAPEL.

VIEW FROM THE LAWN

STAIRCASE.

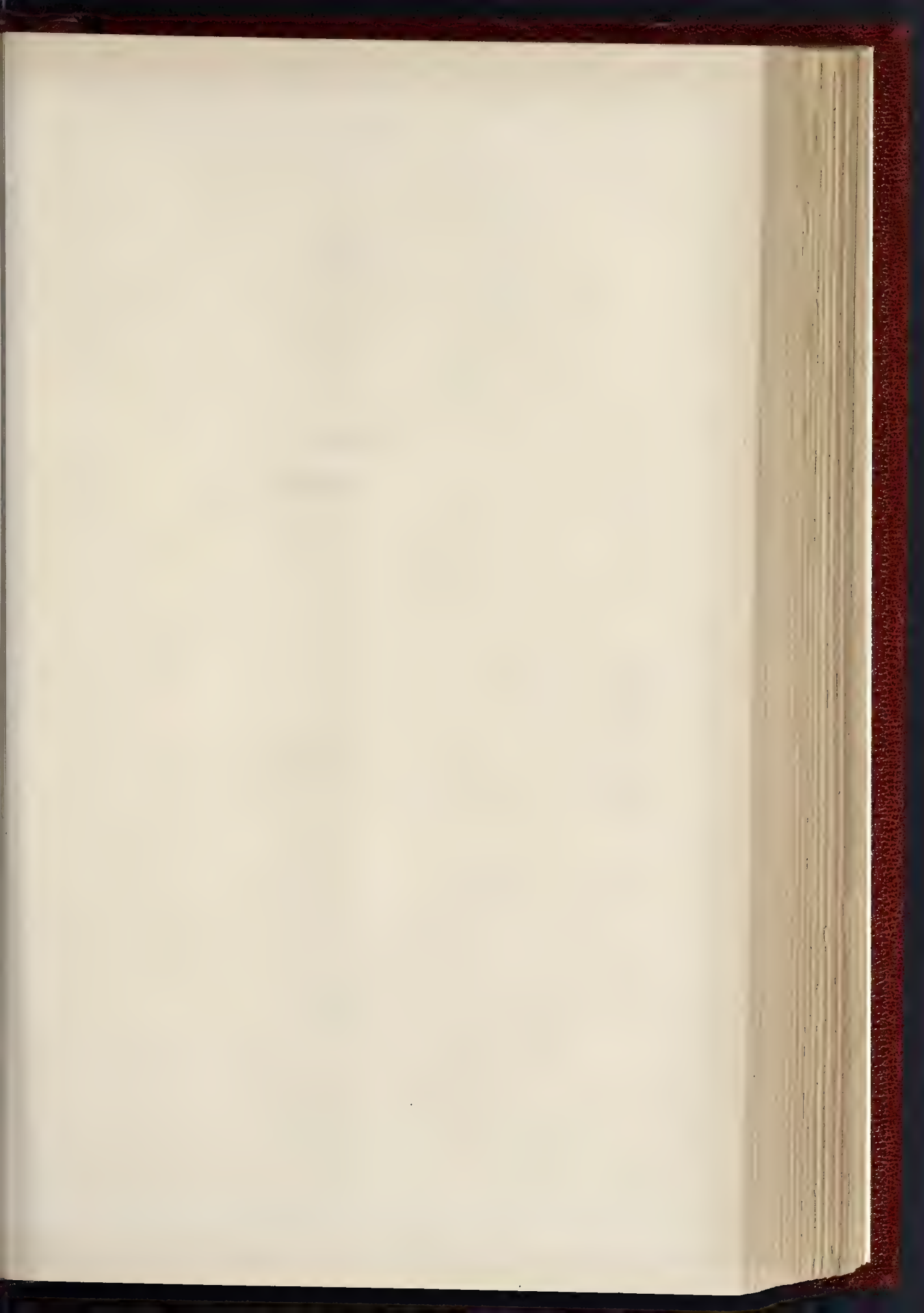
THE PHOTO. STYACUI & CO. LONDON

# VIEWS OF COMPTON WINYATES, WARWICKSHIRE.

FROM PHOTOGRAPHS BY AN ARCHITECT. USED AS ILLUSTRATIONS TO A PAPER ON "ARCHITECTURAL PHOTOGRAPHY BY AMATEURS," (ARCHITECTURAL ASSOCIATION, MARCH 14th, 1884.)



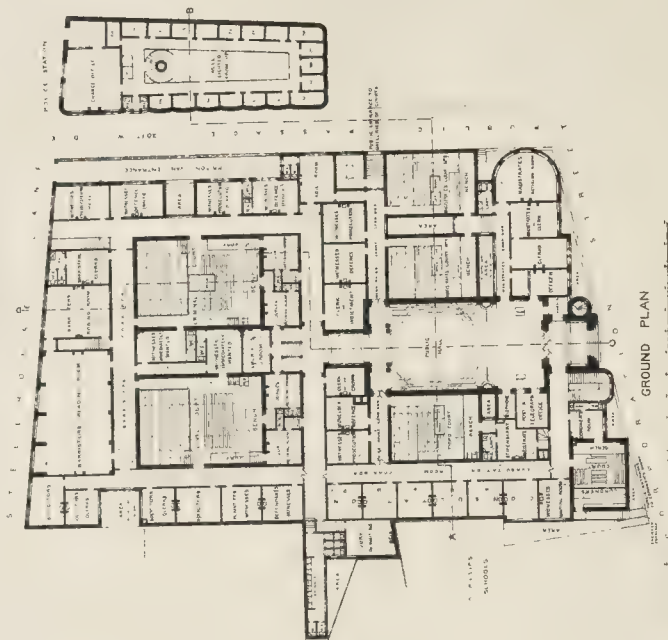




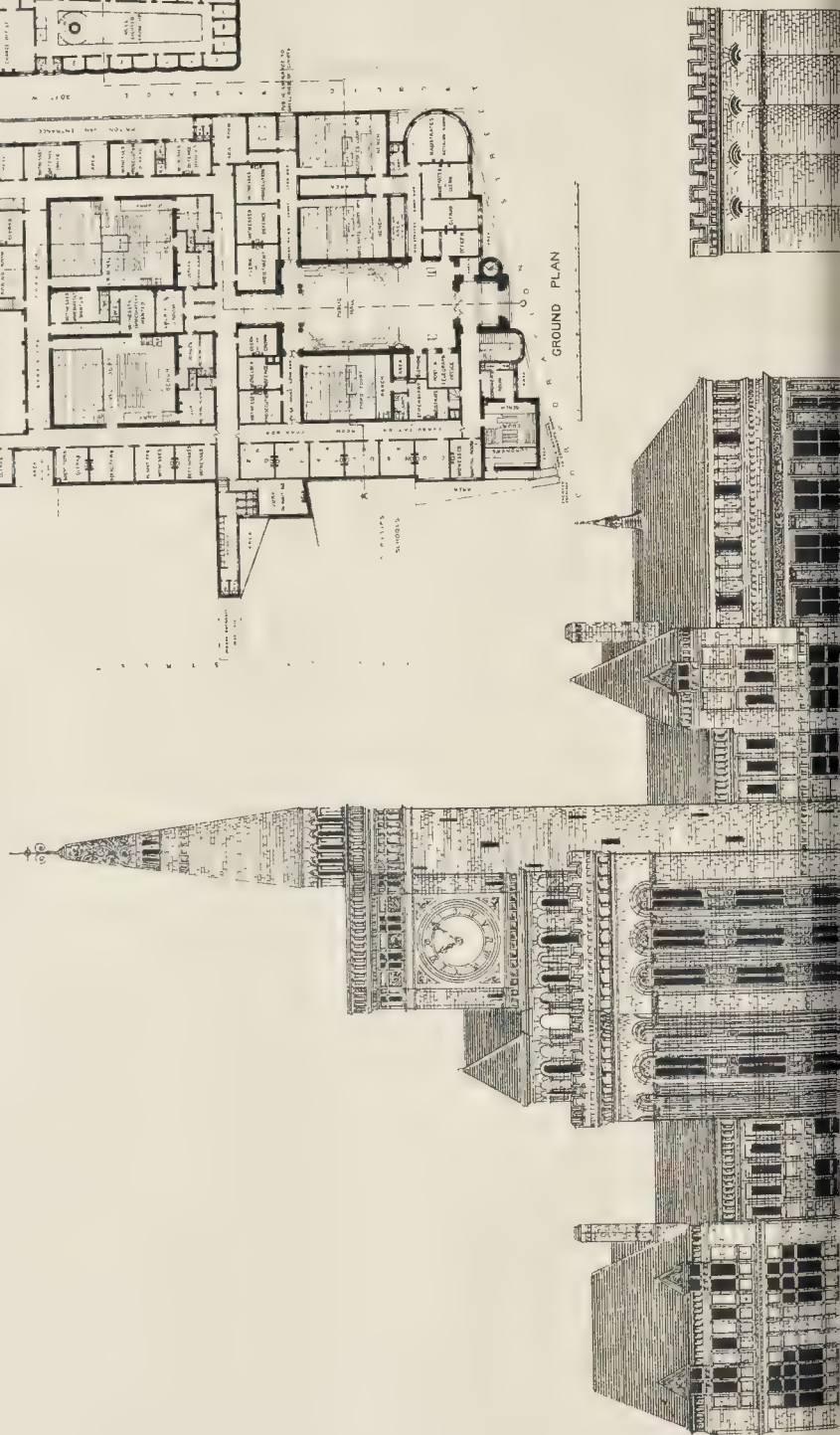


THE BUILDER, MARCH 20, 1886.

**BIRMINGHAM LAW COURTS**  
**SKETCH DESIGN**



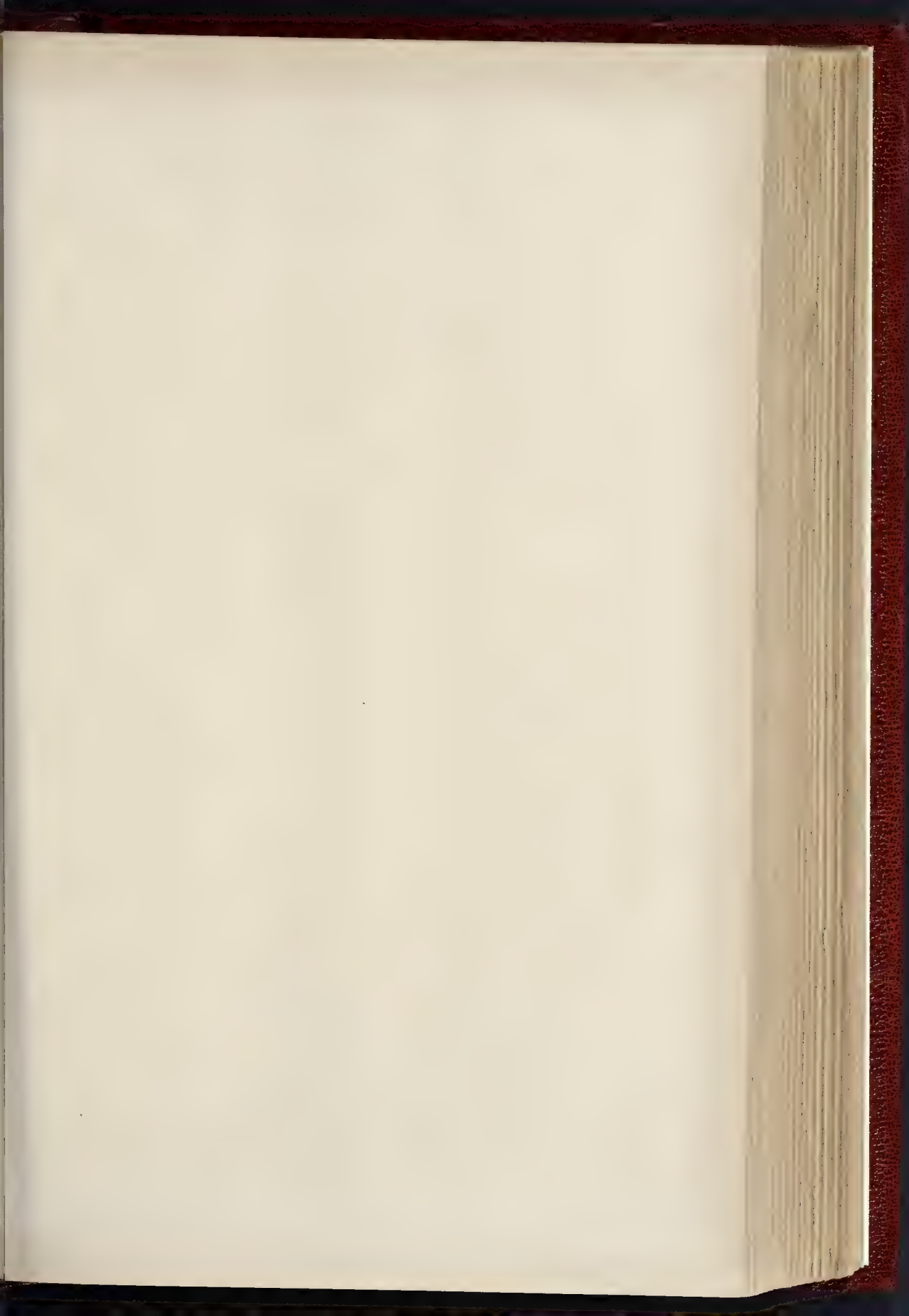
GROUND PLAN







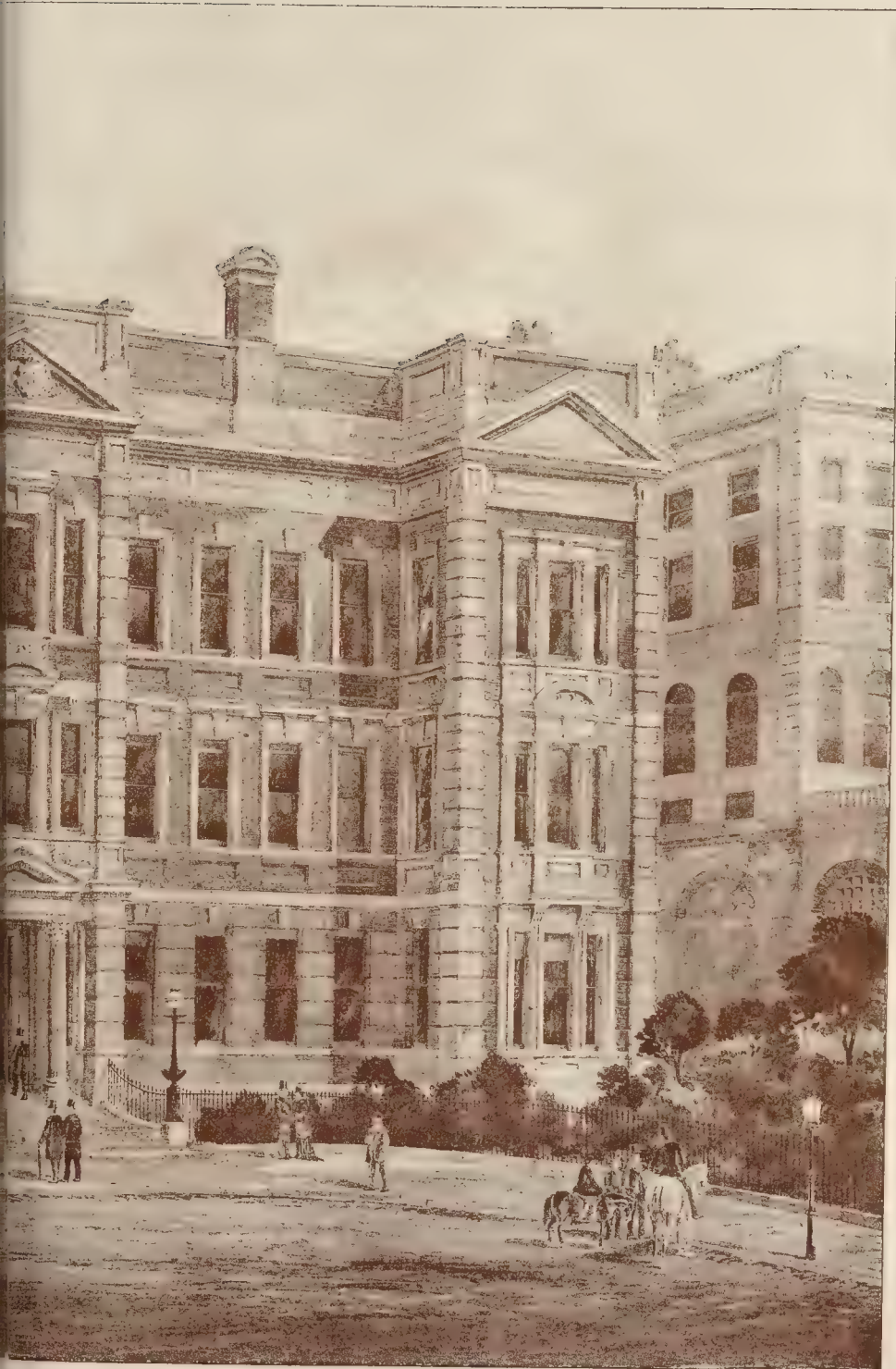








NEW EXAMINATION HALLS FOR THE ROYAL COLLEGES OF PHYSICIAN

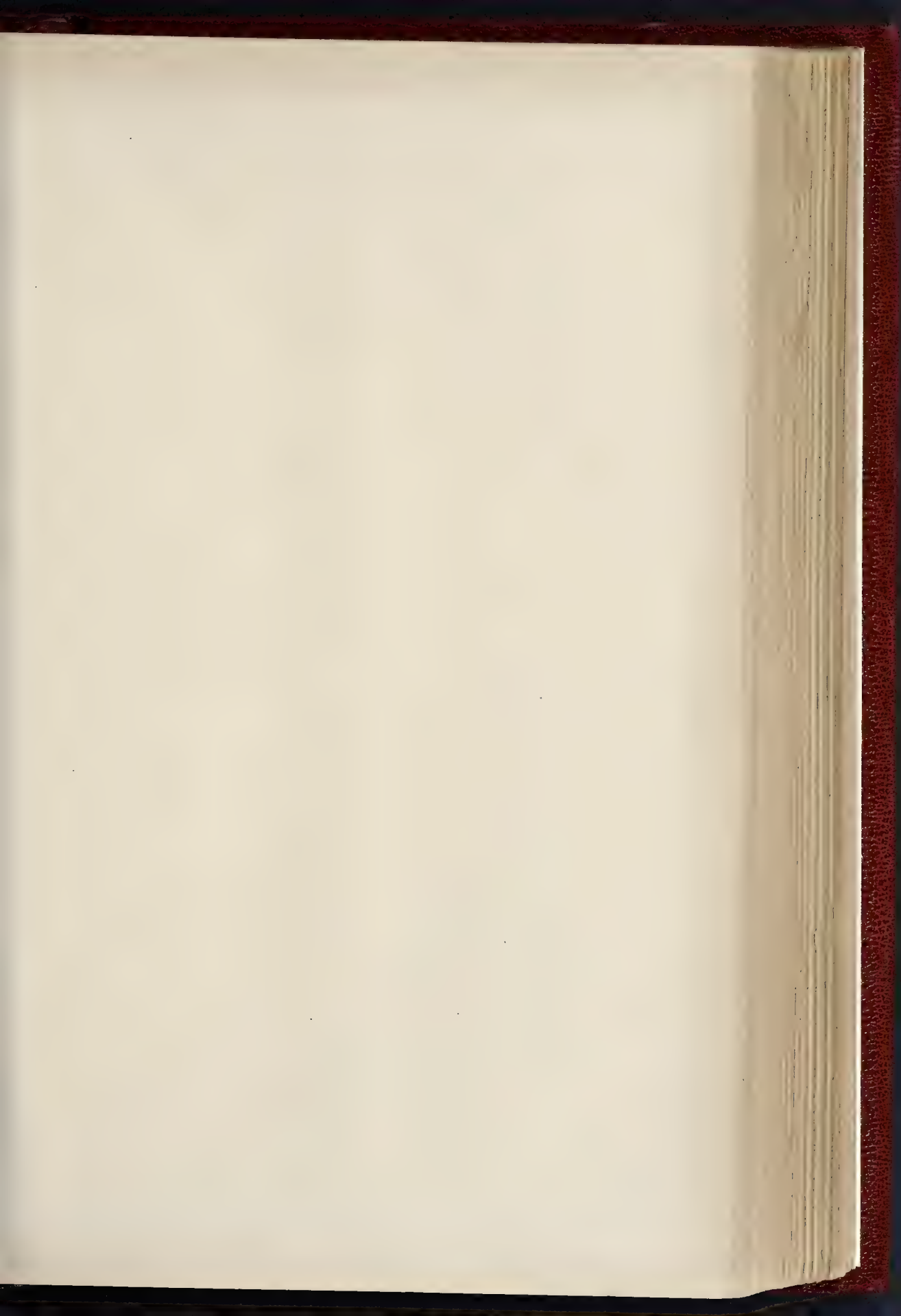


THE PHOTOGRAPH BY J. C. GORDON

ON THE THAMES EMBANKMENT.—MR. S. SALTER, F.R.I.B.A., ARCHITECT.









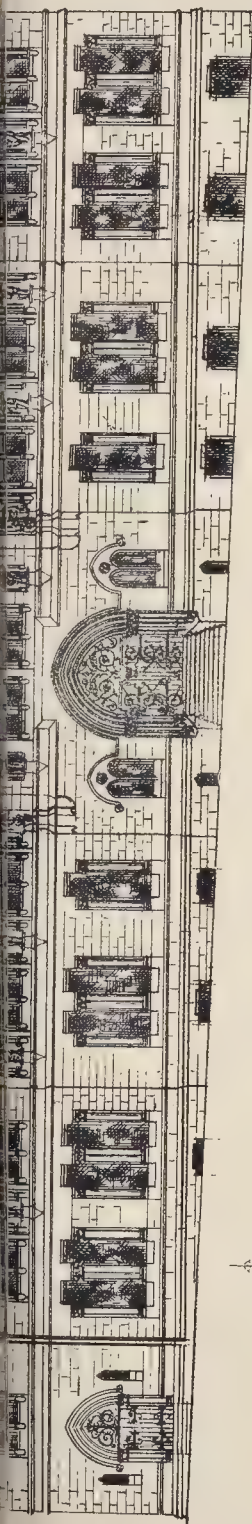
# BIRMINGHAM LAW COURTS.

SKETCH DESIGN BY "Castor & Pollux."



FOURTH FLOOR PLAN.

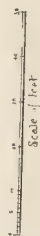




CORPORATION STREET FRONT



SECTION THROUGH HALL COURT &c

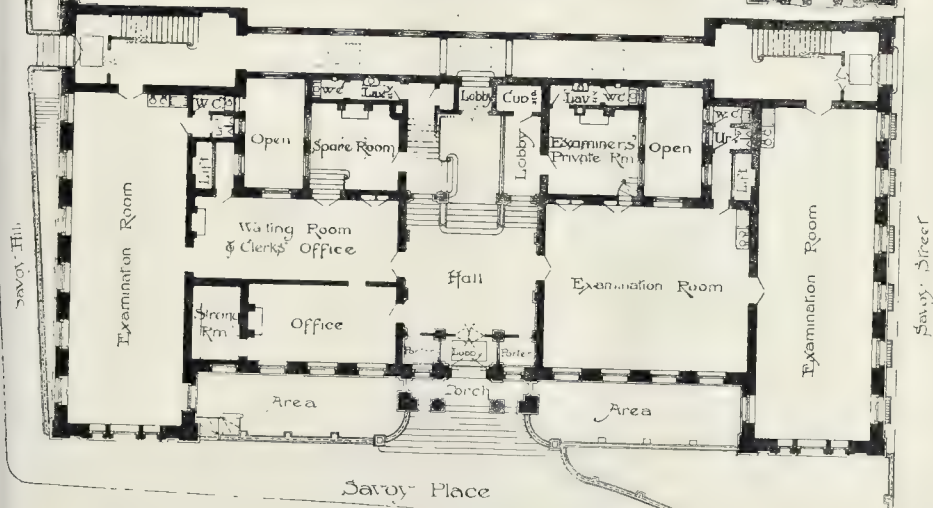
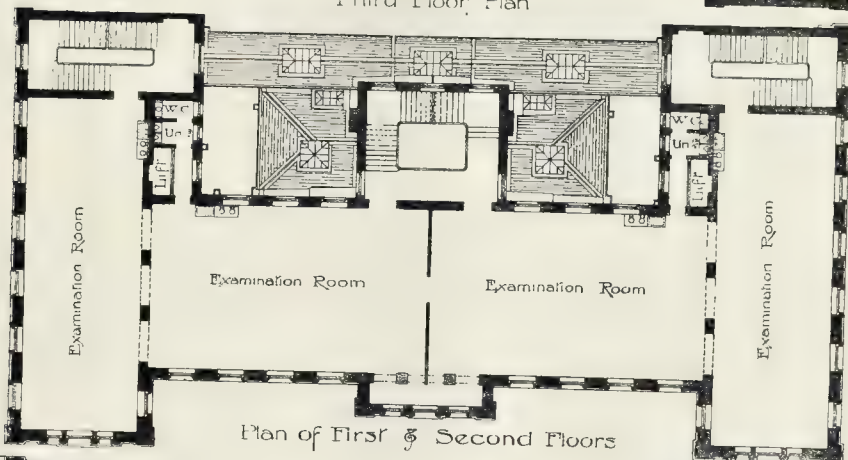
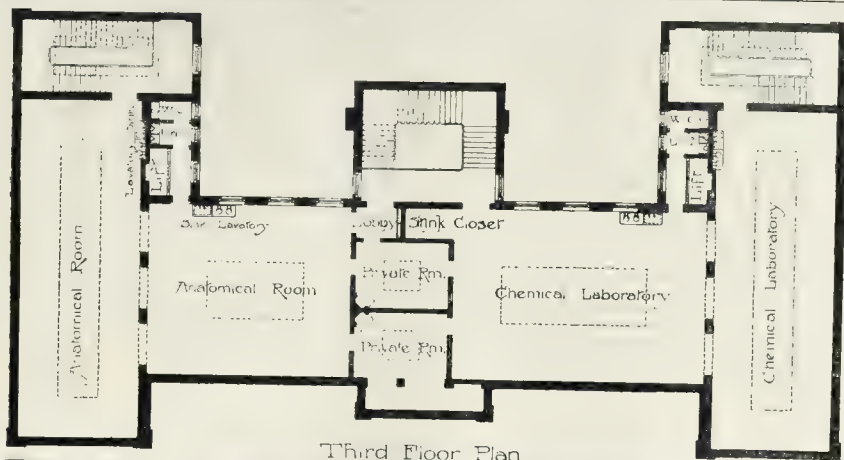


BIRMINGHAM LAW COURTS COMPETITION.—ONE OF THE SKETCH DESIGNS SUBMITTED BY MR J. P. SEDDON, F.R.I.B.A. AND J. COATES CARTER.

PHOTO LITTO SURAGE & CO LONDON







Scale of Feet

NEW EXAMINATION HALLS FOR THE ROYAL COLLEGES OF PHYSICIANS AND SURGEONS.



of joyous days. He found the Feldon (the part of Warwickshire south of the Avon), "a champain country, whose fertile fields of corn and verdant pastures yield a most delightful prospect from the top of Edgehill." If, however, the larger roads and a prospect are preferred, it must be fully a dozen miles from Kineton station to the house.

The post-Restoration church is a little further down the hollow than the house,—to the north-west of it. The old church is said to have been destroyed by Parliamentary soldiers in 1646. The house was garrisoned by them, as its owner was a zealous partisan of Charles. The present church was commenced in 1663; and the date, 1665, on a pipe-head, may point to its completion. We gave in our last volume (vol. xlix., p. 237) some extracts from old account-books showing that the cost of the building started in 1663 was about 300l., and may mention here that on pp. 237, 332, 337 of that volume are some notes and illustrations as to the house also. The church has two equal naves,—the arcade between them abutting on the eastern wall, and the altar being placed under the point where it abuts. An intention to deviate from ordinary plans has been suggested; but instances, such as Caythorpe, a church on the Cliff-road, south of Lincoln, may be quoted as telling against this. Caythorpe is almost entirely of geometrical date, and has also a double nave, the easternmost arch abutting against the central tower, above the apex of the west crossing arch, and the westernmost arch hitting the centre of the gable of the west front; for at Caythorpe one span covers the two equal naves. At Compton the arcade abuts at the west end on the centre of the tower arch, and is carried on a combination of key-stone and corbel. The date and many oddities of detail make the building piquant; but candour might lead to the confession that there is not much that is architecturally interesting.

Of the house, however, candid visitors always tell a different tale; and it has been known to make so favourable an impression as to distance all competitors of its age and size. Situation, history, and colour may do a good deal, but there are good grouping and detail as well,—so that everything is in its favour. The plan consists of a small quadrangle;—the buildings round it being,—the offices on the left on entering, the hall opposite the entrance porch, and rooms and chapel on the right. Henry VIII., when he visited Compton, was lodged in the rooms on the right of the quadrangle.

Shields on the doorway of the entrance porch,—now reached across the site of the filled-up moat,—give approximately the date of the erection,—that is, somewhere about 1519; for the pomgranate of Aragon, the castles of Castile, the rose and portcullis of the Tudors appear side by side. Sir William Compton, from boyhood the friend and companion of Henry VIII., built the house, and since he lived in it not many alterations have been made. He used brick of a rich red very liberally for walls and chimneys,—diapering some surfaces with a few black headers; stone he used more sparingly in windows and doors, and for quoins and copings. Stone slates with thick ragged edges cover the roofs. One of the stone-paved paths crossing the court leads to the entrance to the hall,—a simple doorway, not very much more prominent than that on the left, which leads into the offices. The founder, it is stated, pulled down a castellated house at Fulbrooke, also in Warwickshire, and carried off the materials to Compton. Fulbrooke is between Stratford and Warwick,—perhaps fifteen miles from Compton, so that the situation of the places offers no obstacle to the credibility of the story. The fact that Fulbrooke Park was the place, as people used to say, from which Shakespeare removed Justice Shallow's deer, has nothing to do with the story of the bay windows and other materials, which to be of any use must have been taken away at least seventy years previously.

The bay window is in the usual position at the east end of the hall. The stonework is earlier in character of detail than in the parts adjoining; and, although the general effect is very pleasing, some parts have a look of not being specially prepared for the place which they occupy. The little arcade above the heads of the window-lights,—a feature which has been repeated at Wroxton Abbey, and in other recent work,—has, for instance, a shield and other ornamentation in one division only,

but that division is not over the central mullion. There is besides no reply to its rich detail elsewhere in the quadrangle; the line of the top of its parapet is carried along by a simple stone coping, but none of the other lines are continued. The other windows just by in the hall have cinquefoiled heads, but those in the bay are plain four-centred. The oak roof of the hall is also said to have come from Fulbrooke; and there is certainly an enigmatical look in it also, especially about the spacing and the feet of the wall-pieces. The wood screen across the hall at the end next the offices is a rich and notable piece of work,—some of the carving full of skill and spirit.

Canonbury Tower also belongs to the Marquis of Northampton, and was made to contribute some years ago to the adornment of Compton. A large oak chimneypiece was brought hither, and some other fittings. Sir Digby Wyatt directed these works, and put the bay window on the staircase which shows on the right of the large view, and is, particularly from the staircase side, a most pleasing addition. Among the pretty things on the outside of the building, the two gables with timber work, one on each side of the porch, in the entrance front, merit a high place, having a good deal of design in them in the cornices, bargeboards, and the little bracketed windows. The designer was, happily, not afraid of a good-sized piece of brick wall. There is a satisfactory breadth in the walls under these gables and elsewhere, and, consequently, an easy restful look; but the happy man was not oppressed by the cry for very ample lighting of all rooms and spaces, as the modern architect very properly is.

The brick chimneys, in every variety of form, are among the noteworthy features: they may be compared with those at Hampton Court, Chertsey, East Barham, &c. The chapel, the plaster ceilings, carving, tapestry hangings, and so on, would deserve notice if we were attempting a complete account, instead of simply putting together a few remarks apropos of the illustrations.

#### FREE LECTURES TO ARTISANS AT CARPENTERS' HALL.

THE ARCHITECTURE OF CITY BUILDINGS.

THIS was the subject of the fourth lecture of this course, which was delivered on the 10th inst. by Mr. T. Chatfield Clarke, F.R.I.B.A.

Mr. Chatfield Clarke commenced by drawing a contrast between the City of London of today and the City as it existed in the time of Henry II. After glancing at the lost opportunity which was presented by the Great Fire of 1666 for laying out the City on some such comprehensive plan as that prepared by Wren, he came to a much more modern period, viz., about fifty years ago, when two great improvements were made in the City, the formation of Moorgate-street and King William-street in connexion with the approaches to the new London Bridge, of the architecture of which streets it could only be said that it was tame and uninteresting in character. After mentioning St. Paul's Cathedral, the Bank of England, the Mansion House, many of the halls of the City companies, and several of Wren's churches, as monuments which were worthy of any city in the world, the lecturer proceeded to refer to the great changes which the street and other improvements of the last forty or forty-five years have wrought in the aspect of the City. Cannon-street was one of the first of the great arteries which cut through the City, the buildings on the south side being wholly new. The formation of the Holborn Viaduct and its approaches, the erection of the new City markets, and the formation of Queen Victoria-street, together with the widening of many of the most important of the City thoroughfares, and, last of all, the formation of the new thoroughfare through Eastcheap, constituted a series of undertakings on a large scale which had given much opportunity for architectural development. One special feature had been adopted, notably in the Mincing-lane and Mark-lane neighbourhoods, that of utilising the frontages of old houses, often the former residences as well as counting-houses of merchant-princes, rebuilding them, but marrying them to a lot of back land, and forming alleys or passages through to an adjacent street, by such means giving much value to back land; for nothing was more noteworthy of the trade of the City than the clinging of certain trades or markets to a very limited

area, giving special value to the property there and determining its use and adaptation with great particularity. It was true that owing to the narrowness of the streets, which, again, was due to the great value of land, many a worthy and excellent building was insufficiently seen; but, nevertheless, they were not scamped on that account or pinched in the character of the design or the material with which they were executed. What could not be seen was worthy as what was seen. One cause which had contributed much to good building in the City was to be found in the fact that the value of the ground bore a much higher proportion to the value of the whole site than did the building to be put upon it. Lamentable as it was to feel that it had been necessary to destroy many a sound and well-built building, occupied in earlier times by a noble family and later by a merchant-prince, the ground had become so valuable,—special sites reaching 45l. per foot super,—that the cost of replacing the building with one economical in its development of the space and complete in its lighting, with numbers of floors and every disposition for business, could not be avoided. The problem of a street building consisted in the adaptability of the buildings to the wants, the climate, and the surroundings of the particular business to be carried on. Now, to combine the needs of buildings with the simple principles of design, such as providing such a sufficiency of sub-structure as not to make the building apparently weak in the lower portion, while not sacrificing light in that portion where it was least abundant, to let opening follow opening, &c., was a problem not always easy of solution. The treatment of the design, however simple, and in whatever style, should bear the relation not only of the scale of the whole to the parts, but a subordination of the lesser features to the ruling lines of the whole. Prominently in City buildings, there were several principal classes, such as banks, insurance offices, warehouses, shops, and offices, each class having its special requirements, while there were some factors common to all. The lecturer named a great many of the principal buildings of these types which have been erected of late years in the City, generally with commendation, pointing out that in some instances good designs had been marred by the exigencies of the law of light. We regret that we have not space to devote to this part of the paper. In conclusion, he observed that he had shown that within the limits of a square mile or upwards there was an amount of really good modern design worthy of the study of all who were interested in the art of architecture. The question that arose in his mind was, Does the amount of work, carefully and conscientiously thought-out, receive at the hands of the public that amount of recognition that it ought to do, and if not, why not? It could not be denied that it had almost been the fashion of late years, in certain circles and journals, to decry the works of modern architects as wanting in fitness, as ill-adapted to their uses, as having been in many cases carried out without a conscientious regard either to cost or to the details of modern wants. Now he took the liberty boldly to deny in the main that there was any shadow of justification for such charges. Admitting some unfortunate exceptions, he contended that an examination of the immense amount of building work executed in the City of London alone would give the easiest refutation to such statements. If we compared for one moment the healthiness, the fitness, and the general disposition of modern premises with those in which our forefathers lived and worked, and if we looked at the careful and economical disposition of the place, the use of materials, and the desire to adopt the scientific classes of construction of iron and otherwise, we should see that there was no comparison between the old and new; and wide knowledge of men in the architectural profession would suffice to convince any one that they were earnestly desirous of carrying out their work with a sole regard to the interests of their clients, and in many cases (though not adequately compensated) with a strict eye to the financial results of their works, and with due regard to their bearing on the health and happiness of the community. Of course, the public at large, who, as a rule, generously recognised the merits of any distinguished designer, had not always at hand the means of knowing how crippled he might have been, and how difficult it was to get access



plans and designs which, to be fully understood at first, must be judged of only by those who had technical knowledge of drawings; but in the end, a conscientious and single eye to the interests of the client or the public would be generously recognised and appreciated, and the passing mood or fashion of decrying the labours of those who were often working under limitations not understood was probably one of those evanescent forms of shallow criticism which would die out. Nevertheless, the student of architectural art justly be warned that the sacrifice of utility to style, the choice of such style where wholly inappropriate to the class or position of the building, and any want of care in the estimates, or carelessness in the construction or superintendence, would justly not only bring on his head dissatisfaction and loss, but would tend to keep alive in the public mind a conviction that it was better to get on without an architect, and to trust themselves unaided by the building contractor. It should be the aim of every young practitioner especially, by his ure, talent, and energy, to dispel such an illusion and to raise the character of the profession of which he was a member. The lecturer's final word was one of satisfaction that that ancient guild was taking up the thread of the work of art-education, so fit and right in connexion with the Company, and by such means establishing in the minds of a great public those claims of fitness and ability to do most useful work in our great community.

On Wednesday evening last the fifth lecture of the series was given by Mr. John Slater, B.A., who took for his subject "Concrete." The portion of this will be found on another page.

#### ARCHITECTURAL SOCIETIES.

**Manchester Architectural Association.**—At the general meeting of this Association, on the 14th inst., Mr. L. Booth, President, in the chair, Mr. John Holden, President of the Manchester Society of Architects, read a paper on "The Duties and Requirements of an Architect's Profession." He said that as the standard of education rose in respect to the general public, would it rise with the architectural profession. He then detailed and described many of the practical questions upon which architects are often consulted, and said it had always been his opinion that the architect was the proper person to take out the quantities for his own works. Such a course was of great advantage both to the owner and also to the builder. Many plans in London offices completed their articles without knowing anything about quantities, which he was glad to say was not the case in Manchester. In conclusion, he said he looked forward to the time when the Fellowship of the Institute would be considered one of the aims of an architect's life. The Institute, from its origin and from the number of its members, must of necessity exercise very great influence on the profession throughout the country. If non-Metropolitan Fellows were to be bound by its regulations, they should have some voice in framing or making the same. A discussion followed, in which Messrs. Mees, Talbot, Colley, Hodgson, Mould, and the chairman took part.

**Royal Institute of the Architects of Ireland.**—The usual monthly Council meeting of the Institute, held on the 14th inst., Mr. J. R. Carroll, in the chair (also present, Messrs. J. J. Callaghan, Wm. Mitchell, S. Symes, hon. treasurer, Albert E. Murray, hon. secretary), and the general business was concluded, it was resolved that a deputation from the Institute should wait on the Lord-Lieutenant, and present him with an address of welcome, Messrs. J. R. Carroll, T. Drew, and Albert E. Murray, hon. secretary, to form a sub-committee to draw up an address, which was duly presented on the 15th inst. The address contained the following passage:—

It is a source of great satisfaction to the architects of country to observe that successive Governments have shown an increasing disposition to employ the best industrial talent available to design important public buildings, rather than by a system of departmental centralisation to lose the advantages to be obtained from varied working in different schools of thought. We can, in pride and satisfaction, point to some public edifices in this country, erected under the former system, not unworthy of the country, and to an important work now being carried out, which, it is believed, will not be less deserving praise.

Lord-Lieutenant, in his reply, accepted the position of vice-patron of the Institute.

#### THE DISPOSAL OF THE METROPOLITAN SEWAGE.

An important report on this subject was presented to the Metropolitan Board of Works at its meeting on the 12th inst. The following are the principal passages:—

"Immediately after the publication of the first Report of the Royal Commission on Sewage Discharge, the Board instructed their Engineer and Chemist to institute a series of experiments for the purpose of ascertaining the best method of complying with the recommendations of the Commission, and voted the sum of 1,000*l.* for the purpose of those experiments, to assist in which Dr. Dupré, F.R.S., was retained.

As a preliminary measure, the Chemist to the Board, Mr. Dibdin, and Dr. Dupré commenced a series of experiments in their respective laboratories, and arrived at certain definite conclusions which served as a guide to the trials subsequently made at the Western Pumping Station, Fimbo. At this place apparatus was erected for the treatment of successive quantities of 1,000 gallons of sewage, which was subsequently arranged for the larger quantities of 100,000 and 250,000 gallons.

These larger experiments were conducted for about three months, and demonstrated that chemical precipitation of the solid matters held in suspension can be effected by the addition of various re-agents, but that no practical advantage accrued from the addition to the sewage of more precipitating matters than are really necessary for facilitating the natural tendency of the solids to deposit: the effect of adding large quantities of chemicals ensuring only a more perfect clarification without materially affecting the soluble constituents of the sewage.

This primary point having been determined, attention was next given to the collection and disposal of the sludge. Although at first sight this appeared to be a tolerably simple matter, the enormous quantity of London sewage rendered it imperative that more precise data should be obtained as to the quantity to be dealt with per day, its adaptability for transit, pressing, and ultimate disposal.

The evidence given before the Commission was of so conflicting a character that it was felt that nothing short of a prolonged series of experiments on a tolerably large scale, extending over some months, and including day and night, would afford the information necessary before working plans could be drawn up for the erection of plant for treating the whole of the sewage.

The Board therefore voted a sum of 5,000*l.* In November, 1884, for the erection of works at the Crossness Outfall for the treatment of one million gallons of sewage daily, and the pressing of the sludge obtained therefrom. These works were accordingly erected, and while special attention was directed to the sludge, numerous experiments were made with regard to the chemicals employed for precipitation. The results of these have confirmed those first arrived at, viz., that the sewage can be sufficiently clarified by the addition of 3·7 grains of lime and 1·0 grain of proto-sulphate of iron to each gallon of sewage, and by subsidence in settling-tanks during a period of from one to two hours. In addition to the removal of the solids, the grosser odours of the sewage are destroyed, and the foul and offensive appearance removed.

The accompanying reports of four very eminent chemists (one of whom was a member of the Royal Commission on the Metropolitan Sewage Discharge) are a sufficient guarantee as to the satisfactory condition of the effluent after the above treatment of the sewage.

The two reports are as follow:—

October 27, 1885.  
To the Sub-Committee on Sewage Disposal of the Metropolitan Board of Works.

Gentlemen,—In response to the question submitted to us for consideration through Mr. Dibdin, whether the treatment of metropolitan sewage with lime and sulphate of iron, in the proportion of 3·7 grains of the former to one grain of the latter to each gallon of sewage, furnishes an effluent of such a character that we could recommend its discharge into the river at all states of the tide, we have, in the first place, to express our regrets that the shortness of time within which it is desired to receive from us an expression of opinion has not allowed of our making such a comprehensive examination of the matter as its importance would have rendered desirable.

We have, however, witnessed at Crossness the treatment of the sewage in the manner indicated, and have made certain experiments with effluents obtained thereby, and we now submit the following statements on the subject:—

1. We are of opinion that the discharge into the river of such an effluent as is obtained by the treatment in question, and after such subsidence of the solid matters as

is practically attainable, would be a very great gain over the discharge of untreated sewage, and that the treatment does, apart from its precipitating action, exert a distinct purifying effect upon the liquid part of the sewage. We consider, however, that the effluent produced by the proposed treatment retains a sufficiently unpleasant odour to prohibit its being discharged into the river during warm weather at all states of the tide.

2. As regards the mere production of a fairly clear effluent our present impression is that little, if any, additional advantage would accrue either from an increase in the proportions of the chemicals specified or from a resort to other chemicals which would act merely as precipitants.

3. We have reason to believe, however, from what we have seen in the way of experiment, that the addition of manganate of soda and sulphuric acid, or of other suitable oxidising agent to the fairly clear effluent obtained by the treatment with lime and sulphate of iron would so far deodorise and purify that effluent as to allow of its being afterwards discharged into the river, throughout the year, at all states of the tide.

4. It is a question whether this supplementary treatment of the said effluent by an oxidising agent may not be dispensed with during the winter months.—We are, &c.,

(Signed) F. A. ARBE,  
WM. CHILDS,  
ALEX. W. WILLIAMSON,  
A. DUTRE.

December 10, 1885.  
To the Sub-Committee on Sewage Disposal of the Metropolitan Board of Works.

Gentlemen,—In our report of the 27th October we expressed the following opinion, viz.:—

1. That the discharge into the river of an effluent obtained by the treatment of sewage with lime and sulphate of iron in the proportion of 3·7 grains of the former and one grain of the latter to each gallon of the sewage, and by such subsidence of the solid matter as is practically attainable, would be a very great gain over the discharge of untreated sewage; but that such an effluent retains a sufficiently unpleasant odour to prohibit its being discharged into the river during warm weather at all states of the tide.

2. That so far as regards the mere production of a fairly clear effluent, little, if any, additional advantage would accrue either from an increase in the proportions of the chemicals specified or from a resort to other chemicals, which would act merely as precipitants.

3. That we have reason to believe that the addition of manganate of soda and sulphuric acid, or of other suitable oxidising agent, to the fairly clear effluent obtained in the manner described, would so far deodorise and purify that effluent as to allow of its being afterwards discharged into the river throughout the year at all states of the tide.

4. That it was a question whether this supplementary treatment of the effluent might not be dispensed with during the winter months.

We have nothing additional to observe with regard to statements 1 and 2, but with reference to 4, we have to state that additional observations made by us since the submission of our report have led us to the conclusion that the concurrence during a considerable part of the year of the comparatively low temperature, both of the sewage and of the river into which it is discharged, with the greater dilution of the sewage, renders a supplementary treatment of the fairly clear effluent obtained by the addition of lime and sulphate of iron unnecessary during the periods of such concurrence.

With a view to enable us to speak more definitely on the subject dealt with in statement 3, we have instituted a number of experiments, not only with samples of average sewage, but also with samples representing exceptionally offensive conditions: we have, moreover, carried out our experiments not merely at the ordinary temperature, but also under exceptionally severe conditions as regards maintenance of the sewage and the effluents at elevated temperatures and in confined spaces.

The results of these experiments have led us to the conclusion that, in cases when the supplementary treatment by an oxidising agent of the effluent obtained by the use of lime and sulphate of iron is necessary, the addition of manganate of soda in some proportion ranging between 0·5 grain and 1·5 grain of the crude commercial manganate to one gallon of the effluent, together with sulphuric acid in a proportion corresponding to about one-third of that of the crude manganate used, suffices to deodorise and purify the effluent to such an extent as to render its discharge into the river unobjectionable at all states of the tide.

We therefore recommend:—

1. That the sewage be treated throughout the year with lime and sulphate of iron, in the proportions of 3·7 grains of lime to 1 grain of sulphate of iron (green vitriol) to each gallon of sewage.

2. That whenever it should be found that the fairly clear effluent obtained by that treatment is to any appreciable extent offensive, manganate of soda be added to the effluent in such proportions as are found to be necessary to deprive it of its offensive smell, those proportions to range between 0·5 grain and 1·5 grain (inclusive) of the crude commercial manganate, with sulphuric acid (commercial oil of vitriol), in quantity equal to about one-third of the crude manganate added.—We are, &c.,

(Signed) F. A. ARBE,  
ALEX. W. WILLIAMSON,  
WILLIAM CHILDS,  
A. DUTRE.

For the purpose of pressing the sludge obtained, a 30-inch press was procured from Messrs. Johnson & Co., of Stratford. During the seven months that this has been at work it has pressed 1,787 tons of sludge, which yielded 523 tons of 'cake.' In addition to the sludge thus treated, 1,408 tons have been experimented upon by various means, for the purpose of ascertaining the possibility of getting the sludge into a solid condition without the expense of thus pressing it. The result showed that this had been done to a certain extent; but the time required to make it solid would, during the summer months, render this method objectionable.

One hundred tons of sewage-cake have been burned in a Hoffman's furnace, at the brick works of Messrs. Hughes & Co., at Pluckley,



Kent, and about 200 tons have been burned in various ways at Crossness. The result showed that, while there is but little difficulty in effecting the desired object, the expense of carrying on the system without nuisance would be prohibitory. It, therefore, became obvious that some other method of disposing of the cake, if the sludge is pressed, or of getting rid of the wet sludge, must be adopted, and if it is not removed from the works by farmers and others for manurial purposes the alternatives evidently are, either raising up low-lying land with the cake, or of taking the sludge or cake out to sea, provided that the contradictory evidence on these points could only be met, as before, by direct experiment. The Board, therefore, ordered that one of the compartments of the reservoir at Crossness should be arranged for the treatment of eight million gallons of sewage daily (the one-million gallon works being continued simultaneously) and that the sludge thus resulting from the treatment of nine million gallons of sewage should be used for the purpose of settling many doubtful questions as to its treatment and ultimate disposal. These works are now completed, and will be in operation in a few days. In the meantime, as many conflicting estimates of the cost of carrying the sludge out to sea have been submitted to the Board, advertisements were inserted in the leading daily newspapers inviting plans and estimates for a vessel suitable for that purpose, and in order to induce the leading firms of shipbuilders to compete, the Board offered a premium of 500*l.* for the best proposal in the event of the tender not being accepted. These plans have now been received and are under the consideration of the Board.

As soon as the eight million gallons experiment is at work, advertisements will be issued offering the pressed or unpressed sludge to all persons who may desire it, free of cost,—the object being to ascertain to what extent the sludge may be disposed of by this means.

The Royal Commission recommended that in the event of the sewage being treated by chemical precipitation at the present outfalls, the effluent should be filtered by passing it through land before being discharged into the river. The object of this was evidently to insure the removal of all odour from the effluent, and the possibility of 'secondary fermentation,' as it is called. The great cost attending such a method, and the difficulty of finding suitable land for the purpose in the neighbourhood of the outfalls, induced the Board to ascertain whether the desired object could not be effected by direct treatment of the effluent by means of an oxidising agent which, while effecting immediate deodorisation of the slight sewage odour remaining after the chemical or precipitation, should, at the same time, prevent the redevelopment of offensive gases. This agent has been found in permanganic acid, a substance widely used on a small scale, but hitherto not considered available for sewage treatment on a large scale. The operations of the Board, however, have not been confined merely to the application of chemicals, but also to their production on a large scale, with the result that while permanganate of soda, the actual agent in the production of permanganic acid at the commencement of the Board's operations could be obtained only in limited quantities at 40*l.* per ton, it can now be purchased in practically unlimited quantities at 11*l.* per ton.

The application of this material in conjunction with sulphuric acid has met with such success, not only in London but elsewhere, that the necessity for land filtration no longer exists; and thus the great objection to the treatment of the sewage, and the discharge of the effluent at the present outfalls, is overcome.

The deodorisation of the sewage as a temporary measure, pending the construction of permanent works for its treatment by precipitation, has been systematically carried on. At first this was accomplished by means of chlorine of lime, that substance being the only one obtainable in sufficient quantities at the time. Manganate of soda and sulphuric acid were subsequently used. In order to obtain the former of these in sufficient quantity at a low price, the Board found it necessary to construct chemical works and manufacture it themselves, with the result of reducing the cost as above stated. During the past summer these chemicals were the only ones used, and were found to be thoroughly effective.

For the purpose of preventing any nuisance within the metropolis arising from the discharge of offensive gases from sewer ventilators, the Board authorised the application of manganate of soda and sulphuric acid to the sewage as it flowed through the main sewers. Accordingly thirteen stations were arranged at the following places, viz.:—Bedford Park, Willesden, Fimlico, Westminster, Bayswater, Holloway, Old Ford, the Tower, Deptford, and Battersea.

The first of these came into operation on July 28th, and the remainder as rapidly as possible. These stations are now being considerably augmented, and thus, while the evolution of sewer gas will be prevented within the metropolis from sewers under the Board's authority, more complete control will also be obtained over the storm overflows.

Provision has been made for the supply of 3,000 tons of manganate of soda, and 1,000 tons of sulphuric acid. Of this quantity 1,000 tons of manganate are now in stock, and the remainder is under contract for delivery by July, deliveries commencing at once. Should these quantities prove insufficient, by reason of another exceptional season, there will be no difficulty in providing as much more as may be required, either by manufacturing or purchasing it.

The plan of deodorising the sewage within the metropolis is proposed, not only as a temporary measure, but also as a permanent scheme for preventing the sewer gas nuisance, and will, therefore, ensure, during the summer months, the arrival of the sewage at the outfalls in a deodorised condition, and thus materially assist in the production of an effluent of a far better character than would otherwise be obtainable.

The contract drawings for the enlargement of the Barking reservoir, and arranging it for precipitation and purification works, are in a forward condition, and the contracts may be let in the course of the ensuing summer, and the works completed and ready to come into full operation for the summer of 1888; in the meantime, the deodorising works already described will prevent any nuisance from arising at this outfall.

Nine million gallons of sewage per day will be precipitated at Crossness throughout the coming summer, and the remainder will be deodorised, as on the north side, until the process of precipitation has been extended to the whole of the sewage discharged at this outfall.

The sludge arising from the precipitated sewage is being pressed into 'cake,' and given to agriculturists gratuitously to utilise upon their lands, and, if possible, to develop a demand for its use; and sludge that may not be so disposed of will be sent in lighters out to sea, both in the liquid and in the cake condition, in order to ascertain the cost and effect of this mode of getting rid of it.

The Board have now under consideration the twenty-three designs sent in by shipbuilders in reply to the invitation issued by the Board, and will shortly be in a position to determine what course they will adopt with respect to them.

Your committee submit the above facts for the information of the Board, and beg to recommend that letters founded upon this report be addressed to the Secretary of State and the Erith Local Board of Health, in reply to their communications on the subject."

The report was received, and ordered to be printed and circulated, its consideration being postponed for a fortnight.

**German Renaissance.**—So much importance is often attached by the unskilled public to names as indicative of architectural or pictorial styles that the exposition lately given by Dr. Lehfeld at Berlin deserves mention as elucidating the above subject. According to his view, much is now described as *German Renaissance*, which should more properly be styled *Baroque*. While the Renaissance period in Italy extended from 1420 to about 1540, the movement only displayed itself in Germany about 1500, and was concentrated in the period between then and 1560. A distinction was drawn by the lecturer between the Renaissance works built in Germany by Italians, and those designed by native architects. The introduction of Renaissance styles into Germany was due not only to architecture, but also to painting and engraving; the pictorial treatment of many German Renaissance works being thus explained as well as the occurrence of ideas drawn from metal work, &c. In North and South Germany true Renaissance work has a like character of graceful simplicity.

## ARCHITECTURAL ASSOCIATION VISITS.

The fourth Saturday afternoon visit of this Association for the present season was made on Saturday last to the houses in Kensington court, which are being erected from the designs of Mr. Stevenson.

The houses now in course of erection are principally facing the street which runs parallel to the High-street, the roadway having been raised some 8 ft. from the original level; the angle house, which is very ingeniously planned with a small frontage to each street, has the dining-room on the floor below the entrance hall, which is, however, still well above the level of the street at the back; this lower ground-floor comprises in addition the kitchen and offices. The hall floor comprises, in addition to the large hall, two reception-rooms. There are two floors above this. The other houses are arranged with large halls in the centre of the block. The external elevations are faced with red brick—some with buff terra-cotta dressings, others with gauged brick. All the houses have lifts which pass through the principal floors, and which are worked by hydraulic power, which is supplied by the Hydraulic Power Company, who have a station on the estate. The lifts are made with an arrangement whereby the door opening into the lift cannot be opened unless the cage is opposite the door. At the back of the estate the stables have been built. These are arranged with the coach-houses on the ground-floor; the stables are on the first floor approached by an incline, and with a rise of 1 in 3; and above these, the coachmen's living rooms, which have a separate gallery and staircase to reach them from the ground, and also a staircase from them to the stable level.

## PROPOSED UNITED ARTS CLUB.

SIR,—Will you allow me, through the medium of your valuable columns, to draw the attention of professional men to the fact that a circular will, in the course of a few days, be issued relative to the above? The Club will be founded on principles comprising all the accessories pertaining to institutions of a similar nature, and will provide accommodation specially suitable to the requirements of professional men.

All architects, painters, sculptors, and engineers in the United Kingdom will be eligible. By thus bringing together the various members of the different professions, it is hoped to promote more social intercourse than at present exists between them.

The annual subscription will be placed at the lowest possible figure, so as to enable the youngest members to participate in the benefits offered.

A. LOWTHER FORREST,

Hon. Sec. (pro. tem.).

No. 19, York Buildings, Adelphi, W.C.

## SEWER VENTILATION.

SIR,—("Sanitary Engineer," on p. 424 in your issue of 12th inst.) says, as far as he is in sewerage sanitation as he is in his grammar. I say:—"Thorough aération . . . and a perfect system of flushing has prevented the generation of the gas altogether." Now, I do not believe in these will diminish the production of the gas as dilute it, but not prevent it altogether. Moreover, it is not only the "gas" that has to be guarded against, but disease germs floating in the "gas" in the atmosphere of the sewer; hence the objections made by many people to surface-gratings: the streets as blow-offs, and especially in close and crowded thoroughfares. The *Lancet* in advocating high-level outlet ventilating pipes for sewer ventilation is simply recommending a sensible plan, as one which would be of great benefit in many places where the street-gratings are dangerous. I have suggested this often for years back.

W. P. BUCHANAN.

\*.\* Where are the pipes to go, no as not to either an eyesore and obstruction, or a concentration of danger to individual houses? That is the question,—or one of the questions,—in connexion with the subject.

**Buxton.**—At a recent meeting of the Directors of the Buxton Improvement Commissioners, it was decided to recommend that the capital of the company be increased by 4,000*l.* for the purpose of erecting an assembly-room adapted to the requirements of a theatre. It was also decided to accept an offer from the Duke of Devonshire of part of the Sorrento to be added to the Pavilion Gardens as a recreation-ground for juveniles, &c.



# The Student's Column.

## OUR BUILDING STONES.—II. THE GENERAL CHARACTERS OF ROCKS.

THE word "rock" does not necessarily imply that the substance is of a solid, rocky material, although rocks used for building purposes are generally so. Geologists apply the word to gravel, clay, sand, and mud equally as to granite, sandstone, and limestone. All rocks are mixtures of different minerals in varying proportions, and they are not therefore definite chemical compounds. In describing a rock it is not enough to mention its component minerals, for distinct varieties of rocks may be made up of similar minerals. For instance, we propose we state that it is made almost wholly calcite; this would equally apply to statuary marble, chalk, and encrinitic limestone, and yet these rocks are widely different from each other in other matters. In addition to mentioning the minerals that compose the rock, it is necessary to state its texture, state of aggregation, and general structure. A rock may be crystalline,—a compound chiefly of altogether crystals or crystalline particles,—or fragmental,—composed of detritus, &c.

When a rock has a finely crystalline ground-mass (matrix) through which distinct larger crystals are dispersed, it is called a *porphyry*. When we speak, therefore, of porphyries, which are largely used in some districts for ornamental purposes, it must be remembered that the term refers only to this peculiarity of the structure of the stone. Granite is composed principally of quartz, felspar, and mica, but if the felspar crystals were large, and showed up prominently in the mass, it would no longer be called granite, but porphyry, or porphyritic granite.

Marble, strictly speaking, is crystalline limestone, but for architectural purposes we shall include under this name various rocks that may be limestones or even crystalline and, indeed, is usual to include any stone that is hard enough to be capable of receiving a polish, not granites and the like excepted.

Freestone is not a geological term. It is used in connexion with sandstone and limestone, and notes that the rock can be cut into blocks in any direction, without a marked tendency to break in any one place more than in another. Some exceedingly compact limestones break at a peculiar fracture into convex and concave rounded shell-like surfaces. This fracture is called *conchoidal*. Finely granular rocks which are very compact, sometimes break with a *plinty* fracture. They are often very difficult to manipulate.

When we say that a rock is *calcareous*, it notes that it contains much carbonate of lime; *siliceous*, containing much silica; *felspathic*, having felspar as a principal constituent; *argillaceous*, sandy; and *argillaceous*, clayey.

## THE CHEMICAL ACTION OF RAIN AND AIR ON STONE.

Having given a few of the more important laws which characterise rocks generally, we now proceed to discuss the action of rain and air on them in so far as it concerns the decay or preservation, as the case may be, of stone used for building purposes.

The normal condition of the atmosphere is considered to be a mechanical mixture of nearly equal volumes of nitrogen and one of oxygen to every small proportions of water vapour, carbonic acid, and still smaller quantities of ozone and ammonia. In addition to these, or vapours, gases, and solid particles are present. It is with the vapour which, when condensed, forms rain, hail, and snow, that we are now particularly to deal. In falling, rain carries up a very small portion of air, including contained gases, and the impurity of the atmosphere at any place is best examined by weighing the rain-water of the district.

An average proportional percentage composition of rain-water by measure is,—nitrogen, 17; oxygen, 33.76; carbonic acid, 1.77; carbonic acid being more soluble than the other gases is contained in rain-water in proportions between thirty and forty times greater than in the atmosphere. Oxygen, also, is more soluble than nitrogen. This difference acquires considerable importance in the chemical relations of rain.\*

In analysis of rain-water will show us that sulphuric acid frequently occurs in the air of

our large cities in considerable quantities, but more especially so in the manufacturing districts, where its presence is governed more or less by the nature and magnitude of the manufacturing processes.

The same thing applies to a certain extent to *hydrochloric acid*. We should find that this acid occurred largely in a free state in towns; but it exists in the sea-air as chlorides, principally as chloride of sodium,—common salt. The amount in sea-air would be proportionate to the saltiness of the sea, and the rapidity of evaporation.

*Nitric Acid* also occurs in small quantities in rain-water.

We have seen that rain-water in descending through the air takes up a certain quantity of it, and that *carbonic acid* is largely present in rain-water. Any stone containing carbonate of lime is attacked by this acid. Carbonate of lime is insoluble in water, but the carbonic acid converts the lime into a bi-carbonate, which is soluble, and is thus removed from the stone. If this carbonate does not play a conspicuous part in the composition of the stone, then the stone is not much injured by the acid, but such stones that are largely made up of it, are liable to decay quickly. We say *liable*, advisedly, because it is not a rule, as many stones used in building will be seen to contain a comparatively high percentage of it, and yet are fairly durable. It depends in a great measure on the form which the carbonate of lime takes,—whether it be crystalline or not,—and which has, therefore, to do with the structure and not the chemical composition of the stone. We shall further allude to this.

## RECENT PATENTS.

### ABSTRACTS OF SPECIFICATIONS.

7,674, Sharpening and Setting Saws. L. Martinier.

The saw is supported by a holder which can be raised or lowered, and is sharpened by a file fixed in a holder, to which a reciprocating motion is imparted by a crank and connecting-rod. The holder and the mechanism for advancing the saw tooth by tooth and engaging and disengaging the sharpening mechanism, are described in a previous specification. The saw is set by the successive action of deflecting jaws and a pair of larger jaws which press back any teeth which are bent too far. Special mechanism is used for engaging and disengaging the setting mechanism when the saw is advanced.

9,762, Cattle Drinking-Troughs. R. Pringle.

The orifice of the inlet-pipe from the main is directed upwards and protected by a shield presenting its convexity to the inflow to direct the water upwards, thus obtaining a surface flow of water and a "tranquil bed." At the other end of the trough is an overflow funnel-shaped waste-pipe head, leading into a waste-pipe. The bottom of the trough is concave towards the centre or other point, at which is connected a cleaning-out pipe and mud-cock.

9,846, Excavator. J. F. Sang.

Two or more rotary disc cutters and a plough are mounted in the fore part of the main framing, and serve to cut and direct the earth into a receptacle through which the endless series of the elevator buckets work. The elevator is driven from the axle of the rear supporting roller, either directly or through a second motion-shaft, by means of the pitch-chain and pulleys. The depth of cut can be regulated by the front guiding-wheel or roller, which can be adjusted in the bearing or support of the main framing.

12,136, Cellars, &c. P. Sohaar.

The vessels containing the beer, &c., are formed of masonry, glass, earthenware, concrete, or a similar material, and may be lined, if required, with cement and the like. They are fixed permanently in rows, with their front walls facing a passage, and are so arranged that they may be nearly surrounded with ice. These front walls are provided with man-holes, and the bungs consist of screw-caps, with plugs having a bore communicating with a pipe leading to a gas-vent or discharge-valve in the front wall.

13,350, Kilns and Stoves. J. C. Webb.

The kilns are placed one above another, and the flues arranged so that the gases pass round the top and sides before passing beneath the floor. In a modified form a single flue from each fireplace passes round both the kilns, with an intermediate connexion to the stack, so that the heat may be confined to the lower kiln if necessary.

13,651, Portable Load Gauge. H. Adair.

The apparatus is used for gauging the height and width of loads. It consists of a folding post of adjustable length, with a hinged gauge arm and a hinged foot, and is placed beside the wagon or conveyance.

14,892, Fireplace. Winfield, Evered, and Underhill.

A mantel register stove is converted into a cooking stove by the addition of an oven and boiler. The oven is fitted to the fire, and is surrounded by a flue through which the products of combustion pass to the chimney, a perforated damper regulating the draught. A supplementary gas-burner is provided, and is protected from the fire by a plate which has space at the sides to allow the smoke from the fire to pass into the flue. A boiler, provided with a separate flue and damper, may be placed behind the fireplace. The oven is ventilated by opening the damper.

## NEW APPLICATIONS FOR PATENTS.

March 5.—3,109, J. and O. Cunningham, Jointing Pipes.—3,113, C. Henderson, Ventilation.—3,116, G. Kyte, Self-locking Coal Plate.—3,123, H. Rothery, Locks and Latches.—3,139, F. Hammond, Hinge.

March 6.—3,161, W. Meakin, Drain-pipes, &c.—3,164, B. Sutcliffe, Planing and Moulding Cutters for Wood.—3,208, H. Parenty, Syphon Apparatus for Flushing.

March 8.—3,214, A. Browning, Gas and Water Meter.—3,252, A. Henderson, Stained-glass Window.—3,259, H. Penrice, Rock-tunnelling Machinery.

March 9.—3,272, C. Wharton, Continuous Motion Handle for Screw-drivers.—3,274, F. Hamilton, Nail Screws.—3,283, S. Mower and T. Fowler, Machines for Making Saws.—3,285, W. Howie and R. Henderson, Windows.—3,336, H. Kingsbury and A. Pazy, Window Fastener.

March 10.—3,352, H. Lander, Silos.—3,354, C. Price, Levers for Sash Fasteners.—3,375, W. Lund, Brace Bits, Bradawls, Gimlets, &c.—3,388, H. Dempewolf, Smoke-consuming Fire-places.—3,391, S. Payne, Firebricks, Retorts, &c.

March 11.—3,416, W. Barraclough, Cast-metal Door and Frame.—3,420 and 3,421, G. Jarvis, Bastic Bricks.—3,424, M. Macleod, Laying Wood, Tile, Concrete, and other Pavements.—3,449, G. Davis, Roofing Tiles.—3,452, J. and F. Loughran, Window Sashes and Frames.—3,459, J. Plenty, Glazed Structures and Skylights.—3,478, W. Punchard, Construction of Harbour, Dock, and Quay Walls, Breakwaters, Piers, &c.

## PROVISIONAL SPECIFICATIONS ACCEPTED.

15,613, T. Gray, Door Locks.—801, A. Pilling, Self-closing Doors.—930, W. Bartholomew, Water-Waste-preventing Cisterns.—1,408, W. Webb, Ventilating.—1,416, J. Fletcher, Fasteners for Doors, Gates, &c.—1,491, R. Jenkins and J. Cox, Enamelled Coloured Plaster for Walls, &c.—1,572, S. Gratrix, Gasfittings, 1,550, E. Cameron, Nail.—1,654, A. Gold, Hinges.—1,691, T. Hellwell, Zinc or other Metal Roofing.—1,706, J. & A. Cooke, Syphon Cisterns for Flushing Water-closets, &c.—2,120, B. Boothroyd, Automatic Ventilation.—2,269, W. Payton, Preventing Water-pipes being Burst by Frost.—6,112, H. Chancellor, Automatic Window Holder or Fastener.—1,936, W. Scarlett, Pipe Tongues and Cutters.—1,986, W. Haigh, Mitrering Machine.—2,063, H. Morris, Window Fastening.—2,131, R. Greenwood and J. Webb, Sash Fasteners.—2,150, B. Twigg, Chandeliers.—2,149, S. Bridgen, Gas Bracket and Chandelier Fittings.—2,236, A. Schauschieff, Locks and Latches.

## COMPLETE SPECIFICATIONS ACCEPTED.

Open to opposition for two months.

6,928, A. Ashwell and C. Cross, Indicating Door Fastenings.—7,055, H. Johnson, Warming and Ventilating.—7,289, H. Fourness, Gas Lighting Apparatus.—1,604, E. Ashby and A. Ashby, Cement Kilns.—4,975, C. and F. Smith, Attaching Door Knobs to Spindles.—6,225, E. Bellow, Latches for Doors, Gates, &c.—6,694, H. Doulton, Moulding Earthenware Pipes with a Socket at their end.—6,842, C. Grimmer and J. Cook, Window Fasteners.—8,485, A. Emery, Eye Links or Bars, &c., for Bridges, Buildings, &c.—6,621, T. Street, Lock Bricks.—6,439, J. Ellis, Metal Rib for Bridge Floorings for Columns, &c.

## RECENT SALES OF PROPERTY.

### ESTATE EXCHANGE REPORT.

MARCH 8.  
By G. COOTE & SON.  
Westminster—One-third Share of 1, Great George street, freehold..... £3,250

MARCH 9.  
By WATSON & SONS.  
Brixton—50, Wilshire-road, 75 years, ground-rent 9s. .... 450  
84 to 90, Loughborough-road, 18 years, ground-rent 18s. .... 985

By T. B. WESTACOTT.  
King's-cross—34, Hastings-street, 21 years, ground-rent 3s. 6d. .... 295

By F. W. GLASIER.  
Chester—406, King's-road, 24 years, ground-rent 9s. 16s. .... 485

By DYER, SON, & HILTON.  
Blackheath—The Lease of 117, Lea-road, term 7 years ..... 70

MARCH 10.  
By FULLER, HORSEY, SONS, & CASSELL.  
Spitalfields—Freehold Ground-rent of 40s. per annum, reversion in 51 years ..... 800

\* Geikie, "Text Book of Geol." (1882), p. 330.



By H. MILLS & TITCHMASSER.	
Strand—9 and 10, Stanhope-street, 84 years, ground-rent 150l.	£2,000
Peckham, York-grove—Lime Cottage, 28 years, ground-rent 5l.	240
MARCH 11.	
By WOOD & SPINK.	
Holborn—4, East-street, the Lease of term 22 years	280
By A. BOOTH.	
Kennington—67 and 69, New-street, 9 years, ground-rent 8l.	185
By HENDERSON & FAWCETT.	
Sydenham, Wells-road—Poplar Cottage, freehold.	381
Blackheath—2, Eastcombe Villas, 71 years, ground-rent 10l. 10s.	800
By HADS & JENKINSON.	
Muswell Hill—Ground-rent of 54l. 12s., reversion in 99 years, and a Plot of Land.	2,651
By NEWSON & HARDING.	
Holloway—103 and 105, Moray-road, 78 years, ground-rent 12l. 12s.	480
107 and 117, Moray-road, 78 years, ground-rent 12l. 12s.	490
37 and 39, Charteris-road, 78 years, ground-rent 12l. 12s.	450
Highbury, St. Paul's-road—Two Plots of Freehold Land.	720
23, 25, and 27, Hamilton-road, 61 years, ground-rent 13l. 10s.	825
Talington—42, 44, and 46, Friband-road, 40 years, ground-rent 12l. 12s.	880
24, Harding-street, 45 years, ground-rent 6l.	290
By C. & T. MOORE.	
Stratford—110, 112, and 114, Grove, Freehold.	6,030
227, Leytonstone-road, 60 years, ground-rent 7l. 10s.	550
Lambeth—14 to 17, James-street, Freehold.	1,280
MARCH 12.	
By NOSTON, TAIT, WATNEY, & Co.	
Whitechapel—19 and 20, Vine-court, Freehold.	710
8, 9, and 10, Vine-court, Freehold.	1,075
By BURN & SONS.	
South Kensington—Profit Rental of 92l. a year, term 20 years.	830
Pinner—Three Plots of Freehold Land, 4s. 2r. 34p.	1,320
Four Plots of Freehold Land, 4s. 2r. 34p.	1,365

## MEETINGS.

SATURDAY, MARCH 20.	
St. Paul's Ecclesiastical Society.—Visit to the Charter-house, 8.15 p.m.	
Edinburgh Architectural Association.—Visit to the Buildings of the International Exhibition of Industry, 2.30 p.m.	
MONDAY, MARCH 22.	
Surveyors' Institution.—Mr. Wm. Mathews on "The Taxation of Real Property," 8 p.m.	
Society of Arts (Antarctic Lectures).—Mr. Royston Redwood on "Petroleum and its Products." III. 8 p.m.	
Inventors' Institute.—8 p.m.	
Leeds and Yorkshire Architectural Society.—Members' Soirée.	
TUESDAY, MARCH 23.	
Builders' Clerks' Benevolent Institution.—Annual Dinner, Holborn Restaurant, 8 p.m.	
Institution of Civil Engineers.—Discussion of the papers by Messrs. R. Gordon, J. R. Moore, and G. C. Cunningham, on "The Economical Construction and Operation of Railways in newly-developed Countries, or where small returns are expected." 8 p.m.	
Society of Arts (Foreign and Colonial Section).—Mr. Alexander Begg on "Canada and its National Highway," 6 p.m.	
WEDNESDAY, MARCH 24.	
Society of Arts.—Mr. W. H. Preece, F.R.S., on "Domestic Electric Lighting," 8 p.m.	
Carpenters' Hall, London Wall.—Mr. H. H. Statham on "The Fine Art Aspect of Woodwork," 8 p.m.	
Civil and Mechanical Engineers' Society.—Mr. F. G. M. Stoney "On the Construction of large Sluices for Irrigation, Drainage, and Navigation," 7 p.m.	
Surrey Archaeological Society.—Annual Meeting at Whitgift Hospital, Croydon. Papers by Dr. Alfred Carpenter, Mr. J. R. Trewer, and Mr. S. W. Kersey, on "Whitgift's Hospital," 7 p.m.	
THURSDAY, MARCH 25.	
Society of Antiquaries.—8.30 p.m.	
Society of Telegraph-Engineers and Electricians.—Mr. Alexander Bernstein on "Electric Lighting by means of Low Resistance Glow Lamps," 8 p.m.	
FRIDAY, MARCH 26.	
Architectural Association.—Members' Soirée, 8 p.m.	
Institution of Civil Engineers (Students' Meeting).—Mr. Wm. Andrew Legg on "The Construction of the Hume Tunnel on the line of Aqueduct of the Wymwy Waterworks for the Supply of Liverpool," 7.30 p.m.	
SATURDAY, MARCH 27.	
Architectural Association.—Visit to the Royal Courts of Justice. Members to assemble in the Great Hall at 3 p.m.	
Edinburgh Architectural Association.—Visit to Niddrie Marischall.	

## Miscellaneous.

**Surrey Archaeological Society.**—The annual general meeting of this society, to receive the report of the Council, to elect officers for the ensuing year, and for general business, will be held at the Whitgift Hospital, High-street, Croydon, on Wednesday next, the 24th inst., after which Dr. Alfred Carpenter and Mr. J. R. Trewer will offer some remarks on the history and nature of the foundation of the Whitgift Hospital. Mr. S. W. Kersey, M.A., F.S.A., will also read a paper entitled "Notes and Annals of the Hospital;" and Mr. Henry Berney, A.R.I.B.A., will describe the paintings in the Chapel of the Hospital.

## The New Unitarian Hall in Essex-street.

In the *Builder* of the 27th ult. appeared an article on the historical associations connected with Essex-street Chapel, Strand, which is now being converted into a public hall for the general uses of the Unitarian body. The structural alterations include, externally, the Essex-street frontage, which has been designed in the Italian style, faced with cement. Arched windows have been opened out, and the frontage has been relieved with handsome pilasters and cornices. The entrance to the office portion of the re-arranged structure is at the north angle, and is in Portland stone, with ornamental iron gates. Internally, the area of the chapel,—which was on the first floor,—is being converted into a public hall, 50 ft. by 40 ft., with a large recess for an organ, and over the east end there will be a gallery capable of accommodating 200 persons, the entire capacity of the hall being equal to an audience of 600. Besides the hall there are several retiring-rooms. The hall is approached from the ground-floor by a handsome stone staircase. On the ground-floor what was the old house as the residence of the ministers, together with several other apartments, have been converted into offices for the various Unitarian book societies. A shop for the sale of books has been provided, whilst adjacent are large apartments for storage purposes. On this floor there are also several committee-rooms, together with a library, likewise a council-chamber, lighted by a skylight, and fitted with pitch-pine dado and fittings. As already stated, Messrs. T. Chaffield Clarke & Son are the architects, and Mr. J. T. Chappell, of Pimlico, is the contractor. The cost of re-constructing the building will be about 6,000l.

**The First Theatre in Brighton.**—"The History of the Theatres of Brighton," with brief biographical notes of the principal performers from 1774 to 1885, written and collated by Henry C. Porter, twenty-four years dramatic critic at Brighton, will be issued shortly. The author says:—"The first theatre that Brighton could boast of was in North-street, and approached through a garden that abutted upon the main thoroughfare from Church Hill to the Steine. The building was of wood, with brick basement, and underneath the house was a vault dug out of the chalk bank, in which it is said smuggled spirits used to be kept, as opposite the building were uncultivated fields and narrow bridle paths that merged into the greater Laine at the rear. The entry to the theatre was partly concealed by a high wooden hoarding, and there was also another entrance from the back in Duke-street. The house was sustained by massive oak beams, and the stage was with its back to the west, rather declining towards the row of oil lamps and the circle of lamps that served to illuminate the shrine of Thespia. The structure was erected in the spring of 1774 by Samuel Paine, a bricklayer, who resided in a cottage close at hand, and followed that vocation. The first tenant was Roger Johnstone, a property-man from Covent Garden, who inaugurated the initial season on Tuesday, August 30, 1774, with Garrick's farce 'Letho, or Æsop in the Shades,' preceded by Colman's 'Jealous Wife.'"

**The Unemployed.**—The employees at the different Government Works in London, being invited by the heads of the firm of Messrs. Perry & Co., Government Contractors, to assist in forming a fund for the relief of the distressed workmen, responded by at once forming a committee of the several foremen, or their representative, of each district, and raising weekly subscriptions from the men under their charge (for a period of six weeks, if necessary), the mechanics subscribing one shilling and labourers sixpence each week. This has been so heartily taken up by the workmen that the committee were able, at their last meeting, to consider and give relief to twenty-five applicants, these being in all cases workmen who have been engaged upon Government works from time to time and well known to the foreman, who is responsible to the committee and vouchers for their being duly entitled to such relief. The firm sent the treasurer a handsome donation of 100l., which enabled the committee to grant to each of the twenty-five applicants the sum of 1l. each.

**The Tite Prize.**—Mr. Leeson writes to point out that his design "Specs" was placed third, not second, in the Institute list, the second being "Doric." The place of the two was inadvertently transposed in our remarks on the drawings.

## Lightning Conductors in Germany.

The Lübeck Insurance Association has been taking steps to facilitate the adoption of its policy-holders of these important protective measures against disaster, by reducing its rates for insuring buildings thus protected and arranging easy terms of payment with a Berlin firm which supplies them. The importance of this question to the office referred to may be estimated from the fact that scarcely one-twelfth of the cases of damage from lightning occur in towns or villages, and the rural nature of the district in which its risks lie renders it peculiarly liable to losses from this cause. It is stated that buildings with such roofing are struck two and a half times oftener than those with hard roofing, and are twenty times more liable to become ignited than the latter.

## PRICES CURRENT OF MATERIALS.

TIMBER.		£.	s.	d.	¢.
Greenheart, B.G.	ton	8	0	0	7
Teak, E.I.	load	12	10	0	15
Sesquiu, U.S.	foot cube	0	2	4	0
Ash, Canada	load	3	0	0	410
" "	" "	3	0	0	10
Elm	" "	3	10	0	415
Fir, Dantsic, &c.	" "	1	10	0	410
Oak	" "	5	0	0	5
Canada	" "	5	10	0	10
Pine, Canada red	" "	3	0	0	4
" "	" "	3	0	0	5
Lath, Dantsic	fathom	3	10	0	5
St. Petersburg	" "	7	10	0	8
Wanaco, Kiga	log	2	15	0	410
" "	" "	3	12	8	315
Desla, Finland, 2nd and 1st, std. 100	" "	7	10	0	8
4th and 3rd	" "	6	0	0	710
" "	" "	6	0	0	8
St. Petersburg, 1st yellow	" "	9	0	0	14
" "	" "	7	8	0	15
" "	" "	7	0	0	10
" "	" "	8	0	0	10
" "	" "	8	0	0	11
" "	" "	8	0	0	7
" "	" "	5	0	0	7
" "	" "	4	0	0	12
Baltica, all kinds	" "	0	0	0	13
Flooring Boards, sq. 1 in.—Pine	" "	0	0	0	13
Second	" "	0	7	6	8
Other qualities	" "	0	5	0	7
Cedar, Cuba	foot	0	3	8	6
Honduras, &c.	" "	0	0	3	0
Australian	" "	0	2	4	0
Mahogany, Cuba	" "	0	5	0	0
St. Domingo, cargo average	" "	0	5	0	0
Mexican	" "	0	3	4	0
Tobacco	" "	0	4	0	0
Honduras	" "	0	4	4	0
Maple, Bird's-eye	" "	0	6	0	0
Rose, Rio	ton	7	0	0	10
Bals.	" "	6	0	0	10
Box, Turkey	ton	15	0	0	0
Satin, St. Domingo	ton	0	7	0	1
Porto Rico	ton	0	8	0	1
Walnut, Italian	ton	0	4	0	8

## METALS.

Iron—Pig in Scotland	ton	1	19	0	0
Bar, Welsh, in London	ton	4	15	0	0
" "	" "	4	7	6	10
Staffordshire, London	ton	5	15	0	0
Shropshire, single, in London	ton	0	3	8	0
Hoops	ton	6	5	0	7
Nail-roads	ton	5	15	0	0
COPPER—					
British, cake and ingot	ton	44	10	0	45
Best selected	ton	46	10	0	47
Sheets, strong	ton	63	0	0	0
" "	ton	0	0	0	0
" "	ton	47	0	0	0
Chili, bars	ton	42	10	0	42
YELLOW METAL—					
Lead—Pig, Spanish	ton	13	2	0	0
English, common brands	ton	13	16	0	0
Sheet, English	ton	14	7	0	14
SILVER—					
Silesian, special	ton	14	15	0	15
Ordinary brands	ton	14	10	0	14
TIN—					
Banco	ton	0	0	0	0
Billion	ton	0	0	0	0
Strait	ton	23	5	0	24
Australian	ton	0	0	0	0
English ingots	ton	97	0	0	0
ZINC—					
English sheet	ton	17	0	0	17

## OILS.

Linseed	ton	20	10	0	20
Cocanut, Ceylon	ton	29	0	0	29
Ceylon	ton	28	0	0	0
Copra	ton	0	0	0	0
Palm-oil, Kermel	ton	35	0	0	35
Palm-oil, Lagos	ton	23	10	0	23
Kapessed, English pale	ton	23	5	0	23
" "	ton	21	15	0	21
Cottonseed, refined	ton	17	0	0	17
Tallow and Oleine	ton	25	0	0	25
Lubricating, U.S.	ton	6	0	0	10
" "	ton	8	0	0	13
TUMBERS—					
American, in casks	owt.	1	9	6	110
Tar—Stockholm	barrel	0	19	0	0
Archangel	barrel	0	12	0	12



LONDON.—For alterations to the Foresters' Music-hall, Cambridge-road, for Mr. J. L. Graydon. Mr. E. Clark, architect. Quantities supplied:—  
J. O. Richardson, Peckham, ..... £698 0 0  
\* Accepted.



- MODELS AND SECTIONS ON VIEW. -  
LONDON: LIVERPOOL: GLASGOW:  
356 to 362, EUSTON ROAD. 6 and 8, HATTON GARDEN. 335, ARGYLE STREET.



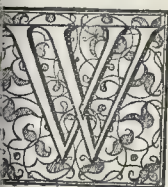
## ILLUSTRATIONS.

Monuments commemorative of the Siege of Paris: Monument of "The Defence of Paris," M. Ernest Barrias, Sculptor. Monuments at Champigny, M. Vaudremier, Architect; M. Chapu, Sculptor. Monument at Bourget, M. Deslinières, Architect.....	474-475
St. James's R.C. Church, Marsh-lane, Liverpool.—Messrs. Haddfield & Son, Architects.....	473-479
Design for a Museum and Library for a small Country Town.—Royal Academy Upper School Prize Design by Mr. E. Gay Dawber.....	482
New Presbyterian Church, Highgate.—Messrs. Potts, Sulman, & Hennings, Architects.....	483
Industrial Dwellings to be erected for the Vestry of the Parish of St. James, Westminster.—Mr. H. H. Collins, Architect.....	496-497

## CONTENTS.

Reconstruction and Sanitation of Central London.....	403	Obituary.....	471	Provincial News.....	490
Buildings entitled to Light under the Prescription Act.....	404	St. James's Church, Marsh-lane, Bootle, near Liverpool.....	471	Church Building News.....	490
Monuments commemorative of the Siege of Paris.....	404	Industrial Dwellings to be erected in Silver-place, and Ingleure place.....	472	Dissenting Church Building News.....	490
Architectural Photographs by Amateurs.....	406	Presbyterian Church, Highgate.....	472	The Student's Column: Our Building Stones.—III.....	491
Association.....	407	Design for a Museum and Library for a small Country Town.....	473	Books: Laxton's Builders' Price Book (Stimpkin & Co.);	
Association of Public Sanitary Inspectors.....	407	Font Cover, Congrebury Church (Illustrated).....	473	Precautions to be adapted on Introducing the Electric	
Royal Meteorological Society.....	407	A Roman Mosaic Pavement at Berlin (Illustrated).....	473	Light (Spon): Wages and Earnings of the Working Classes	
University College, Liverpool: New Chemical Laboratories.....	409	Plumbers' Work.....	473	(Murray); Michel's François Boucher (Rouman, Paris).....	492
Cliffers' Clarke's Benevolent Institution: Annual Dinner.....	473	Sewer Ventilation.....	473	Recent Patents.....	493
Agenda in Barnham.....	470	An Appeal.....	473	Recent Sales of Property.....	493
Architectural Societies.....	471	A Question of Siting.....	473	Meetings.....	493
Philological Societies.....	471	A Tax on Beauty.....	473	Miscellaneous.....	493
				Prices Current of Building Materials.....	494

### Reconstruction and Sanitation of Central London.



WHEN a certain eminent historian was inditing the opening chapters of his projected work, he was disturbed, it is said, by a street row under his windows, the merits of which he could by no ingenuity of questioning discover. And his inability to determine the rights of a quarrel which happened under his own observation not unnaturally disheartened him in his task of unriddling the quarrels of all the world; for history, as it was then understood, is little else than a record of quarrels.

We have just now at our doors an opportunity of improving Whitehall, for which all things are ripe, and of the importance of which we are assured, and which, once neglected, will never, in all human probability, recur. If we do not bring ourselves to spend a few hundred thousand pounds in so desirable a work, what chance is there of our spending a few hundred millions on the reconstruction of Central London, the need of which is not so pressing, the merits of which are not so obvious, while attendant difficulties are incomparably greater? "A question not to be asked," and there is but little or no chance of our embarking upon a scheme of such unexampled unwieldy magnitude, what good is to be expected from its serious discussion?

And yet such a project has recently occurred to many minds, and that which must, we suppose, be accepted as the result of the best thought upon the subject, has been embodied in a volume of selected essays,\* prepared in response to the offer of a large money prize. By three essays out of the twenty-seven awarded have been printed, and these are ably illustrated by plans and sketches. The subject divides itself into three parts,—the alignment, the reconstruction of destroyed districts, and the best manner of re-housing the distressed poor. And each section falls naturally into two main divisions,—What is well to do? And by what means it is to be accomplished? Each part of the subject is treated by special difficulties of varying degrees of intensity. It is easy to take a London Ordnance map of London and lay upon it any number of desirable routes for facility of intercommunication and

conducive to architectural magnificence. It is easy also to clear away in imagination the congested centres of the great city, marking them out by washes of colour, and re-arranging their surfaces in symmetrically-figured building blocks, with open spaces and breathing-grounds, and all sorts of pleasant ameliorations. But it is difficult to determine with any approach to certainty what description of new building shall most suitably replace the old as being really adapted to the needs of the poor; and more difficult still to devise a financial scheme by which operations on such a scale can be conducted with a reasonable prospect of commercial success,—the only sure basis. The promoters of the scheme start with the postulate that property must steadily increase in value indefinitely where the population is constantly growing and the occupied area is fixed, and that future value so assured may be discounted for present purposes. No very close estimates are given, nor are they possible without such preliminary valuations of the districts to be dealt with as would involve a very large outlay of capital. It is proposed that the huge work shall be undertaken in sections, with the sanction of a special Act of Parliament, by a company or trust having some such title as "The Consolidated Central London Reconstruction Company" (which sounds to our ears a little too much like the sort of institution which we meet with in the works of Charles Dickens), subscribed by capitalists in shares of from 1,000*l.* to 10,000*l.* each, and guaranteed in part by the hypothecation of the coal and wine duties, and in part by a charge upon the local rates. The works would be carried out by contractors selected by competition, and under the direction of a special Works department composed of a staff of solicitors, architects, engineers, and surveyors. The essayists confess themselves appalled at the extent of the operations involved, which would demand an outlay equal in amount to the whole of the National Debt. Mr. Westgarth endorses their verdict as to its impracticability, but thinks that what cannot be undertaken in whole may still be accomplished in part. This is, in fact, what is being done by private enterprise, by philanthropic effort, and by the public bodies charged with these special duties.

The Metropolitan Board of Works have undertaken, upon a comparatively limited scale, similar works to those proposed to be entrusted to this imaginary department. They have laid out new streets, and cleared away old neighbourhoods. They have created superior frontages, and let the abutting plots on building leases; and they have, as it appears to one of the essayists more critical than his fellows, done all this unwisely, and not too well. What

security have we that where the Board has failed the company would succeed, or that they would do well in the future what their predecessors have done ill in the past? That with ampler powers and a wider discretion, they will achieve more fortunate results? None. The larger the scheme the greater the opportunities of error, and the more widespread the possible disaster.

The facts as to the present condition of Central London adduced by the essayists are sadly interesting; but they are not new. London is overcrowded: its thoroughfares are yearly growing less and less equal to the pressure of the periodic ebb and flow of the vast human tide which courses through them. The dwellings of the very poor are as bad as they can be,—a scandal to a Christian State. We have preached from these texts for half a century, and have lost no opportunity of enforcing their lessons.

It is, in fact, on the social and economic side of the great problem to which the essayists have addressed themselves that the real difficulty lies. Consider for a moment, and by way of example, the condition of the poor sempstresses of the East end of London, numbering a quarter of a million souls, recruited annually from our rural population. While every other form of labour has been receiving an enlarged remuneration theirs has fallen. Their position is sensibly worse than it was when Hood's piteous "song" stung the public conscience into transient remorse. By working fifteen hours,—when they are so "fortunate" as to obtain continuous work,—they can earn a shilling! And it is taken for granted that no improvement in this respect is to be so much as hoped for. They live in lonely garrets and die of broken hearts, or they seek in shame the means of existence which their utmost efforts cannot honestly procure. How is it proposed to deal with the case of such a class as this? It is proposed to erect vast piles of buildings in which these poor women can live as it were in communities,—under the administration of capable managers,—that they shall occupy cell-like apartments surrounding a common dining-hall. The suggestion of a "reading-room" for those weary eyes reads like mockery. It is calculated that by wise management, a rigorous economy in all things,—warming the building by hot water and regulating the dietary upon scientific principles,—it may be possible for each poor needlewoman to obtain lodging, food, light, and warmth, for 4*s.* 6*d.* per week, leaving 1*s.* 6*d.* for clothing and sundries, always assuming that she is fully employed and never ill. It is almost certain that such a scheme would break down from a hundred causes, and that an existence so conditioned would not resist the temptations of a great city, the

\* Essays on the Street Alignment, Reconstruction, and Housing of Central London, and on the Re-housing of the Poor Classes, to which Prizes, offered by William Arthur, were awarded by the Society of Arts, 1886, by George Bell & Sons.



attractions of the glittering street, and the bright warmth and gaiety of the music-hall or gin-palace.

There is just one drop of comfort to be sucked out of these essays. One of them gives a useful table of the proportion of open spaces to the population in European and American towns, and shows that London is not the worst off in this regard. Thus, while Paris has 1 acre of park to every 13 inhabitants, Vienna 1 to 100, Chicago 1 to 200, Philadelphia 1 to 300, Brooklyn 1 to 639, New York 1 to 1,363, London has 1 acre of open space to every 353 inhabitants. It is unhappily true that where the population is most dense the open spaces are most contracted, and that central London has only 1 acre of recreation-ground for every 1,000 inhabitants, being but a shade better off than New York. But in that city the evil is working its remedy, and large tracts are being purchased, at enormous cost, for its better sanitation. Here is a possible field for philanthropic effort, the results of which can be in no wise doubtful. It is very doubtful wisdom to house our poor in vast barrack-like structures, which must, from the very nature of their occupation, deteriorate in a hygienic sense, and in the long run become centres of disease. But there is no doubt about the wisdom of seizing every opportunity of buying up less valuable sites in the congested districts, and keeping them, if possible, free from buildings. Even the aged needlewoman could sometimes find an hour to breathe the purer air which such open spaces would afford, and to refresh herself with the sight of flowers, and, may be, the songs of birds,—sad reminiscences of the country life from which she was too early torn. Something in this direction is not beyond the power of organised beneficence; it would not tend to pauperise the recipients of benefits which would re-act with salutary force upon the community at large; and it could be carried out piecemeal without any "staff" or "department" whatever.

There was once, and once only, an opportunity of reconstructing Central London on a comprehensive and sufficient plan, and the man of all others best fitted for the work was at hand. That opportunity was lost, and will never return. The very excellence of our modern building forbids the notion that a widely-devastating fire will give another Wren the chance of laying out the capital on lines adequate to its necessities. Something in the right direction has already been done, and more is in progress, and we must be content with the prudent use of each opportunity as it arises, rather than look to projects which break with their own weight. To some such conclusion Mr. Westgarth has himself been reluctantly driven; for in an introductory chapter, which is the most thoughtful portion of the work, he sorrowfully admits that towards the housing of the very poorest classes,—which was his chief, and indeed, his sole aim,—absolutely nothing has been done by these essays. It is evident that he has been moved to a consideration of the subject by an ardent sympathy with human suffering, and one can but regret the insurmountable difficulties which lie in his way.

**Health Exhibition, York.**—An important meeting was held in the city of York on the 17th inst., convened by the Lord Mayor, to consider the arrangements to be made for the Sanitary Congress and Health Exhibition to be held in the city in September next by the Sanitary Institute of Great Britain. Dr. Alfred Carpenter, Mr. Rogers Field, M. Inst. C.E., Mr. Ernest Turner, F.R.I.B.A., and Mr. E. White Wallis, secretary, attended as a deputation from the Institute, and spoke of the satisfactory results which had followed the previous Congresses of the Institute. The building selected by the local committee for the Exhibition is the most suitable that has ever been placed at the disposal of the Institute; and from the way in which the preliminary arrangements have already been made there is every reason to believe that the Congress and Exhibition in this city, in which so many successful meetings of this kind have been held, will have a large result in the progress of sanitary science. The Congress will commence on September 21st, and the Exhibition will remain open one month.

## BUILDINGS ENTITLED TO LIGHT WITHIN THE PRESCRIPTION ACT.

THE question as to what erections can be the subject matter of a claim in respect of a right to light within the meaning of the second section of the Prescription Act (2 & 3 William IV., c. 71) becomes very important in these days, when spaces within towns are of so much more value than was formerly the case. Thus it might be of great importance to obtain as soon as possible a right in respect of some space of ground occupied by a building, and at the same time it might not be desired to erect thereon "any dwelling-house" or "workshop," which are the two words which appear with distinctness in the section in question. Something, then, in order to gain a statutory right must be placed on the ground, and it must fall within the category of "other building," which is the sequel to "dwelling-house" or "workshop" in the Act to which we have referred. It is equally also of importance that a person who is building on a servient tenement should be able to know whether he will obscure the light of a "building" which can acquire a statutory right.

To know what erection can acquire a right such a person naturally turns to the Prescription Act, and there finds the words which we have quoted. In regard to the two first there can be no doubt, but the words "other building" are apt to be puzzling, since nowhere in the Act does any definition appear of them.

Before we attempt to consider them it is, in passing, worth while to notice that a house not actually complete can obtain a right to light. That was decided, once for all, in *Courtauld v. Legh* (Roscoe's "Digest of the Law of Light," second edition, p. 6), where the house was not painted or papered, nor was it decorated, nor were the internal fittings completed. A person bought it in this state, and after putting it into a habitable condition lived there for ten years, when a neighbour obscured his light, and the judges decided that mere occupation was not necessary to found a statutory right, and that a house, so long as it is structurally complete, can obtain the right. This was a very important decision, because it affects those numberless houses which are erected by speculative builders, and which often stand empty, and, so far as painting, &c., goes, unfinished for several years. We confess that occupation of premises appears to us to be an element which the Legislature might well have considered necessary in order to give a dominant tenement the right to light. It is, perhaps, the more curious that occupation has not been considered necessary, because it has been held that the use of the premises may affect the question of the right,—that is to say, that if a person has enjoyed a strong light for some rather unusual purpose, such as examining jewelry or sampling silk, he is entitled to have this extraordinary amount unobscured. Thus occupation here directly affects the right, whereas in regard to a right to light in the first instance, it has been held to be an immaterial element. This is one example of the need for some legislative consideration of the whole subject. It is somewhat surprising that the words "other building" have been almost absolutely free from litigation. It is true that the word "building" has been considered in connexion with the Reform Act of 1832, when a wooden structure with boarded sides and a thatched roof, supported by wooden pillars let into the ground with a padlocked door, and used as a place for storing potatoes, was held to fall within the words "other building," following the words "house, warehouse, counting-house, shop" in Section 27. Also the words have been considered in regard to the Metropolitan Building Act, but there they had to be construed strictly in regard to the object of the statute. It was left for Mr. Justice Chitty in the recent case of *Harris v. De Pinna*, of which the full report will be found in the *Law Times* Reports for March 13th, 1886 (for it has not yet appeared in the *Law Reports*) to give an authoritative decision in the words of the Prescription Act. What the erection was may be best shown by quoting the description of the

judge's premising that it was a structure for the storage of timber. "It has beyond question certain elements of permanence and stability. There are large upright baulks of timber, and there are cross-beams. There are besides floors; above that in some parts, at any rate, there are coverings which serve as a roof, but not merely as a roof, but serve for the purpose of stacking timber on the top. These coverings have a double use,—the protection of the timber, which is below from the effect of the water, and also the use for storing other and additional timber on the top. In this place the timber is stacked, is stored, is dried, exhibited for sale and sold, and the plaintiffs say that beyond all question light is a matter of importance to them." The three sides were open, and there were no windows in the ordinary sense of the word, the apertures being the spaces left between the upright and the cross beams. The reasons which induced Mr. Justice Chitty to hold that this was not a building within the meaning of the Prescription Act were, so to say, general considerations of its character. "Would any ordinary man, with a reasonable knowledge of the English language, passing this structure, speak of it as a building?" A question which he himself answered in the negative. If he said it had been a glass structure completely, or for the greater part enclosed, then it would be a building within the Act. Again, he asked, was this a structure which a reasonable man would be on his guard against obtaining the right to light, and this also he answered in the negative. The result is that we fail to obtain any precise definition of the word "building," but we perhaps may say that it must be a permanent structure, completely enclosed, and one which is, in ordinary parlance, a building. These elements will cause the inclusion of most things in the shape of sheds, outhouses, and so forth; but they should exclude such things as the old-fashioned Dutch barns, spaces covered by galvanised iron roofs supported by post and pillars, and open at the sides. Yet in every case it must be a question of fact, though from what has here been stated there are some considerations which clearly assist at a solution of the question.

## NOTES.

THE memorial to Mr. Street, which was unveiled by the Lord Chancellor on Wednesday in the central hall of the Law Courts, we cannot consider as a very satisfactory work except as regards its general effect architecturally, which is good, and combines well with the surrounding architectural details. Admiring, as we do, Mr. Armistead's great abilities as the sculptor of many fine works, we cannot regard his statue of the late architect as a good likeness, nor as a very happily designed figure. The frieze below, representing handicrafts connected with building, is only partially successful; the best figures are the smith wielding his hammer, which he does with considerable energy, and the figure of the architect studying his plan, which is unfortunately very much hidden from view on the return side of the frieze where it is in the shadow of one of the projecting piers of the hall. The Lord Chancellor spoke with truth and eloquence in regard to the "patient and loving attention" which Mr. Street gave to his great building; we know he attended to all the architectural details personally with a minuteness which is unusual in the case of so large a work; and in regard to the architectural treatment, he was unquestionably very seriously hampered by the economics of a certain well-remembered *Fir* Commissioner of Works. Among those present at the ceremony were Mr. Beresford-Hop M.P., Mr. Blomfield (the architect for the memorial), Mr. Armistead, Mr. Pearson, Sir John Millsais, Mr. G. Godwin, and Mr. Justice Kay, Mr. Justice Grantham, Mr. Justice Chitty, and others.

AS soon as the London season begins, at Rotten-row, "the ride, where gaily flows the human tide," as Mr. Arnold has it, is al-



FROM a circular forwarded to us, we are given to understand that "an attempt is about to be made under distinguished auspices to revolutionise the cab system of London.



which is admitted to be in many respects unworthy of the greatest city in the world. It is intended to place upon the streets of the City and West End three thousand new cabs, built upon the best principles, and with some novel improvements. A number of these vehicles will be in the form of open Victorias, so that when weather permits the Londoner will be able to enjoy the luxury of a pleasure-drive in the parks or suburbs in a handsome and convenient equipage. It is intended to take sixpenny fares, and tips and extortion will be abolished, as the drivers will be paid by wages and a commission.\* If superior vehicles are to be provided at lower fares than at present, it is not very easy to see how the new venture is to pay. A better form of hired vehicle for pleasure drives would certainly be a boon to ladies. For ordinary purposes of getting about quickly, the London Hansom is not to be complained of, however, and the legal fare is very low for the work done; nor have we met with "extortion" save in very rare instances. For the London "four-wheeler," however, there is nothing to be said, and if it is against this quadruped (or quadruped) that the new movement is directed, may it prosper.

#### MONUMENTS COMMEMORATIVE OF THE SIEGE OF PARIS.

IN 1871, immediately after the disasters which cost France five milliards and two provinces, and many of the best and noblest of her lives, the Conseil-Général of the Seine decided to open a public competition of designs for monuments to commemorate the principal combats in the vicinity of the city.

The most eminent architects and sculptors hastened to respond to the invitation. Among 130 competitors we may mention M.M. Boité, Davioud, Boileau, Chipiez, Vaudremer, Deslinières, Etex, Rouillard, Lheureux, Gerhardt, Corroyer, Villemain, Salleron, Cornesson, Magne, Henard, Carrier-Bellense, &c. The following year a jury, among whom were M.M. Guillaume, Ch. Garnier, Duc, Baltard, and Alphand, decided on this very remarkable competition, which, like all large competitions of the kind, showed a good many eccentricities, among others a stone skeleton with a Prussian helmet on its skull. M. Bruneau obtained the commission for the monument for Châtillon, M. Marcel Deslinières for that of Bourget, the monument of Haij was entrusted to M. Mellet; that of Champigny to M. Vaudremer; and that of Buzenval to M. Chipiez. Of three of these we give illustrations, and a general description of them may be of some interest.

Leaving Paris with Fort Moutrouge on our right, and Fort Bicêtre on our left, by a somewhat circuitous route (for the communes just outlying Paris are very badly served in the way of convenience of transit), we reach Bourg-la-Reine. There a neighbouring road leads to the slope of the hill, on which stands M. Mellet's monument in memory of the battle of the 27th of November, 1870. This is a stone erection, resting on a base of cyclopean rusticated masonry. On the upper portion is a mass in the form of a sarcophagus, surmounted by a monumental stone, with two pediments, on one of which is sculptured a sword, on the other the words "Paris à ses défenseurs," and the name and date of the battle.

At Chevilly, a little commune about a mile distant, which on the previous 30th of September had been the scene of a sanguinary combat, in which the 35th Regiment of the Line had suffered cruelly, the survivors of the fight have erected to the memory of their comrades an obelisk in black marble, terminated by a white marble urn.

Returning to Bourg-la-Reine to get to Châtillon, where M. Bruneau's work is erected, we pass Bagneux, where, on the 13th of October, the Comte de Dampierre, commanding the mobiles of the Aube, was killed at the head of his troops. To commemorate that day, the Commune, in a little place which bears the name of that brave soldier, erected a circular subbase carrying an octagonal pyramid surmounted by a cross. Four faces are decorated with commemorative inscriptions and warlike emblems. The subbase is crowned by battlements, and four funeral steles occupy its extremities. The effect is pretensions and the general outline wanting in that simplicity of

line which gives a character of grandeur to a monument. One of the steles, higher than the rest, serves as a supporter to a bust of the Comte de Dampierre, a remarkable work by M. Marquest de Vasselot. Not far off, on a tablet let into the wall of a house, is an inscription indicating the place where the commander was killed.

We are now arrived on the woody plateau of Châtillon, from whence there is an extensive view. At our feet is the fort of Vanves; further, the villages of Issy, Vanves, and Malakoff, and in the background Paris and its fortifications. On the height whence the Prussian batteries bombarded for a month the quarters on the left bank, rises a monument in the form of an obelisk, occupying the centre of the circular space surrounded by a grille. On one of the faces is sculptured a palm combined with an antique shield bearing the inscription, "1870, Châtillon," and below, on the stone, the words, "Paris à ses Défenseurs." On the base of the obelisk are reproduced the arms of the city, and the motto, "Fluctuat nec mergitur."

Châtillon is our last halting-place in that part of the suburban zone, and we now quit the department of the Seine, to find, at the gates of St. Cloud, the monument of Buzenval. Châtillon and Buzenval are almost the extreme limits of that interrupted fight which went on for 130 days. This monument, of great simplicity, is, as we have said, the work of M. Chipiez. On a rectangular subbase is a stone stele on which is graven the date of the battle of Buzenval. With the stele is joined a pilaster supporting a torn laurel crown, emblematic of the brave but vain resistance of the besieged. Not far off, in the cemetery of Montreuil, is a rectangular pyramid to the memory of those who fell on January 19, 1871. After having crossed the Seine by the Pont de Neuilly, we find, at the turn of the Courbevoie, the monument which the Conseil Général of the Seine has dedicated to the memory of the national defence. On the pedestal (once occupied by the statue of Napoleon I.) is a figure of a woman in a military cloak, and whose head, of a rather masculine style of beauty, is crowned with battlements (see illustration). She leans against a broken cannon, her right hand grasping a sword, the other holding a standard as if to protect with its folds a soldier lying at her feet. The dying man, whose countenance is more or less a portrait of Henri Regnault, who perished at Buzenval, endeavours, with failing hand, to get at a last cartridge. This monument was the subject of a special competition in 1879, when the prize fell to M. Barrias. By a touching contrast, behind the principal group, which faces the position occupied by the enemy, the artist has sculptured a lovely little girl cowering terrified beneath the cannon, personifying the sufferings of the inhabitants during the long siege. This figure is hidden from view in the illustration.

By the Brussels road we arrive at Bourget, situated at the extreme limit of the department. It was here that there took place the furious combats of October 28th and December 16th, 1870, an episode of which was popularised by the engravings from De Neuville's picture. This fight is commemorated by two monuments. That by M. Deslinières, chosen in the Municipal competition, is entirely constructed of grey granite. It is erected on the Place de la Mairie at Bourget, and consists of a square base carrying a pedestal of which the upper part presents a frieze decorated with triglyphs (see illustration). The metopes enclose laurel crowns, and a square pyramid terminates the monument, of which one face shows a broken sword carved in relief, with the following inscription:—

BOURGET  
XXX OCT. XXI DEC.  
MDCCCLXX  
ILS SONT MORTS  
POUR DÉFENDRE  
LA PATRIE.  
L'ÉPÉE DE LA FRANCE,  
BRISÉE DANS LEURS  
VAILLANTES MAINS,  
SERA FORGÉE  
DE NOUVEAU PAR LEURS  
DESCENDANTS.\*

The monument is of an architectural simplicity much more eloquent than the complicated and

mannered ornamentation of the second monument, the author of which we do not know, which has been raised at the end of the main street, by private subscription.

Not far from Bourget we remark in the middle of a field a large pyramid decorated with a cross. It has been erected, in virtue of a stipulation in the treaty of Paris, to the memory of the German soldiers who fell in the war. Nor must we forget in our route the monument erected on the territory of Epinay in memory of the soldier killed on September 30, 1870, and who are buried at the foot of that little monument.

The heights of Avron and Chennévière, whence we look down the panorama of the Marne Valley, have also their monumental souvenirs of the war. On the plateau at Avron is a very simple rectangular pyramid of great simplicity; at Chennévière is the funeral monument of Franqueti, commander of the éclaireurs de la Seine.

We are now at Champigny, where the fight was carried on for two long days. At the end of the war every rising of the ground concealed a dead body. On this field of melancholy fertility two great mounds have been raised, covering each 2,000 or 3,000 soldiers. Further towards Villiers-sur-Marne every field and garden has its graves; the plateau became a vast cemetery. We remember still, in 1871, deciphering with difficulty, on a wooden cross, coarsely shaped, this singular inscription:—"Ici repose ma main gauche élevée par un éclat d'obus le 1er Décembre, 1870. Carloti, Sergent-Major au 121<sup>e</sup> de ligne." On another cross, that simple words, "Regretté par ses camarades," on another further on, "Friez pour vos frères d'armes." All these poor corpses are now collected in a vast crypt constructed by M. Rivière, architect to the Government, behind the monument by M. Vaudremer. This square crypt comprises a set of subterranean galleries with a chapel adjoining them. On tablets of marble between the piers are inscribed the numbers of the French regiments whose soldiers repose side by side with the German soldiers' remains.

The principal façade, where two wrought-iron doors give access, is in rusticated masonry with courses of granite. On a large tablet of marble is the following inscription:—"Monument élevé par l'État à la mémoire des soldats morts pendant le siège de Paris: Bataille de Champigny (Loi des tombes militaires, 4 Avril 1873)." The other portion of the monument to which we ascend by two flights of granite steps in the wall, is the first in date. It is composed of a quadrangular cippus on a large spreading base, and crowned by a capital the angles of which are decorated with large leaves. The spaces between the leaves are occupied by two heads, symbolising "France" and "War." They are the work of M. Chapu (see illustration). On the principal face are carved the words "Défense de Paris," and on a shield is a relief of a Roman soldier falling, with his sword broken in his hand; a large palm passes behind this. Beneath this is the inscription: "Champigny, 30 Novembre—2 Décembre 1870." On the opposite side is the Paris motto again: "Fluctuat nec mergitur," accompanying the ship emblematic of Paris.

Here ends our peregrination, unless we wish to go as far as Vincennes, where is the monument of another siege of Paris; we mean the bronze statue of General Dumas, the work of Rochet, to whom we owe the colossal Charles Magne on the place adjoining Notre Dame. This statue, which commemorates the defence of the Donjon de Vincennes in 1814, stands on a short obelisk in red granite, constructed after the design of M. Ch. Garnier. But it is pleasant to remain at Champigny, where the war has left no permanent traces, where at months after the end of the war life had become already gay with Parisian strollers as "bals champêtres." The ruins have now disappeared; gay and coquettish villas have replaced the blackened houses and gaping walls. Everywhere the trace of bullets has been effaced, and holes made by shot filled up, as here, as elsewhere all around the great city, only some funeral stones, piously visited every year,\* recall the sufferings of besieged Paris and the places where her defenders fell.

R. B. FENWICK.

\* We cannot suppress a passing note of admiration for the fine artistic perception and the chivalrous feeling shown in this monument and its brief inscription. It is worthy of a country which, more than any other, has combined the qualities of the artist and the soldier.—Ed.

\* It is the custom with many Parisians to make a pilgrimage round these monuments every winter, and was apropos of that occasion that the above record was written early in January, but the appearance of the illustrations had to be postponed owing to the Liverpool Cathedral designs taking up all our space.



# “ARCHITECTURAL PHOTOGRAPHS BY AMATEURS.”

ARCHITECTURAL ASSOCIATION.

In the discussion which followed the reading of Mr. S. Flint Clarkson's paper on this subject see *Builder*, p. 436, ante).

The Chairman (Mr. C. R. Pink, President) complimented Mr. Clarkson upon his excellent paper, and its accompanying illustrations. Undoubtedly there was some danger that photography, in the hands of the architectural student, might militate in some ways against good and careful sketching. Some of them might remember the very obvious pun of Thomas Landseer, the engraver, that photography was indeed “a foe to graphic art!” At the same time, he was happy to say that photography had not been a source of much danger to the members of the Association, when he considered the amount of sketching done by them, which not only annually increased in quantity, but improved also, he thought, in quality.

Mr. J. C. Stenning said that with any process was next to impossible to obtain satisfactory results from exteriors without good sunlight and shadows. The operator should never work with the sun at his back or in front of him, flatness of picture being the inevitable consequence in one case, and a blurred and wretched result in the other. As a guide to the hours most suitable for different points of the compass in taking exteriors, on a summer's day, he might mention, soon after sunrise for the north-point, later on for the north-east, towards midday for the east, just before or after midday for the south, midday for the south-east and north-west, afternoon for the west, evening for the north-west, and last of all north again. It is a good maxim to have the sun shining from the direction of either shoulder, so as to secure both sunlight and shadow on the building, and thus obtain relief and contrast. For his reason morning and afternoon were the best periods of the day for exterior work. Interiors, as a rule, could be taken best when the light was most artificial, say about midday. An overcast, but not dull day, was very favourable for rendering pictures of interiors soft and harmonious, and the reflected light from snow was useful, as it lightened up the ceiling. The exposure must vary according to the distance the operator from the building, being less as he goes further off, as a greater amount of light is reflected on the plate; while, when close, exposure must be increased. The colour of the building must be considered; few would use the same exposure to an exterior of Westminster Abbey as to that of Salisbury Cathedral. These might be taken as samples of good bad for reflecting light, though there might be others more extreme, such as parts of St. Paul's for darkness, and Milan Cathedral for brightness. The colour of the stone or brick, if vividly red or yellow, rendered a little more exposure necessary, and grey and weathered subjects were deceptive, being less reflecting than was apparently the case. With subjects giving great contrasts, such as light ivy with masses of ivy, or a doorway with deep shadows, a full exposure, and weak development were necessary. Details of architecture when much weather-worn should be under a side light; the exposure being, if thing, a trifle under, with fairly strong deep, so as to obtain contrast. In this case camera should be placed, if possible, at an oblique position to that from which the light came. Interior work was much easier than exterior work, the most suitable lens, using rapid plates of Wratten and Wainwright, in the nave of a cathedral ten minutes' exposure would be sufficient; but in the choir, owing to the dark glass, the dark wood of the stalls, &c., exposure of half an hour to one hour would be too much. It was best to err on the side of over-exposure for interiors, and, in fact, rather try to over-expose. A lens of short length was preferable for use, and the series of lenses were not adapted, except details, to architectural work, on account of small angle. The portable symmetrical lens of Ross, worked to maximum size of 3, or the wide angle rectilinear of Dallmeyer, set to a size less than advertised, would give best results. Landscape or single combinations must not be used, in consequence of optical distortion, the only exception being a view from a distance included a building which came near the centre of the plate.

In confined situations it was necessary to use a lens embracing a very wide angle, or one of short focus. The result, however, was not to be compared with that produced by a proper lens for the subject, as the untrue proportions were so marked, the foreground being exaggerated, and the distance reduced. A full outfit for an 8½ in. by 6½ in. camera by a first-rate maker would cost from 30l., and for a 12 in. by 10 in. from 50l. to 60l., chemicals included, but not prepared plates, which cost from 10s. to 18s. per dozen for ordinary rapidity, and more for rapid and instantaneous. Apparatus could be obtained second-hand under these figures, but the purchase should be entrusted to some one *au fait* at such matters.

Mr. J. A. Gotch proposed a vote of thanks to Mr. Clarkson and to the several exhibitors, viz., Mr. J. C. Stenning, Mr. J. Clerk, Q.C., Admiral Matland, Mr. Gifford, Rev. F. C. Lambert, Lieutenant Little, Mr. Seymour Conway, Mr. J. L. Robinson, and others, for lending photographs and slides, and to Mr. J. Gale for the loan of slides, and directing the lantern illustrations.

Mr. Leonard Stokes seconded the vote of thanks, and considered that any one who could not afford to give plenty of time to photography had better let it alone. It was the sort of thing that could not be done well without a great many failures, and a pretty considerable outlay. No doubt when at one's fingers' ends it was a very valuable thing to be able to take good views, but even then a small pony-trap was almost necessary if one carried large plates. There was also a good deal of time taken up in the developing, printing, and so on.

The vote of thanks was then carried by acclamation, and the proceedings terminated.

## THE ASSOCIATION OF PUBLIC SANITARY INSPECTORS.

THE Council's “Report on Impending Changes in Sanitary Law,” as affecting initial procedure, and the powers, responsibilities, emoluments, and status of sanitary inspectors, was adopted at a special meeting of the Association, held on the 19th instant. The Report is as follows:—

“The Council beg to report that they have considered the impending changes in sanitary law, and are of opinion that much public benefit may result from a statement of their knowledge of the law which they are called upon to administer, and their opinion on required changes therein.

The Council having much experience as executive officers in operations under the various sanitary enactments, and in view of their probable amendment or consolidation, desire to state that they have proved the said laws to be unnecessarily complicated, to be unreliable in administration, and in no wise calculated to encourage zealous officers in efforts to secure prompt abatement of insanitary conditions.

The Council endorse the recommendations contained in the Memorandum to the Report of the Royal Commission on the Housing of the Working Classes, by E. Dwyer Gray, esq., M.P., in so far as follows:—

1. ‘That the sanitary officers should only be removed by the Local Authority for misconduct or neglect of duty’ (and, we would add, proved incompetence).
2. ‘That sanitary officers should be held more directly responsible for the abatement of nuisances.’ And we add, they should be required to initiate proceedings on their own responsibility on behalf of the Local Authority for the abatement of nuisances, by serving notices requiring all necessary works to be done for such purpose; such notices to be reported to the Local Authority and approved or otherwise.
3. We also agree with Mr. Gray's recommendation, that ‘far more simple, stringent, and summary powers should be given for the abatement of nuisances by the sanitary officers,’ that ‘the procedure is dilatory and cumbersome,’ and ‘that in many instances after the case is worked up with much labour by the sanitary officer the offender is let off by the magistrate with a caution or nominal penalty.’ We also agree with Mr. Gray that ‘a minimum as well as a maximum penalty should be provided for sanitary offences; and the minimum should be largely increased in all cases of a repetition of offences by the same person in respect to the same premises.’

The Council consider it desirable in the present position of Parliamentary affairs to limit the scope of this report primarily to a formal declaration that sanitary inspectors are placed

in positions of great responsibility, armed with totally inadequate powers to efficiently respond to the expectations and requirements of the public. Secondly, to a confirmation of evidence given to the Royal Commission on the Housing of the Working Classes, in so far as relates to the present defective condition of the law, which is here done. And thirdly, to set forth what our experience has proved to be the most essential amendments required in sanitary law to secure efficient administration, as follows:—

1. That the powers, responsibilities, and emoluments of sanitary inspectors should be largely increased.
2. That a minimum rate of salary for sanitary inspectors should be enacted, and that it be legal for Local Authorities to make provision for superannuation or compensation, similar to the provisions made under the Poor Law and Metropolitan Local Management Acts.
3. That sanitary inspectors should be duly qualified, and only be removable from their appointment for proved misconduct or incompetence.
4. It should be enacted that sanitary inspectors shall initiate proceedings on behalf of the Local Authority for the abatement of nuisances by serving notices requiring all necessary works to be done for that purpose. All such notices to be read to and approved, or otherwise, by the Local Authority, or Committee appointed for such purpose, who shall, if satisfied thereon, order proceedings to be taken against the offenders.
5. It should be enacted, that any person failing or refusing to comply with the notice requiring abatement of nuisance (the nuisance being proved to the satisfaction of the court), shall, if he fail to satisfy the court that he has used all due diligence to carry out the necessary works, forfeit, and pay to the Local Authority a sum not exceeding £—, and also a further sum not exceeding £—, per day during default.”

## CONCRETE.\*

THE Metropolitan Board of Works, after long deliberation, have at length announced their intention of recognising the use of concrete as a building material for walls in London, and to place the following restrictions on its use, viz., that the proportions shall be one part of cement, two of sand, and three of coarser materials, which may be ballast, gravel, broken bricks or stone, or furnace clinkers, but the coarser materials are to be broken small enough to go through a 2-in. ring. The walls are to be of the same thickness as brick walls, and to be carried up between parallel frames, and the District Surveyors are to see that the regulations are properly carried out. I think these regulations too strict as to the thickness of the walls, and as to the proportion of cement, particularly as extensive ranges of buildings have been put up in Southwark, where the cement was gauged eight to one. I rather pity the District Surveyors in their work of supervision, but the Board seem to have missed the most important point of all, viz., the quality of the cement; and they certainly ought to give their officers power to test this, for, as I have pointed out, serious consequences will ensue if this be not of the best kind.

The second or block system has, however, some advantages: no particular building apparatus is required; any imperfections in the concrete can be discovered before it is used; the blocks can be made of any required section and of any size; and permanent tints can be given to the blocks by mixing various mineral colouring matters with the aggregate in the moulds. But for laying these blocks just as much skilled labour is required as is the case with bricks or stone, and, of course, mortar or cement must be used to bed the blocks in; in fact, this is merely using artificial blocks of stone instead of natural ones. But this artificial stone is really concrete, and as such it possesses virtues which may be sought in vain in any of the natural building stones, and therefore no lecture on concrete would be complete without a reference to the artificial concrete blocks, which are very extensively used at the present time. I believe the first artificial stone which was used in this country was Ransome's, which was patented in

\* Continuation of the lecture by Mr. John Slater, F.R.A., being the fifth of the present course of free lectures to artisans at Carpenters' Hall, delivered on Wednesday evening, the 17th inst. (See p. 434, ante.)



1844 or 1845. This consisted of a mixture of sand, silicate of soda, powdered flints, and a little clay, which was worked up to the consistency of putty, pressed into moulds, dried and burned, and this burning, in my judgment, takes this material out of the category of concrete stones. Some years later, however, Mr. Ransome found that by dipping the moulded mixture into a bath of chloride of calcium the burning could be dispensed with, and a series of experiments made in 1861 by Professor Frankland showed most conclusively that Ransome's patent concrete stone, when only a fortnight old, was equal to the best of the natural stones. Soon after Mr. Ransome's first patent, in 1847, a Mr. Buckwell obtained a patent for "Granitic Breccia Stone," which, I believe, was used in 1851 in the Hyde Park Exhibition. This was essentially a concrete, as it consisted of fragments of suitable stone broken into small pieces and mixed with cement with a small quantity of water, not more than enough to bring it to a damp state; this was put into a mould and powerfully compressed with a percussive action, additional materials being added until the requisite thickness of block was obtained. The block was thus rendered very dense and compact, and this artificial stone was used for water-tanks,—than which no severer test can be applied of the qualities of an artificial stone. At the present day the artificial stone which is most used is the well-known Victoria stone, the patent for which was originally obtained by a Mr. Highton. The aggregate of which this stone is composed is ground Leicestershire syenite, a species of granite containing hornblende instead of mica, and lacking quartz, which is thoroughly washed so that no earthy particles remain, and an ingenious machine has been patented for doing the washing business. After being washed the aggregate is carefully mixed with a certain quantity of Portland cement of the very best quality, and is placed in iron-lined wooden moulds which are filled to the top, but no pressure is applied; after the concrete is set it is taken from the moulds and placed in a bath of liquid silicate of soda, and after ten days' immersion the block becomes so thoroughly impregnated with silica that nothing but the strongest acids will free it again. The stone thus becomes intensely hard and quite impervious to weather action; in fact, its hardness increases with time. This property makes it invaluable for copings, sills, paving, &c., and it has another advantage over ordinary stone that heads and sills can be cast in as long lengths as are desired, thus avoiding joints. It is used also for sinks and other such purposes. The silica used in the manufacture of this stone is obtained from the Farnham stone found under the Surrey chalk beds, which is boiled in coppers with caustic soda.

One of the most enterprising modern pioneers in concrete building was the late Mr. W. H. Lascelles, of Bunhill-row, who was a most sanguine believer in the future of this material. Mr. Lascelles actually built cottages which were not only habitable, but comfortable, the walls of which were only  $\frac{1}{2}$  in. thick, formed of slabs of cement concrete,—the outer side cast in imitation of brick or tiles, and the inner side left rough for plastering. These very thin walls appear to have kept out the weather perfectly, but moisture condensed on the inner face, so Mr. Lascelles improved upon his original idea by having a double casing of slabs with a cavity between. He also formed floors of concrete, window-frames, and roofs, but the latter did not turn out very successful, as there was always a certain amount of shrinkage. This system did away almost entirely with the use of wood, and consequently the houses so built were as near being fireproof as possible.

Mr. Lascelles's concrete is composed of four parts of powdered coke and one part of cement mixed together in a mill, with a small quantity of water, and cast in moulds without pressure, and by mixing metallic oxides in the form of powder with the cement the concrete is coloured any desired tint. Very excellent specimens of mullioned windows, chimney caps, heads and sills, strings, copings, panels, and overmantels are made in this material, and are largely used as a substitute for stone, and it is much cheaper than stone, but I am bound to say I have seen cases where the colour has not been retained as it ought to be, and I am informed that this is caused by the workmen giving the slabs a top dressing of coloured cement after they come out of the moulds. Of course this should never be

done, as the colour should really penetrate some depth into the mass of concrete. For standing a London damp and smoky atmosphere, there can be no doubt of the great superiority of this concrete to almost any natural stone. Messrs. Lascelles also make a very good wall on what is termed Potter's patent. In this a casing of concrete slabs, of which one face is fine, is put up and ordinary concrete filled in between just as in the way I described with the wooden framework; but as the slabs are intended to remain they are formed with a key, so that when the core of concrete sets it is quite impossible for the skin of slabs to move. Among the numerous purposes for which this material is used may be mentioned silos, water-tanks, sewer-pipes, columns, &c.

It would occupy too much time were I to attempt a description of all the methods of concrete construction that have been invented, such as Tall's, Drake's, and others, but the most recent of these,—the system patented by Messrs. West,—has various novel features about it which deserve attention. This, like Potter's system, is a slab construction filled in with rough concrete, but the form of the slabs is ingeniously arranged so that no temporary tie or external support is required during building. The slab itself is made of concrete cast in a mould, so that on one side is a finished face, plain or ornamental as the case may be, and on the other a sunk panel about half the thickness of the slab itself, with its edges undercut, so that when in position, and the mass of semi-liquid concrete is poured in, the slabs are securely keyed to the general mass. Dovetail mortise-holes are also formed on the top and bottom edges of the slabs, in order that when laid they may be kept in their proper place by simply pouring into these holes some quick-setting cement. There is also a narrow groove along the edges of the slab, which, when filled with cement, acts as a joggle joint, keeping the slabs together. An inner and outer casing of slabs is thus set up, and the plastic concrete poured in, filling up the sunk panels, and making with the slabs a perfectly solid wall.

For openings, jambs are moulded having recesses or dovetail holes, into which the fluid concrete may penetrate, so that they can be thus keyed to the general mass of the wall. The slabs are made either rectangular or hexagonal on plan, and as they are all cast in a mould, there is, of course, not the slightest difficulty in arranging for circular work, splayed angles, or anything of that kind. There has always been considerable difficulty in arranging for moulded or enriched string-courses or projections with concrete, and this difficulty is proposed to be overcome by casting the moulding first and then applying it to the slabs while they are in a plastic state, the moulding thus becoming part of the slab, which is then fixed in the required position. The moulds for casting these slabs are made of metal and lined with india-rubber. Similar slabs can be moulded with curves for constructing domes, and ceiling-slabs can be made with rebates, so that they can be supported on the joists or girders. This system of concrete building is certainly the most scientific and the most complete that has yet been invented, and I have no doubt whatever that a building thus erected would be perfectly dry and very strong; but I am somewhat disposed to think that the system is a little too complicated to be cheap, as the labour required for properly setting the slabs in place and cementing them together would nearly equal that required for a stone wall. The inventors have, however, shown so much skill in maturing their designs and providing for all difficulties, that it is quite possible they may soon be able to point to actual works carried out on this principle and to give accurate details of cost, which I am not able to do now. A very ingenious travelling scaffold and concrete elevator have also been invented by Messrs. West, which obviate the necessity of erecting a scaffold all round the work, and require no putlog holes to be left, and undoubtedly some such arrangement as this has been a great desideratum as an auxiliary to concrete construction. There can be little doubt that this system of concrete building would be of most material use in the construction of farm buildings, cottages, &c., in country districts far removed from railways, as the slabs are light and portable, and the material for the filling can generally be obtained on the spot.

For paving purposes, concrete is, of course,

excellently adapted, but it is very difficult to get ordinary workmen to lay a concrete floor properly. What they like is to lay the concrete and let it get hard, and then finish off the top with a thin coating of neat cement. This looks very well when it is first done, but sooner or later the thin coating begins to flake off or crack and looks very bad. The proper way is to break up the materials of the concrete to small size, and then, in laying it, to trowel it on the top as smooth as possible, so that it is all one mass and no layers exist. Portland cement should always be used, and, if ordinary care be taken, there is no reason why a labourer should not lay an excellent concrete floor. There are many patents for concrete paving, of which I may mention Drake's granitic concrete and Macleod's granitic, which has been largely used in the North of England for warehouses, stables, &c. It is not cast in blocks, but laid *in situ*, and it can be made to take somewhat of a polish if desired. This forms an extremely hard impermeable pavement, and it looks very well, but I really believe the whole secret of the excellence of these patent systems of paving lies in the careful manipulation of the materials and the sparing use of water. I may state here that, for engine-beds concrete is, in many respects, far superior to stone, and it is not liable to chip and crack, and it is very much less expensive.

I now come to the last division of my subject, and that is the use of concrete for vaults and in fireproof construction. Every one is acquainted with the fact that an ordinary arch exerts a thrust which has to be counteracted, or it would soon push out its abutments. A concrete arch, however, after it has set forms a complete homogeneous mass, and exerts only a dead weight on its supports. The Romans were aware of this, and constructed the boldest and most extensive vaults of concrete as in the Baths of Caracalla and the House of the Vestals lately excavated. They were careful, moreover, to make the concrete used for these purposes of lighter materials than that employed for wells or pavements. The great dome of the Pantheon was constructed entirely of concrete of varying thickness, and the walls supporting this enormous mass were 20 ft. thick. In the House of the Vestals the whole of one of the upper floors, about 20 ft. in span, consisted entirely of a great slab of concrete 14 in. thick, merely supported by corbels projecting from the walls, and in the Baths of Caracalla there are still extensive remains of large concrete vaults. We in this country have not yet obtained satisfactory evidence of the safe span and thickness of a concrete vault, but the material is very largely used to form small arches for fireproof floors. It is quite impossible to treat the very important question of fireproof buildings fully at the age end of a lecture; the subject demands a whole evening to itself, but whatever system of fireproofing be adopted concrete will prove to be the most important element in it. Whereas the opinion used to be held that iron girders and columns as supports to a building were sufficient to make it fireproof, we have been taught by sad and costly experience that this is very far indeed from being the case. In the United States and in France they are much more particular than we are in this matter, and in the former country it is laid down as an incontrovertible maxim "that no building can be fireproof unless all constructional ironwork be protected," and no better material can be found as a protective than concrete. Stone is utterly valueless in this respect, as it will crack when heated, and give way without any warning whatever. Fox & Barrett's system consists in filling in concrete between wrought-iron joists the concrete being supported on fillets of wood placed about  $\frac{1}{4}$  in. apart, and resting on the bottom flange of the iron joists, the underside of the wood fillets being plastered. Either the concrete is carried up the requisite height to form the floor, or if a wooden section are imbedded in the concrete and the floor-board nailed to them. Bennett's system is almost exclusively a concrete construction, consisting of concrete arches supported next the walls or projecting courses, and by rolled iron joists intermediate points. In this system gypsum mixed with the Portland cement to form the matrix, as experiments have shown that the substance can be heated to whiteness, and the suddenly cooled without being injuriously affected. In Hornblower's system the iron girders are surrounded by concrete, an



enclosed in a fire-clay casing supporting fire-clay arches. Even concrete arches supported on triangular-shaped wooden joists, form a floor which is very largely fireproof. If iron columns are used, a temporary wooden casing should be erected round them, leaving a space of about 2 in., which should be entirely filled up with Portland cement concrete, and if a fine face be desired this can easily be obtained by cementing the concrete. Messrs. Lindsay have patented two systems which comprise the use of steel decking, as it is called, and concrete arches, the girders being entirely covered with concrete both at top and bottom. The concrete used by this firm is very light; it is called pumice-concrete, and is composed of washed coke-reeze and sand mixed dry, and Portland cement of the very best quality. It is, of course, self-evident that if you get sufficient cohesiveness and transverse strength to support the mass of concrete is for upper floors vaults, the better, as so much less weight is thrown upon the supporting walls or columns. The steel decking for this kind of floor is of peculiar shape, and the system is a novel one, and appears to me likely to prove of great value for buildings of considerable size, where girders are a necessity for supporting upper floors. These girders may be described as truncated quadrilateral triangles, set alternately on their bases, and the truncated vertices riveted together at their sides, and forming a series of hollows and elevations. They are constructed of rolled steel about  $\frac{3}{4}$  in. in thickness, and their depth need not be much more than half that required for an iron girder. When the weights required to be supported are not very heavy, a combination of these steel girders, with ordinary rolled joists can be adopted. The iron joists can be placed about 14 ft. apart, and from the steel skewbacks riveted to the joists arches of concrete can be turned on centreing. There is a possibility with concrete floors that will withstand any ordinary strain, that the sudden fall of anything like a huge iron safe might break through the floor, and in order to avoid any risk of this kind Mr. Lindsay runs steel wires through the joists, the whole length of the floor, before the concrete is filled in. These are about  $\frac{1}{2}$  in. apart, and are strong enough to hold up any exceptional weight that may by accident come upon the floor. In addition, these steel wires form a sort of nucleus round which the concrete sets. The total weight, girders and all, of these latter floors is considerably less than that of any other system of fireproof construction, and they are also extraordinarily strong. At one of the latest tests of these rough-girders, where the thickness of metal was 5-16ths of an inch only, a load of 15 tons was applied in the centre of a 10-ft. bearing without causing fracture. And this test was at a confirmation of previous ones, so that I feel sure these girders will supply a long-felt want. They are being used largely in the construction of the new National Liberal Club by Mr. Waterhouse.

I have now endeavoured to bring before you some of the purposes for which this common material, concrete, is adapted. Its use is extending daily, and in that extended use lies a danger which it behoves us all to guard against: whether we are employing it for floors, for pavings, for walls, for vaults, for architectural enrichment, or what not, it cannot be too strongly insisted upon that sampling of every kind must be avoided; that the quality of the Portland cement used in manufacture must be of the very best; and that no labour in manipulation must be spared, if inferior materials be used, or carelessness in working, the results are sure to be disastrous, and grave discredit will be thrown upon a most useful building material. The object is a sternly practical one, and it has been impossible to illustrate it by elaborate and beautiful drawings, but at least we can learn one lesson from it, and that is the great, inestimable value of thoroughness in all the work which we have to undertake. As I commenced by referring to the Roman builders, so would conclude by pointing to them again as a model for us. Depend upon it, when they were building the walls of those edifices which are still the wonder of the world, they gave no thought to what posterity would think of them; they simply did their work in the best way they knew of, and spared no pains to make it good, and if we imitate them on this, we shall all, whether architect, builder, or artisan, have the

satisfaction of feeling that we have done some bit of good work, and although it is not given to us all to be great artists, and to which the world with noble buildings, we can at least put our whole heart into everything we undertake, and we shall thereby display the truest genius which has been described as an infinite capacity for taking pains.

#### ROYAL METEOROLOGICAL SOCIETY.

THERE were some interesting points about the annual exhibition of instruments which was held in the Library of the Institution of Civil Engineers, Great George-street, Westminster, last week (16th and 17th inst.). Perhaps the most interesting of the exhibits, not strictly meteorological, and having at the same time a sanitary importance, was Mr. Baldwin Latham's earth hygrometer. The question of the hygro-metric condition of the ground as compared with the air in a certain district, is one which is not at present understood; but Mr. Latham has been investigating the matter, and believes that he will be able to establish relations which will contribute to the solution of a question having an important sanitary bearing. During the ten years he has been in charge of the drainage works of Croydon he has been preparing calculations made upon observations obtained there. He is satisfied that his instrument will afford trustworthy results. It consists of three perforated cylinders, lined with fine wire gauze. Each is filled with earth from the locality to be tested; but they occupy different positions, one being suspended in the air, one immediately below the surface of the ground, and the third 12 in. lower. A lever is appointed to each cylinder, on the opposite side of which is a counter-weight. Acting separately, each cylinder records its observations in the form of a diagram upon a small cylinder driven by clockwork. The percentage of moisture which the earth in every case contains at any one time is seen at once by a glance at the index.

Among the instruments new, or not previously exhibited, we noticed Jordan's improved photographic sunshine recorder, which consists of a cylindrical box, in which a slip of prepared paper is fixed. The sensitised paper receives the sunlight which is admitted into the box by two small apertures, upon which a distinct mark is obtained. Mr. Jordan, who is the Keeper of Mining Records at the Home Office, secured, at the eleventh hour, but not without considerable trouble, a place for his instrument at the recent Inventions Exhibition, where it afterwards obtained an award. There were several new forms of anemometer, the most interesting being one exhibited by Mr. W. H. Dines, in which the axle is driven by a pair of small windmill sails. A registering dial records the number of revolutions, and the instrument is so arranged as to give any required number of revolutions per mile. Several improved surveying aneroids were exhibited. Though these instruments are practically reliable in taking a rough surface survey, and, indeed, exceeding useful in obtaining the section of an extensive piece of rough and difficult country, they are utterly useless for surveying purposes underground. We suspect it is due to the ever-varying conditions of air-currents in such situations; but it is a fact, nevertheless, that they almost invariably read too deep in metal mines and not deep enough in collieries. In a Welsh mine, a recent experiment discovered discrepancies varying from 50 ft. to 45 ft. from the correct depths in the indications of several aneroids used. Possibly improvements will ultimately obviate these objections.

The usual monthly meeting of the Royal Meteorological Society was held on Wednesday in last week, at the Institution of Civil Engineers. The President (Mr. W. Ellis, F.R.S.) gave an historical sketch of the barometer. After remarking on the accidental nature of the discovery of the instrument, in the year 1643, in its best form, in ignorance for some time of its value for purposes of meteorological inquiry, he gave a brief account of many early kinds of barometers, the first endeavour being in consequence of difficulties experienced with the ordinary mercurial form to enlarge the scale of variation, attempts which in general introduced other errors and inconveniences. The desire to experiment on elevated positions induced the construction of an early form of

portable barometer, one such, with cistern completely closed, leaving the air to communicate through the pores of the wood, having been made above 200 years ago. The President further described various points in the arrangement of the Ramsden, Gay Lussac, and other barometers, including also mention of some modern patterns of long-range barometers, standard barometers, and such barometers as are more commonly used. The practice of driving out air from the mercury by heating or boiling appears to have been in use early in the last century. Engraved plates indicating the weather to be expected with different heights of the mercury have been longer used, at least as early as 1688. As regards correction for temperature, Le Duc, in the last century, adopted a temperature corresponding to 54.5 deg. Fahr. as that to which to make reduction, because corresponding nearly to the average of observations, such reductions being now made to the natural zero 32 deg. Fahr. Reference was made to the employment of water (as in the well-known Royal Society barometer) and other liquids instead of mercury; also to various kinds of floating and other barometers not at all or not entirely mercurial, and to metallic barometers. The President concluded his account with a sketch of the history of recording barometers or barographs, including a notice of the application of photography and electricity to recording purposes. At the conclusion of the President's address the meeting was adjourned to afford the fellows and their friends an opportunity of inspecting the valuable and interesting exhibition of barometers referred to above.

#### UNIVERSITY COLLEGE, LIVERPOOL: NEW CHEMICAL LABORATORIES.

THE new chemical laboratories in connexion with University College, Liverpool, were opened on Saturday last by Sir Lyon Playfair, M.P., who delivered an interesting address on the occasion.

The buildings, which have been erected from designs by and under the superintendence of Mr. Alfred Waterhouse, R.A., occupy the western confines of the college site, and are placed in immediate and convenient connexion with the Medical School block. The west front, containing the principal entrance, which is surmounted by the water-tower, faces direct upon Brownlow-street; while the eastern elevation looks out upon the college grounds. The most characteristic feature in the building is the large pentagonal apse, which looks southwards and forms the containing wall of the large lecture and practical theatres, which have been designed expressly with a view to lecturing requirements. The polygonal angles are relieved with buttresses running up the entire height of the building, and terminating in ornamental headpieces in terra cotta. The lower theatre is lighted with dual windows introduced in each of the five polygonal facets, while corresponding ornamental arcading is introduced in the exterior facades of the upper theatre, which (to facilitate artificial darkening) is in part lighted from the roof. This outer polygonal apse is flat roofed, backed by the gable roof, which is carried the full length from side to side of the interior portion of the theatre. The main front in Brownlow-street is enriched by the entrance porch and tower, which intervene between the large lecturing-theatre annex and the body of the building, which contains the various supplementary laboratories, museums, and class-rooms, while the tower itself is occupied by the main staircase and minor rooms. The central portion of the building is designed in three gables facing the street, and is built in three stories. Near one end of this rises the bold and lofty chimney, rendered necessary by the elaborate furnace and ventilation arrangements, which are very complete. The entire design will be eventually completed by the erection of two large laboratories for qualitative and quantitative analysis, placed side by side, and extending from the north end of the present building to Dover-street. Until their erection the north wall will retain its present blank unfinished aspect.

The practical theatre is specially arranged for a large class of students to follow by actual experiment on their own part the demonstrations given by the lecturer, whose table is placed in the middle of the room a few feet away from the back wall and between the



frances. The students' working benches are fifty-two in number, and are arranged in six concentric rows rising one above another. These form segments of circles described from the lecturer's position as a centre. It is hoped that by this arrangement the acquisition of a knowledge of elementary practical chemistry will be greatly facilitated and rendered more thorough. The containing wall of the room opposite the lecturer is itself polygonal. The theatre is lighted by three Bower gas-lights, which have been fitted up by Mr. A. Bucknall, of Renshaw-street.

The structure has been carried out under two contracts,—one for the excavation and foundation walls, which was undertaken by Messrs. Wm. Tomkinson & Sons, of Liverpool; and a second, embracing the remainder of the work, which was executed by Messrs. Jones & Sons, also of this city. The greater part of the fittings was entrusted to Mr. T. Urmsen, of Liverpool, under a separate contract. The works have been carried out from first to last under the careful supervision of Mr. A. G. Cook, M.C.W.A., to whom the College is much indebted for his constant vigilance and assiduity as clerk of the works.

#### BUILDERS' CLERKS' BENEVOLENT INSTITUTION.

##### ANNUAL DINNER.

The eighth annual dinner of the members and friends of this excellent charity was held on Tuesday evening last in the Venetian Saloon of the Holborn Restaurant, when 240 gentlemen sat down to table. Mr. George Haward Trollope (Trollope & Sons), President of the Institution, in the chair. After dinner, the Chairman proposed the health of the Queen, referring to the important ceremony which her Majesty was to perform on the morrow (Wednesday last), viz., the laying of the foundation-stone of the new Examination Hall of the Colleges of Physicians and Surgeons, which was described and illustrated in our last.

In proposing the toast of the evening, "The Builders' Clerks' Benevolent Institution," the Chairman expressed the gratification it afforded him to see so many old and valued friends of the Institution present to lend him their support on behalf of so admirable a charity as that whose cause he pleaded. The Institution was founded in 1866, for the purpose of granting pensions to decayed and necessitous builders' clerks and their widows, for the maintenance of the orphans of builders' clerks, and for the granting of temporary relief in times of illness or lack of employment, or under other circumstances. The Institution had now been in existence for twenty years, and consequently it would next year attain its majority. Since its foundation twenty-two pensioners had been elected on its funds, the number on the list at the present time being fifteen. During the first twelve years of the Institution's existence the pensions allowed were 20*l.* a year to males and 15*l.* a year to females, but in the year 1878, under the active presidency of their good friend, Mr. Rider, the pensions had been increased to 25*l.* for males and 20*l.* for females. From very small beginnings the Society had gradually extended its operations with the result that last year it disbursed no less than 380*l.* in pensions and relief.\* The work of the Institution was carried on with an exceedingly small outlay for working expenses, and in that respect he believed it would compare most advantageously with any other institution of the kind. At the same time, the Committee of the Institution would be able to dispense a much larger sum in aid of the necessitous (were funds provided) without any appreciable increase in working expenses, and he trusted that the Committee would be afforded the opportunity of doing so. The regular income from annual subscriptions and from dividends was not sufficient to meet the demands on the charity, and, therefore, they were to some extent dependent upon donations received at the annual dinners. Fortunately the Institution stood very well at present with regard to its Orphan Fund, and, therefore, he asked intending donors on that occasion to devote their gifts, as far as possible, to the Relief Fund, upon which, owing to the present depression, they had, and were likely to have, many claims. He trusted that builders'

\* For further particulars respecting the financial position of the Institution see report of the annual meeting given in the *Builder* for Feb. 27 last, p. 364.

clerks generally would join the Institution, for there were undoubtedly many who had not yet realised the advantages resulting from membership. In conclusion, the Chairman quoted some remarks on the claims of the charity made in a recent "Note" in the *Builder* (p. 328, ante), and the toast was received with much enthusiasm.

Mr. Howard Colls, in proposing "The Architects and Surveyors," said that the architects and surveyors were no doubt at one with the builders in hoping for better times. As a proof of that, he might mention that a short time ago he had the pleasure of hearing a paper read by a young architect at a meeting of the Surveyors' Institution, advocating the rebuilding of a great part of London, the scheme including the formation of about sixty miles of new streets, at a cost of about a million a mile! As builders they would all be glad to welcome the realisation of such a project. But Mr. Woodward's paper had been much criticised, one well-known architect, Mr. Blashill, going so far as to say that it would be cheaper to move London altogether than to rebuild it. However, leaving that subject, he might say that there were some architects and surveyors who were liked by the builders, and some who were not liked. He could only say that the builders wished long life and prosperity to those architects and surveyors whom they liked, while they hoped that those whom they did not like would learn to imitate those whom they did like. With the toast he coupled the names of Mr. Stonor and Mr. Mullett, the latter one of the founders of the Institution, who both responded.

Mr. Roe, in a humorous speech, proposed "The Builders," within which denomination, he said, he did not include certain ingenious gentlemen who were able, out of "airy nothings" to build "local habitations" sufficiently cobwebby in their nature to serve as residences for Ariel; nor the acute and exacting gentlemen who were supposed to have such very keen eyes for "extras" and percentages; nor the gentlemen who were popularly supposed to make it the express purpose of their lives to build in the interests of doctors learned in typhoid fever; nor those other fanciful representatives of the building trade who, in certain quarters, were represented to be perpetually engaged in concocting schemes for the "degradation of the working man," in regard to which it ought in fairness to be said that, in spite of his "degradation," the working man seemed quite able to maintain his position as "boss of the show." No; to his mind, the typical representatives of "The Builders" were to be found in such men as the President of the Institution; as Mr. Greenwood, their President last year; or as other of their past Presidents, such as, to name only a few, Mr. Stanley George Bird, Mr. Howard Colls, or Mr. Joseph Randall (of the firm of Kirk & Randall), and others. With the toast he coupled the name of Mr. Randall.

Mr. Randall having briefly replied, Mr. Edwin Brooks (treasurer) proposed "The Past-Presidents," referring to the great services rendered by the brothers Lawrence, Mr. George Plucknett, Mr. Taprell Holland, Mr. Thomas Stirling, Mr. Stanley Bird, and Mr. Benjamin Colls; and, amongst Presidents in more recent years, by Mr. Howard Colls, Mr. Joseph Randall, and Mr. Greenwood.

Mr. Randall responded.

Mr. Greenwood proposed "The President," and Mr. Trollope, in responding, referred to the fact that his father was President of the Institution in 1875.

The toast of "The Visitors" was next proposed by the President, coupled with the name of Mr. Stanton William Preston, Clerk of the Carpenters' Company, who, in responding, spoke of the educational and philanthropic work which that Company had engaged in of late years, special mention being made of the courses of lectures given by the Company last year and this year.

During the evening, subscriptions and donations to the amount of 326*l.* were announced.

Mr. Wheatley, the Secretary, will be glad to afford further information as to the work of the Institution. The office is at 21, New Bridge-street, E.C.

**Oldbury.**—A proposal is on foot for erecting a Free Library building at Oldbury, but the Ratepayers' Association threatens hostility to the project unless it is carried out by public subscription.

#### PAGODAS IN BURMAH.

From an interesting paper entitled "Burmah, the Eastern Country and the Race of the Brahmans," recently read by Mr. J. George Scott before the Indian Section of the Society of Arts, we extract the following particulars with regard to the pagodas which abound in the country:—

"The number of pagodas in the country is altogether extraordinary. There is no village so poor but that it has its neatly-kept shrine, with the remains of others mouldering away round about it. No hill is so steep and rocky, or so covered with jungle, as to prevent the glittering gold or snow-white spire rising up to guard the place from ghouls and sprites, and remind the surrounding people of the Saviour, Lord, the teacher of Nirvana and the law. The banks of the Irrawaddy are lined with them from the source to the northern hills. The number of them at Pagan, an ancient capital, renders it one of the most remarkable sacred cities in the world. A Burmese proverb says there are 9,999. Whether that is true or not, they cover an area of nearly sixteen square miles, and are of every order of architecture and in every stage of decay, some with cloisters and chapels, and ante-chapels, as fine as many a cathedral, and built in the form of the cross; others with the light grace of the minaret; others again rounded like the Hindoo dome; some that suggest the bamboo-modelled pagodas of China; others a mere Border 'peel'; finally the ordinary bell-shaped solid mass, characteristic of Burmah itself; some gilt and white-plastered, as fresh as if new built; others mere heaps of crumbling bricks. The most picturesque group is, however, at a point of the river a few miles below Mandalay. The Irrawaddy here makes a grand sweep to the westward. On the left, as one ascends, are the bare, rocky Sa-gaing hills, on the right the well-forested banks at Aya and Amarapura, rising here and there into knolls and little hills with rocky faces to the river front. All three towns, Aya, Amarapura, and Sa-gaing, if now they can be called towns, are ancient capitals. Hence the abundance of religious buildings. On the Sa-gaing hills, stairways, some of them over a mile long, wind up the steep slopes to the pagodas on the tops, the steps in some places hewn out of the rocky hill-sides, in others laid with square blocks of alabaster. The shrines are not merely on the hill-tops. Down on the cramped space at the base are many more conspicuous among them being the huge solid cupola of the Pumpkin Pagoda. On every practicable spot of the ascent there are more or more bell-shaped masses of bricks, some mounted by the invariable umbrella, glittering with gold-leaf, and musical with scores of little bells, hung from the concentric circles, rising one above another in lessening size. Opposite, more pagodas rise up in massive dignity on the river bank, or show their slender spires further back against the green boughs of gigantic trees. The sight, with the background of the huge dark Shan hills to the eastward, is striking and beautiful in the extreme.

There is good reason for this multiplication of fanes. No work of merit is so richly paid as the building of a pagoda. The pagoda founder is regarded as a saint on earth, so when he dies he obtains the last release; so him there are no more deaths. The man who sets up a row of water-pots on a dusty road does well; he who raises a sacred post, who builds a rest-house, presents an image or a bell or founds a monastery, gains much merit, and ensures a happy transmigration when he passes away; but the Payah-tagah is finally freed from the three calamities, his merit outweighs the demerits, and he attains the holiest. It may be remarked that it is of no avail to repair a previous dedication, unless it be on of the great world-shrines at Rangoon, Pegu, Prome, or Mandalay. In the case of ordinary pagodas, the merit of the repair goes not to the restorer, but to the founder. Pagodas are built over relics of the Buddha, or models of them; over the sacred eight utensils of a mendicant; or imitations of these, and over copies of the sacred books."

**Cambridge.**—Prince Albert Victor of Wales recently opened the new buildings of the Cambridge University Union Society, which have been erected from the plans of Mr. Alfred Waterhouse, R.A., at a cost of between 9,000 and 10,000*l.*



## ARCHITECTURAL SOCIETIES.

**Birmingham Architectural Association.**—The seventh ordinary meeting of the current session was held on Tuesday evening last in the Library at Queen's College, when a paper was read by Mr. H. H. McConnell on the "Transition in Architecture from Gothic to Renaissance in England." In the course of a very able chronological paper Mr. McConnell clearly showed, with the help of a large number of his own drawings, the cause of the Transition, and spoke of the work done by the many architects during the period. A vote of thanks, proposed by Messrs. A. Reading, E. Wood, J. Jotton (Vice-President), and T. W. F. Newton, was heartily accorded to Mr. McConnell, who briefly responded.

**York Architectural Association.**—At the meeting of this Association held on the 18th inst. Mr. Walter G. Penty read a paper on "Terra-cotta as a Building Material." Terra-cotta, he said, was simply a superior kind of brick, as both were manufactured from the same material, viz., clay; only the one, terra-cotta, was brought to a higher state of perfection. The lecturer described in an interesting manner how terra-cotta was manufactured, and referred to its cheapness, durability, and artistic excellence. It was, he remarked, much deprecated by stonemasons, as they viewed it from a standpoint of rivalry to stone, but he asserted that it was impossible for terra-cotta to be a formidable rival to stone, as the latter exceeded it in dignity. A discussion ensued, in which the chairman, and Messrs. Parker, Yeoman, and the honorary secretary (Mr. Benson) took part.

## ARCHÆOLOGICAL SOCIETIES.

**British Archaeological Association.**—At the meeting on March 17, Mr. G. R. Wright, F.S.A., in the chair, the discovery of a remarkable historic monument at Langley Burrell was announced. It consists of a mound having a circular platform, paved and elevated, surrounded by a ditch, long lines of embankment radiating from the centre. The entrance faces the east, and the mound has the appearance of having been a place of sacrifice. A detailed description will be laid before a future meeting. Mr. McIntyre North exhibited a drawing of the various red brick arches found during some excavation works on the site of the Duke of Norfolk's Palace, in the Borough, Southwark. Mr. Earle Way described some recent discoveries at St. Margaret's Hill, Southwark. Mr. Woodhouse exhibited a fine series of London medals, illustrative of many buildings which have passed away. Mr. Loftus Brock, F.S.A., described a collection of the gun money coins of James II., struck prior to the battle of the Boyne, showing some singular reductions in size. The King's Exchequer declined. Colonel Ramsay, F.S.A., in describing a visit to the statues found at Clapham, expressed his opinion that all the sculptures were the work of the same artist, and that the work was superior to any usual class of monumental figures produced at the close of the seventeenth century. A paper was then read by Mr. W. De Gray Birch, F.S.A., on the Legendary History of St. Nicholas Myra.

**Devon Architectural and Historical Society.**—One of the first of three "walks" of the members of this society took place recently, when a mercurial party, by special permission of the authorities, visited the Castle Mound and the site, in the city. Mr. James Parker gave a short history of the object of the moon's visit. The second "walk," which was arranged should be round the City Walls, New College took place, however, on the 13th inst., when the party was again under the able leadership of Mr. James Parker, who explained the course they were to take, and had already, by maps, which greatly assisted the visitors in forming an idea of the direction the walk took. Inside the Holywell entrance Parker gave an interesting account of the prominent features of the old walls, and of interesting particulars as to the laws compelling New College to keep the walls in repair, which he read from a copy of the original manuscript.

**Sussex Archaeological Society.**—The annual meeting of this society was held on the 18th inst. in the Barbican at Lewes Castle. The chairman (the Rev. P. de Patron), moved a

vote of condolence with the family of the late Earl of Chichester in their bereavement, and expressing the loss the society had sustained in the death of their president. Mr. Crosskey then presented the annual report, and mentioned that Domesday Book would be issued within about a fortnight, and the volume for 1886 would be issued to members in about a month afterwards. The accounts were next presented and passed. Mr. Griffith proposed the election of the Rev. Chancellor Parish as joint secretary with Mr. F. Barchard, in the place of the late Rev. W. Purcell, and this was agreed to, the Chairman remarking that they were very much indebted to Mr. Parish for his services in connexion with Domesday Book. Mr. Latter Parsons, of Lewes, and Mr. Clayton, of North-street, Brighton, were elected members of the Committee. Some discussion then occurred as to the place of holding the annual excursion. After various suggestions had been made the matter was referred for decision to the Committee.

## OBITUARY.

**Mr. Alfred Burges, C.E., F.S.A.**—This well-known engineer died at Worthing on the 12th inst., in his 90th year. He was articulated by his father, a man of humble condition, but who could afford a premium for his son, to the leading civil engineer of the day, James Walker. The pupil soon became the partner; and a life prolonged far beyond the ordinary human span, a colossal fortune, and the survival of his son, William Burges, the distinguished architect, alike attest to the more than ordinary character of the subject of our notice. Alfred Burges, without the same advantages of education, had many of the tastes and proclivities of his son William; he was a careful and tasteful draughtsman, and took especial interest in archaeology and antiquities. He was well known on the various works of the Trinity Corporation, especially additions to lighthouse buildings, &c.; and was constant in his supervision of the most successful wet dock works in the Port of London, the Commercial Docks, and on the Commercial-road tramways and causeways to the East and West India Docks, also on the Barking and Essex roads, the bridges on which, in many cases, were re-erected or widened by his firm. The Essex Sewers Commissioners and the Bedford Level Commissioners were also largely advised by him. The Leeds and Selby Railway, the Hull and Selby Railway works, the Junction Dock at Hull, and numerous metropolitan and provincial docks and harbour works in England and Scotland, were improvised by him. It is only necessary to note the names of the chief assistants who passed through the office of Walker & Burges to identify the position in his profession that the junior partner of the firm occupied. They were as follows, viz.:—J. W. Bazalgette, G. P. Bidder, M. A. Borthwick, W. B. Bray, J. Cooper, G. S. Dalrymple, T. Deane, E. Druce, A. Drysdale, J. Hartley, J. Hawkshaw, J. Herbert, D. P. Hewitt, W. H. Holland, J. R. McClean, J. McConnochie, Major Newsome, R.E., J. Ormiston, W. Parkes, F. Pollock, J. B. Redman, T. M. Smith, R. Townshend, J. S. Tucker, among others. They all are, or were, corporate members of the Institution of Civil Engineers, but nearly two-thirds have long since joined the great majority.

**A New Building Undertaking at Brockley.**—The Bridge House Farm Estate at Brockley, containing an area of about fifty acres, was some time since purchased by a company of capitalists, who have constructed roads on the estate from 50 ft. to 60 ft. in width, and several houses in the "Queen Anne" style have already been erected. The erection of a public hall is contemplated, whilst a site has been reserved for the erection of a church. On an elevated portion of the site the owners have also founded what has been designated the West Kent Grammar School, and a portion of the building, consisting of the central block, has already been erected. It is intended to add two wings, together with a chapel in connexion with the school. The school buildings, when completed, will be three stories in height, and a prominent feature will be a central tower. Mr. C. Evans, of Poet's-corner, Westminster, is the architect.

## Illustrations.

## ST. JAMES'S CHURCH, MARSH-LANE, BOOTLE, NEAR LIVERPOOL.

**THIS** church, the interior of which we this week illustrate (from a water-colour drawing by Mr. Brewer, exhibited last year in the Academy), was described at length in our columns at the time of its opening last February. It will be sufficient now to say that it is designed in the style of the Early Decorated period, dating about the middle of the thirteenth century, and consists in plan of nave and aisles, with tower and entrance at the south-west corner; a baptistery at the end of the north aisle; chancel and side chapels, with stone-vaulted ceilings; and a range of confessionals adjoining the tower and south aisle. The principal dimensions are as follow:—Total internal length from east to west, 148 ft.; chancel, 31 ft.; total breadth across aisles within 64 ft.; breadth of nave, 29 ft.; height of nave from floor to cornice, 50 ft.; height of nave from floor to ceiling in centre, 64 ft.; height of aisles from floor to cornice, 25 ft. There is sitting accommodation for 1,000 people, the seats being of pitch pine. The building is executed in local red sandstone, and the floors are laid with 2-inch pitch-pine flooring; the chancel steps and footpaces of encasement tiles by Messrs. Carter, Johnson, & Co., of Worcester. The heating is by low pressure hot-water pipes, supplied by Mr. C. Seward, of Preston, due care having been given to the subject of ventilation. The plans and details of the church and presbytery have been prepared by Mr. Charles Hadfield, of the firm of M. E. Hadfield & Son, Sheffield, under whose frequent personal supervision the work has been carried out by Messrs. G. Woods & Son, of Bootle. Mr. Haworth was clerk of the works, and Mr. Bishop foreman.

The illustration is reproduced from Mr. Brewer's drawing by Messrs. Goupil's process.

INDUSTRIAL DWELLINGS  
TO BE ERECTED IN SILVER PLACE  
AND INGESTRE PLACE.

THESE plans, by Mr. H. H. Collins, were selected, in a limited competition (as previously mentioned in our columns), instituted by the Vestry of the parish of St. James, Westminster. The primary object of the Vestry was to appropriate a trust fund in the erection of comfortable habitations for those least able to help themselves, namely, widows, with one or more children, and women earning precarious livelihoods.

The land covers an area of about 3,000 ft., and is held on a long lease from the Sutton Estate. The site is not only limited in area for the accommodation required, but is dominated by ancient lights and other difficulties, and express conditions were laid down as to the height to which the proposed buildings were to be carried, and 70 to 75 per cent. of the rooms were to be single-room tenements, the desire being to assist a class of very poor persons.

The building is planned so that a great majority of the rooms can be converted almost indefinitely into one, two, or three room tenements, and as the majority of the occupants will be widows there is no necessity for providing for any increase of family. Twenty-three single-room tenements are provided, of various sizes, to suit the means of all classes, both with regard to dimensions and rent.

The rooms compare favourably with the Peabody Buildings and other model dwellings, the living-rooms being, on an average, 12 ft. 6 in. by 11 ft. 6 in., and the bedrooms 11 ft. 6 in. by 10 ft. 3 in., and all about 9 ft. in height.

The buildings are the rare low in elevation, and the window openings of the present buildings command a right of light over the same, so that the yards, &c., will, practically, always be ensured the same light as the new buildings are arranged for.

The basement contains a small washhouse, with washing troughs and coppers, so that the inmates can wash small articles of clothing; the public baths being close by, there is no occasion for providing an ordinary laundry, and, of course, no laundry business will be allowed to be carried on in the premises. There is also a workroom for the use of sewing-machines, &c., well lighted and heated.

The endeavour has been to make the archi-



tectural features pleasing, but not ornate, so that "monotony and ugliness," which Miss Octavia Hill says the working classes so much complain of, is avoided; the desire has been to make it as homely in appearance as possible. The elevations will be constructed of picked stocks neatly pointed, with red brick and terracotta string courses and dressings.

To each window is provided a light iron balcony, so as to encourage a taste for window gardening and to render the rooms pleasant and cheerful. All the approaches are kept light and cheerful, dark corners being in every instance avoided.

The floors are all fireproof, and the sculleries and w.c.'s are paved with white asphalt. The divisional walls have glazed brick dados, 5 ft. high, the upper portions being painted with enamelled silicate paint. Each room has rails and hooks for hanging up clothes, cupboards being avoided as much as possible on account of the dirt which they too often enclose. In each living-room there is a cottage range with oven, having a special arrangement so as to deliver warm pure air into the room, and every room has a fireplace; and each living-room has a food cupboard with coal bunker underneath properly ventilated, *vide* detail. All the windows are made with deep bottom rails, being an inexpensive mode of providing ventilation, and there are, in addition, foul-air exits.

The sanitary arrangements have been most carefully considered. Mr. George Godwin has pointed out long ago that "the position of the water-closets, &c., is a great danger, not merely for moral, but for physical contamination," the whole question depending upon supervision and personal responsibility. It is evident that the more this supervision can be localised the more the danger is minimised. Thus, in the plan care has been taken, in the first place, for economical reasons, to place the whole of the water-closets as much as possible together, and to so distribute their use that those for the single-room tenements are confined to not more than three tenants, who would be responsible for keeping them clean and sweet; any delinquent being thus easily traced, while each tenant of a double-tenement has a separate and distinct water-closet for the condition of which she will be held personally responsible.

All water-closets are well lighted and ventilated, and placed externally to the building, the windows having the upper parts permanently fixed open as hoppers. The windows over the internal sinks are treated in the same way.

The drainage arrangements are set out in the sanitary sheet. It will be seen that there is an absolute disconnection from the main sewer, a thorough flow of air through all the pipes, an easy means of access for cleansing, and an absolute disconnection from the drainage arrangements and the different tenements. Doulton's last patented closets, without riser and with lifting seats, are provided. The soil-pipes are open at their feet and heads, and have a current of air continually permeating them. The branch pipes of the water-closets are also ventilated so as to prevent syphonage. All waste-pipes from sinks are trapped and carried into the open-air, discharging into heads of rain-water pipes, these latter emptying over Bellman & Ivey's trapped gullies. The potable water is entirely distinct from that used for water-closets, slop sinks, &c., each water-closet having a water-waste preventer placed over the same. The cisterns will be placed on the flat roof, easily accessible and so arranged as to prevent their being affected by frost or being invaded by dirt or vermin.

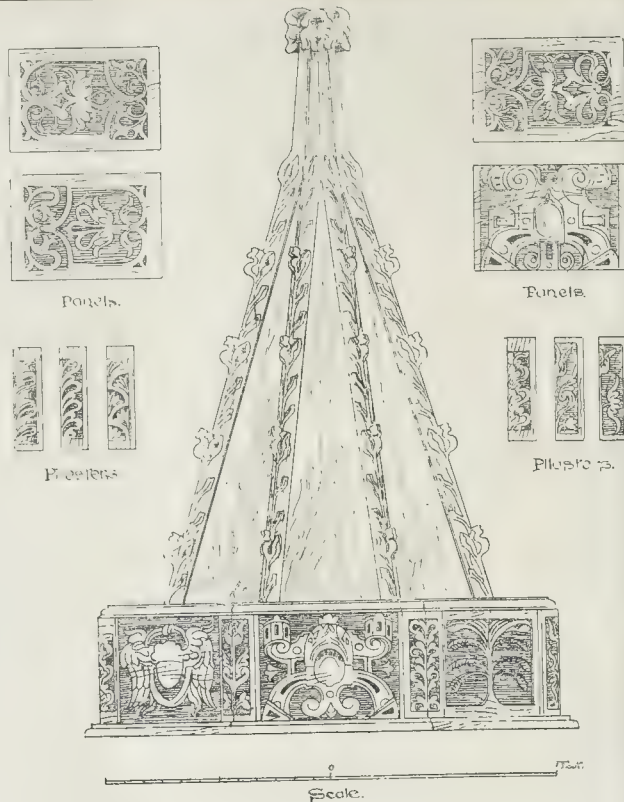
All soil, rain-water, and other pipes are carried externally to the building. Dust shoots are provided off the corridors in the open-air, and have no connexion in any way with the rooms. They are carried up beyond the eaves of the building and are thoroughly ventilated. They discharge into galvanised iron dust-bins, which can be easily cleansed by the dustmen.

Care has been exercised to obtain a good means of escape from fire either by the staircases or on to the fireproof flat roof.

The building contains twenty-one single-room tenements and twelve double-room tenements, exclusive of caretakers' accommodation.

#### MONUMENT'S COMMEMORATIVE OF THE SIEGE OF PARIS.

For some account of the three monuments illustrated, see article on p. 466 of this number.



Font Cover, Congresbury Church.

#### PRESBYTERIAN CHURCH, HIGHGATE.

This building is recently begun, and will occupy a commanding position at the top of the hill, where Hornsey-lane meets Cromwell-avenue. The plans provide for a galleried church to seat 730, whilst behind is a two-storied building having vestries, session room, ladies' room, &c., on the ground-floor, with a large hall over. There are three staircases to galleries and hall. Externally, the materials are Kentish rag, with Bath dressings; and the contract has been let to Messrs. T. Wontner Smith & Son, of Essex-road, at 6,700l., which will include hall, vestries, church, and spire complete. The architects are Messrs. Potts, Sulman, & Hennings, of 1, Farnival's Inn, whose designs were selected in a limited competition.

#### DESIGN FOR A MUSEUM AND LIBRARY FOR A SMALL COUNTRY TOWN.

This pretty little design obtained the prize for the best design produced last year in the upper division of the Architectural School of the Royal Academy, which, considering the high standard of the work generally, was no small achievement. Its author, Mr. E. Guy Dawber, says that he intended the roofs to be covered with red tiles, and the whole front to be of lightish buff terra-cotta, with irregular bands of the same material darkened in the farnae.

**The New Examination Hall for the Colleges of Physicians and Surgeons.**—The foundation-stone of this building was laid by Her Majesty the Queen on Wednesday. We published a view and plans of the building in our last. We are asked to mention that the facing bricks are being supplied by Messrs. Thomas Lawrence & Son, of Bracknell, being of the variety known in the trade as the "T.L.B." bricks.

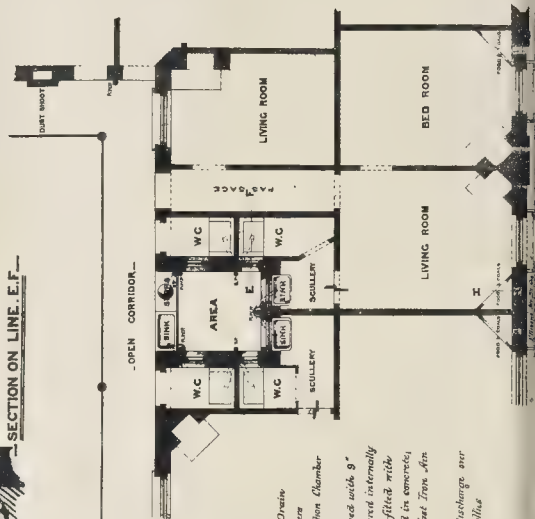
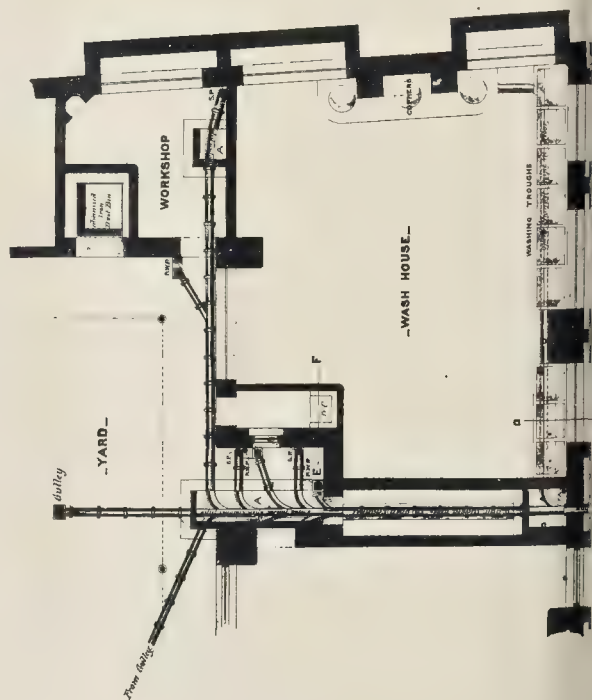
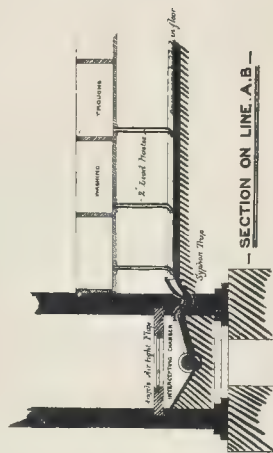
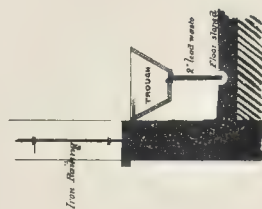
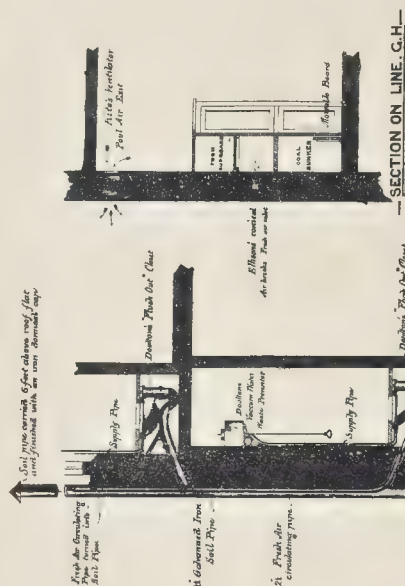
#### FONT COVER, CONGRESBURY CHURCH.

The font-cover here given is the only biblical Jacobean work left in the church. It is a gonal in form, and apparently of two dates, the pyramidal top being slightly earlier than the panels below. These panels are carved in much spirit, as are also the pilasters at the angles, all of them being of different designs. There is some good fifteenth-century scrollwork in the church.

**Labourers' Wages in New South Wales.**—We extract the following from the sheet "Australian Information for British Journalists" issued from time to time by the Immigration Office at Sydney:—"The immigrants who landed at Sydney from the steam-ship *Pat* were a number of single men accustomed to routine of agricultural life. These readily found employment, the rates of wages being as follows:—Gardener for Rockdale, 35s. per week; dairymen for Randwick, 16s. and 18s. per week respectively; and two dairymen for Botany per week each; farm labourers for Queensbury, Liverpool, and Jamberoo, 40s., 36s., and 38s. annum respectively; two ordinary labourers for Liverpool, 90s. each per annum; an ordinary gardener for the Gordon District, near Sydney, 40s. per annum; in all cases with board and lodging. A generally useful man, to drive buggy, was engaged for Wagga Wagga, at 30s. per annum; and an assistant baker, at 39s. annum, with board, for East Maitland. Immigrants were distributed over the colony in the following directions:—North: Glen Innes, Newcastle, Gunnedah, Wallend, and East Maitland. South: Wollongong, Moss Vale, Muller, Albury, Jamberoo, Liverpool, Botany, Cootamundra, Wagga Wagga, Goulburn, Queanbeyan. West: Lithgow, Orange, Nyngan. These are places where steady, industrious men have excellent chances of success, and none others should thin emigrating."







— REFERENCES —  
R.W.P. — *Rain Water Pipes*

### NEEDLES—

S.P. - Soil Pipes

F.A. - Fresh Air Inlet to Di

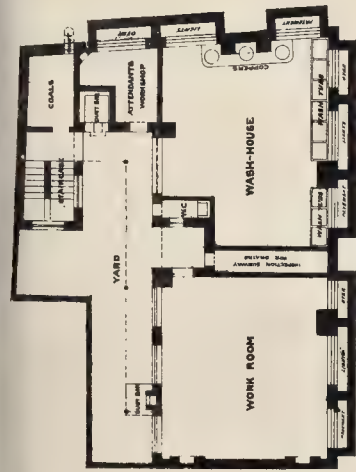
A. — *Inspection Chamber*  
B. — *Inspection Chamber*

-NOTES-

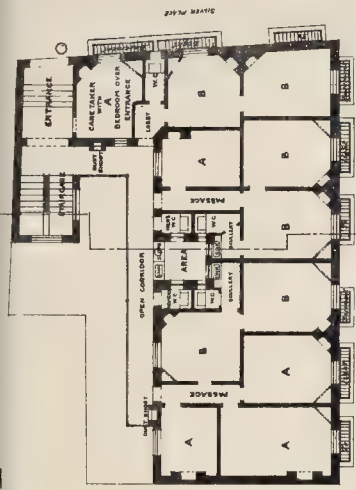
The chambers are to be formed

brick shafts in cement rendered internally with Portland cement and filled with open channel pipes bedded in concrete, & to have Angelo's Patent Cast Iron Air-tight covers over.

all run water pipes to discharge over  
Bellman & Sons' Patent Gutters

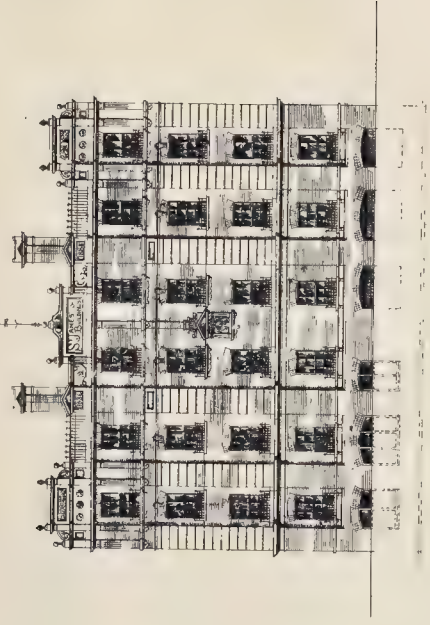


— BASEMENT PLAN —

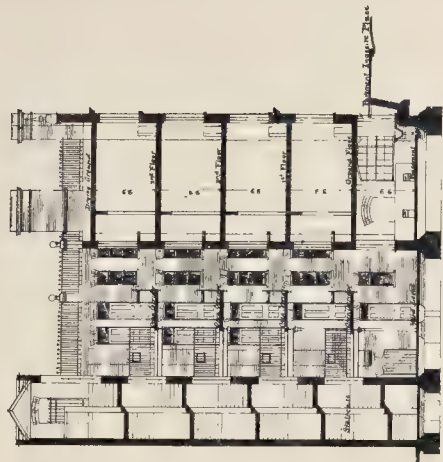


— GROUND PLAN —

— REFERENCES —  
Some marked 'A' indicate single Lettings  
" " "B" form Lettings of two rooms  
with heating and gas and separate W.C.



— ELEVATION IN INGESTRE PLACE —



— SECTION. A. B. —

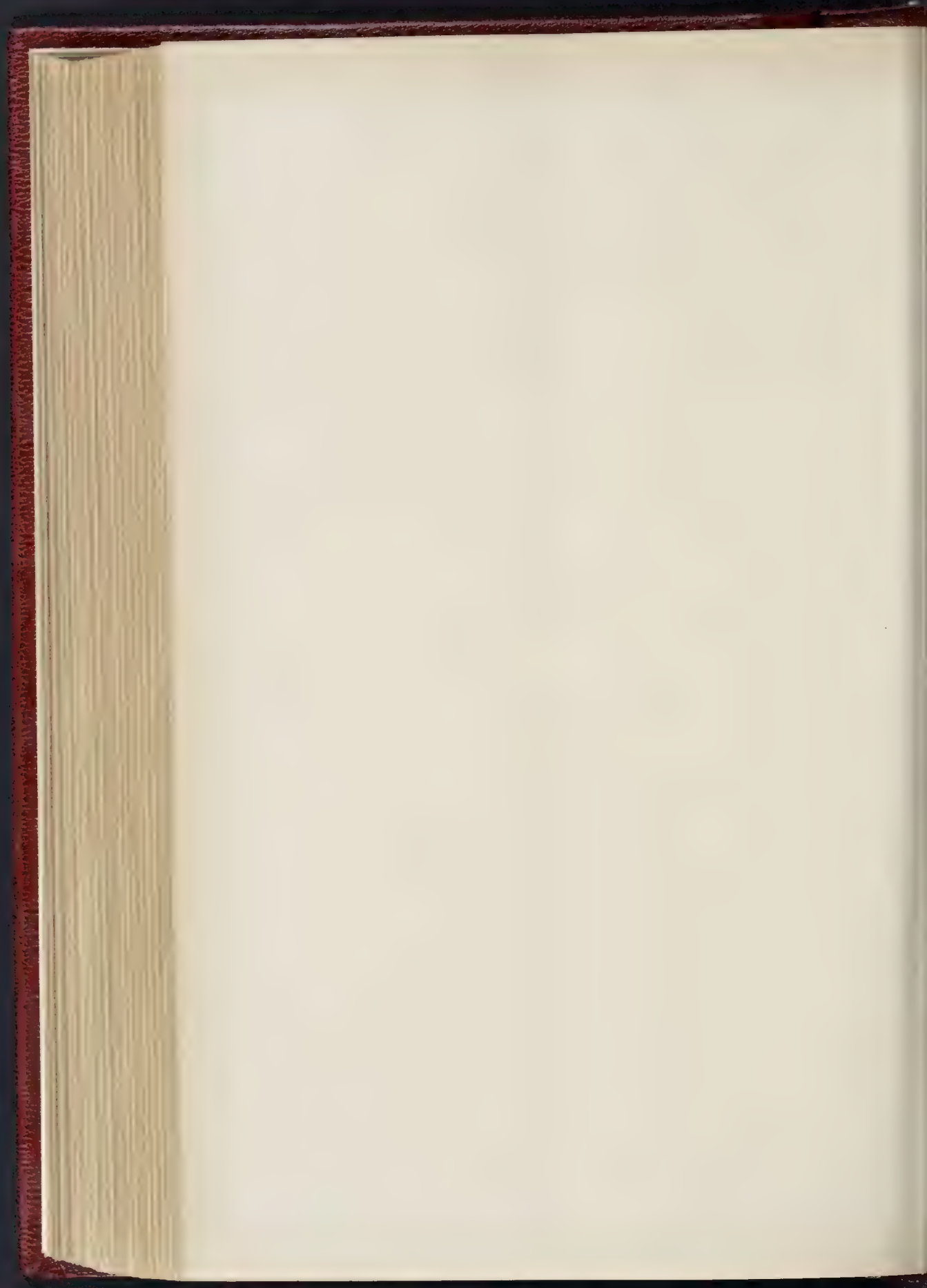
Scale of measurements in feet

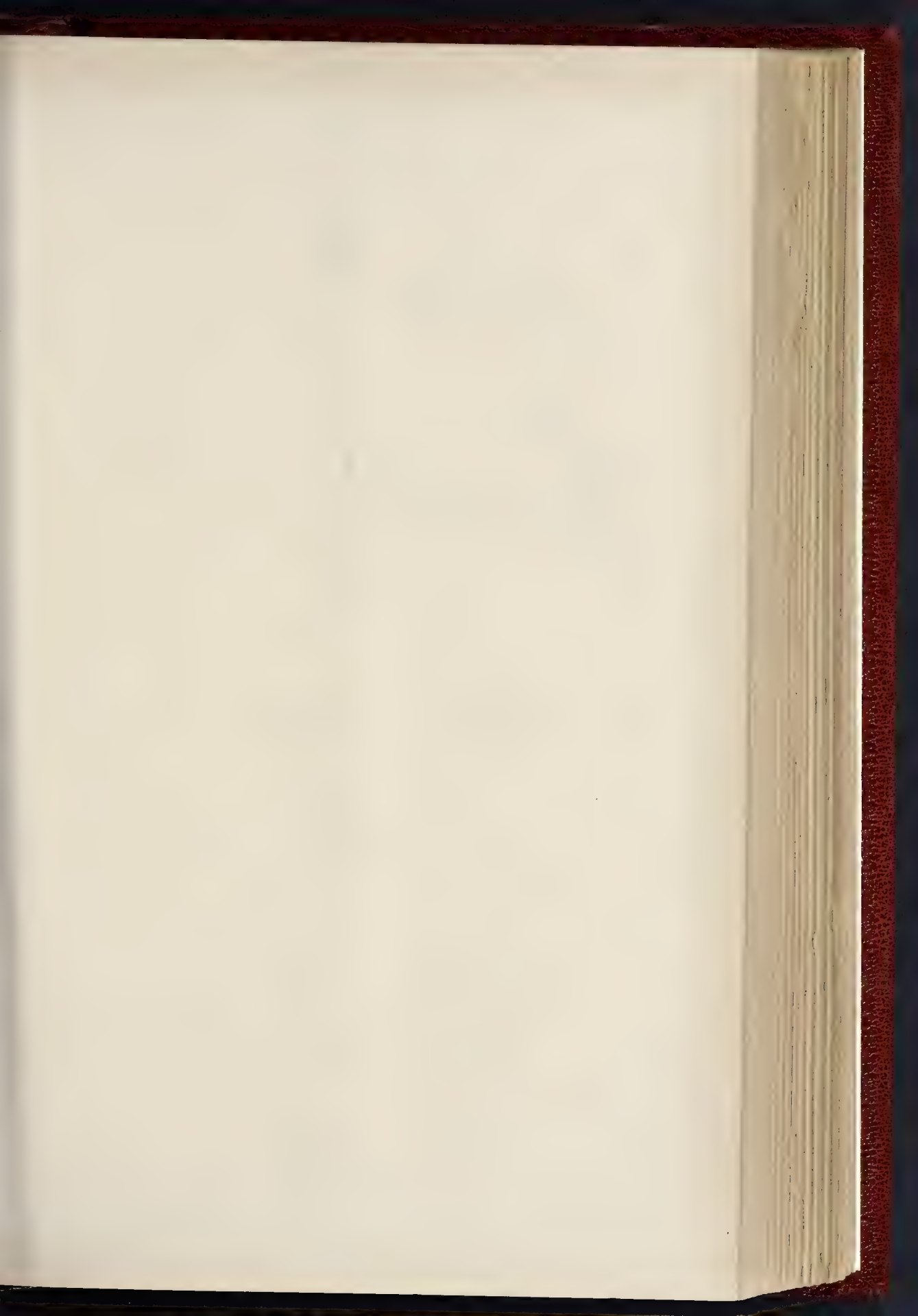
Wyman & Sons Photo-Litho

C/O Queen St. London W.C.

INDUSTRIAL DWELLINGS TO BE ERECTED IN SILVER PLACE AND INGESTRE PLACE FOR THE VESTRY OF THE PARISH OF ST. JAMES, WESTMINSTER.  
MR. H. H. COLLINS, F.R.I.B.A., ARCHITECT.







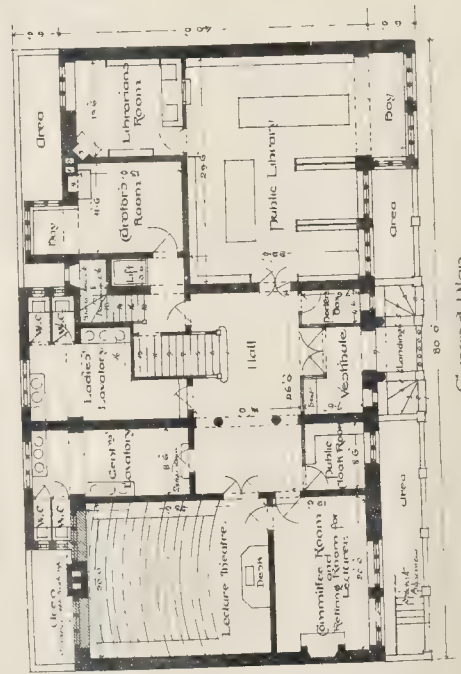




Front Elevation.



Upper floor plan.



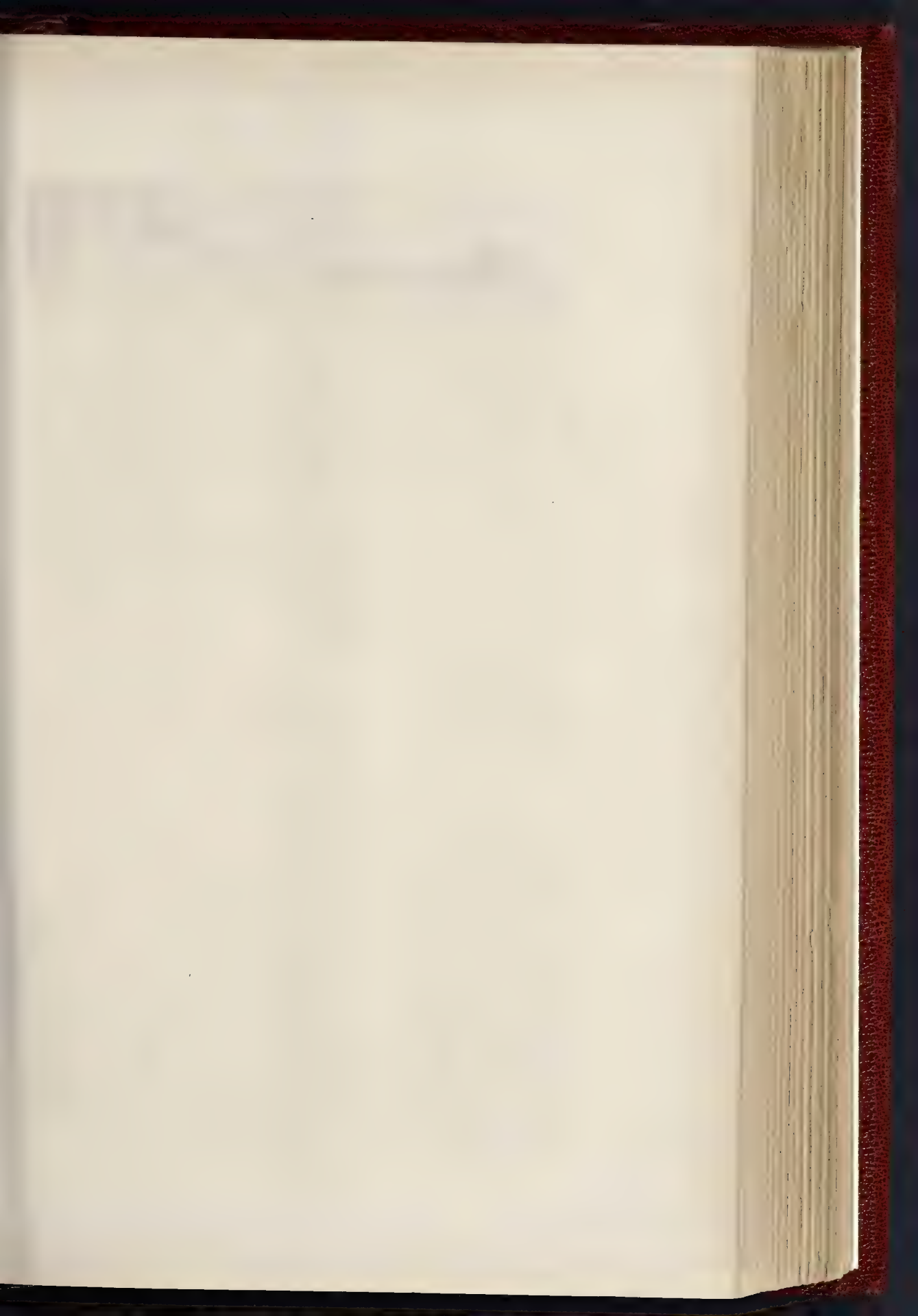
Ground plan.

Scale  
1" = 20' 0"

Wyman & Sons Photo Litho

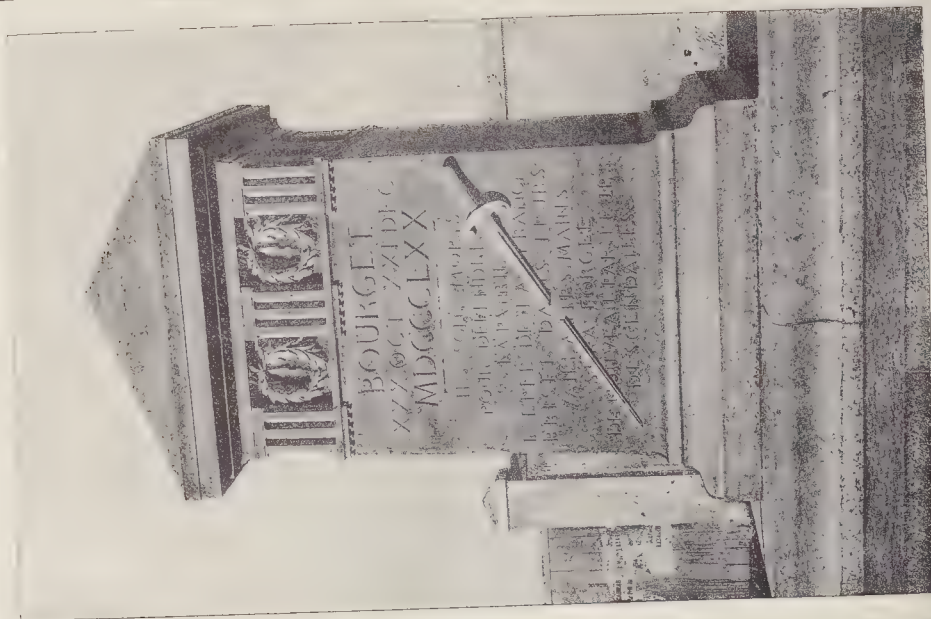
C. Queen St. London W.C.

DESIGN FOR A MUSEUM AND LIBRARY FOR A SMALL COUNTRY TOWN.  
ROYAL ACADEMY, UPPER SCHOOL PRIZE DESIGN BY MR. F. GUY DAWBER.





THE BUILDER, MARCH 27, 1886.





THE PHOTO. SPRAGUE & CO. LONDON

MONUMENTS COMMEMORATIVE OF THE SIEGE OF PARIS

MONUMENT OF "THE DEFENCE OF PARIS" - M. ERNEST BARRIAS, SCULPTOR.







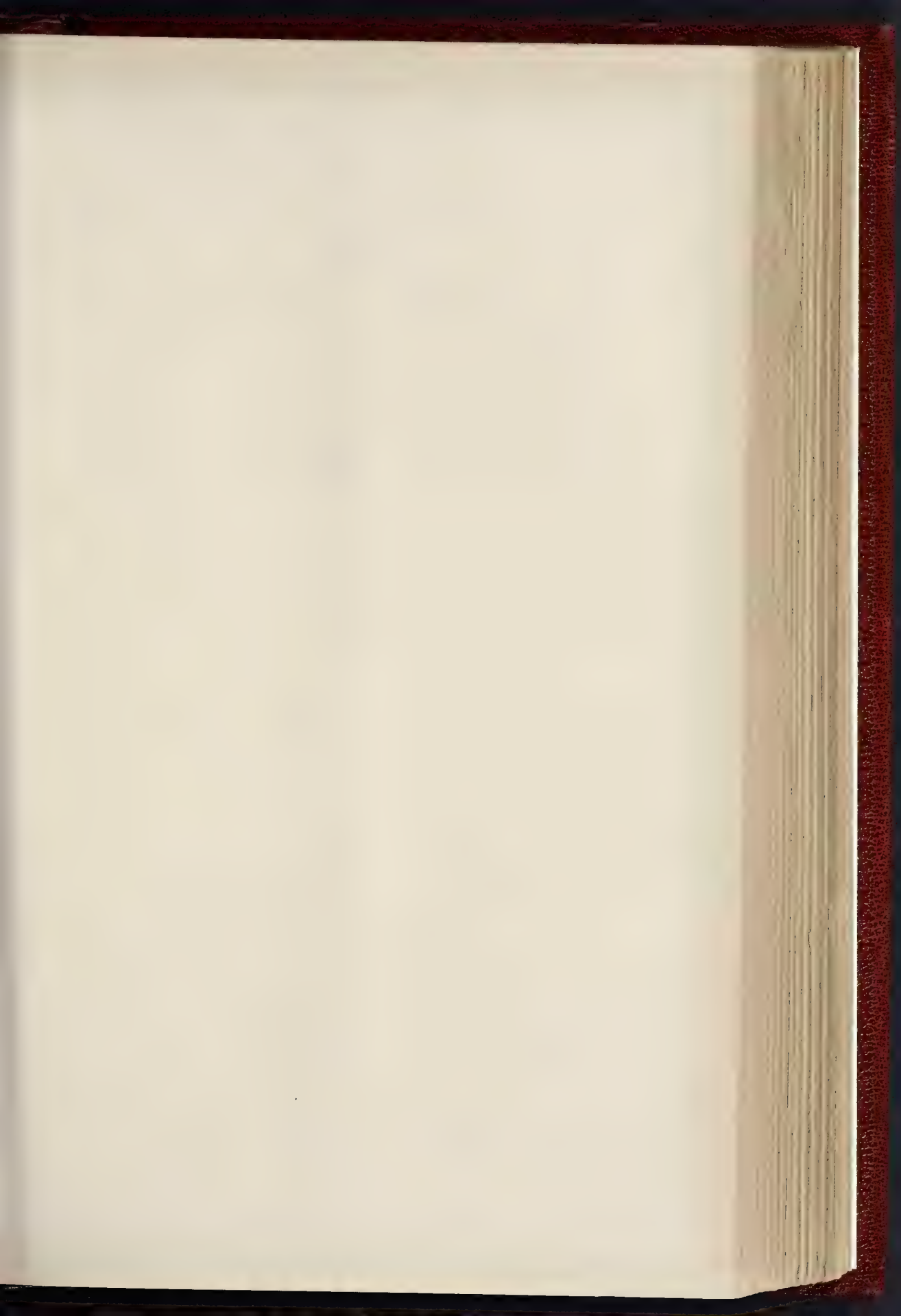
Wynand & Sons Photo-Litho

NEW PRESBYTERIAN CHURCH, HIGHGATE.—MESSRS. POTTS, SULMAN, & HENNINGS, ARCHITECTS.

Chesham St London WC

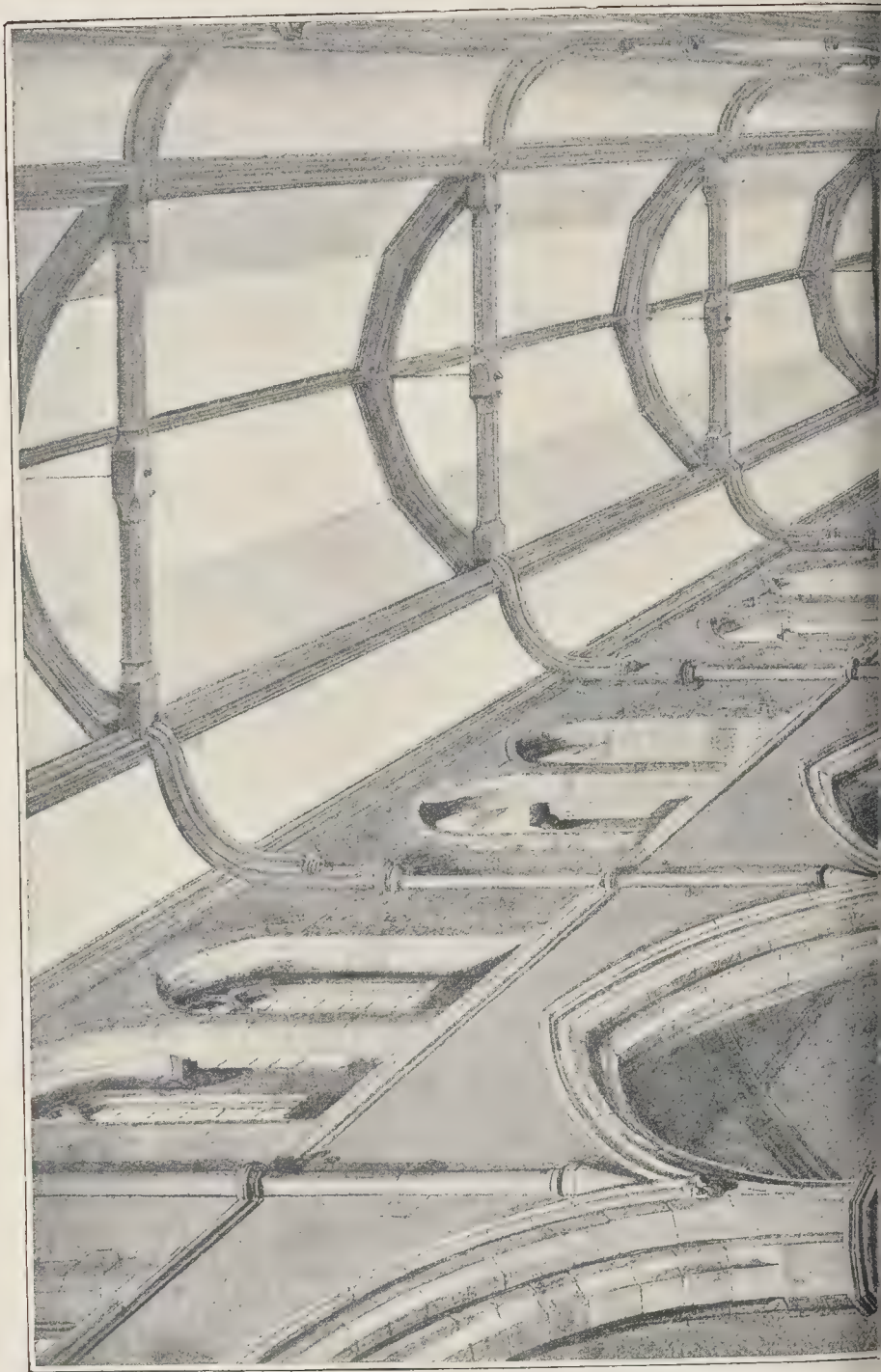


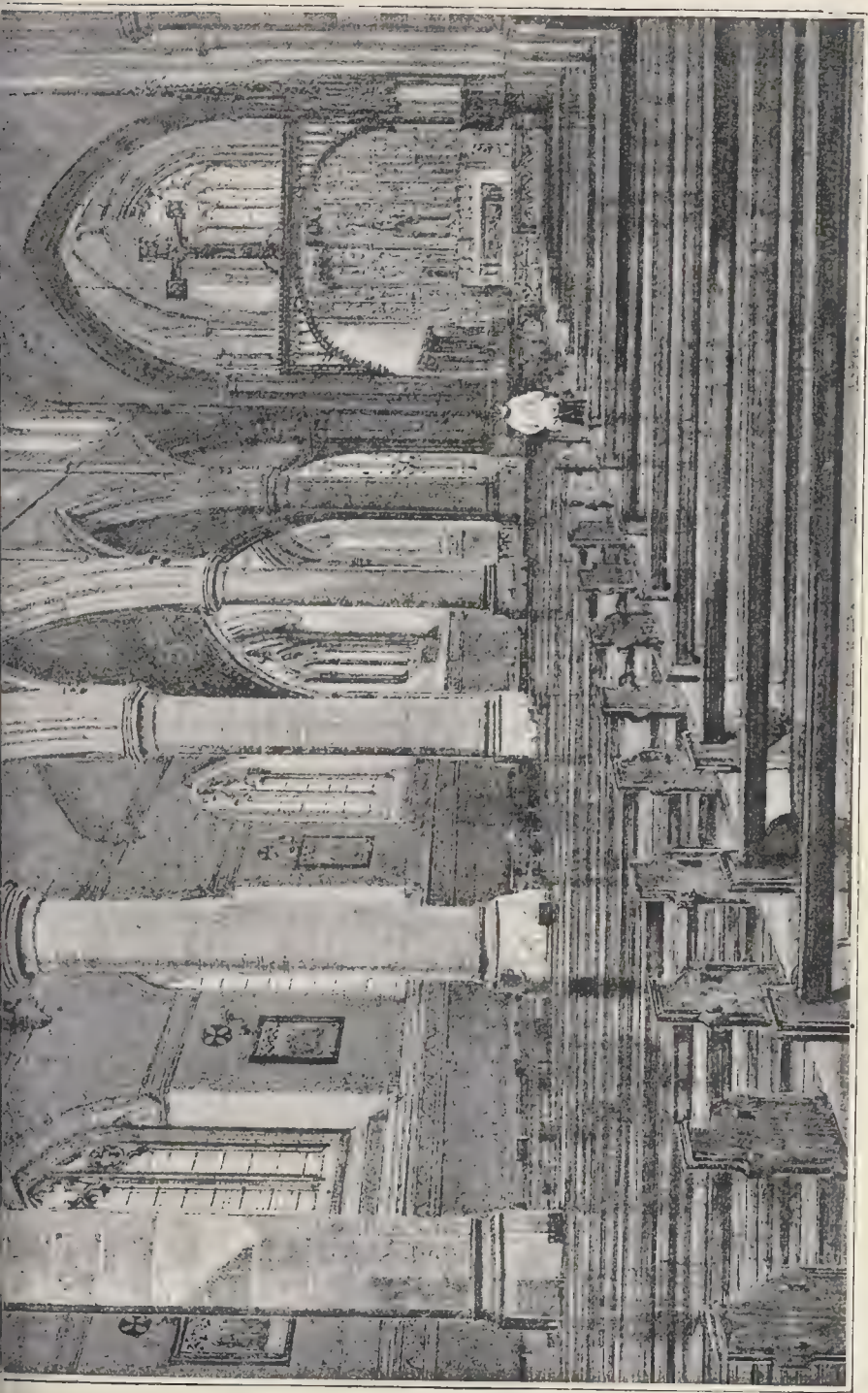






THE BUILDER, MARCH 27, 1385.

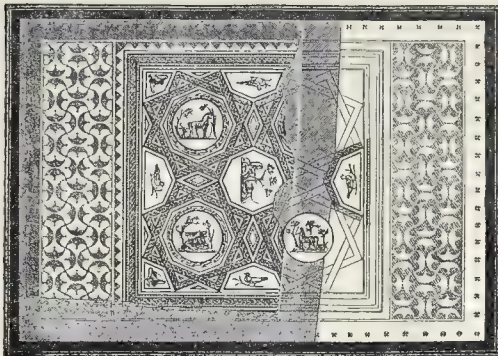




ST. JAMES'S R.C. CHURCH, MARSH LANE, LIVERPOOL.—MESSRS. HADFIELD & SON, ARCHITECTS.







Roman Mosaic at Berlin.

## A ROMAN MOSAIC PAVEMENT AT BERLIN.

The circumstances under which the mosaic re illustrated found its way to Berlin are somewhat singular. It was discovered in 1810, the pulling down of a fifteenth-century dwelling-house in Trèves, about 7 ft. below the level of the street. The Prefect of the town rewarded an announcement of the discovery in Paris, but no notice being taken, the owner of the house was allowed to do as he pleased with it. He built a wall across it, as shown in the illustration. The right-hand and smaller half of the mosaic was taken up, and the larger part of it was placed in the Trèves museum, where the two picture panels (on the right over which the wall was built) are still to be seen, although the remaining fragments have gradually crumbled away, or, as it is related, found their way into the pockets of artists. The left-hand and larger half was covered up again, and not re-opened until 1864, when the house was bought from the son of the mosaic owner. It was then thrown open to the public, and finally offered for sale. It was bought by a firm of Berlin architects (Messrs. Ne & Stegmüller), and placed *pro tem.* in the Royal National Gallery; it still remains the private property of the architects above named.

The pavement is believed to date from the end of the century of our era, and, judging from the character discovered upon some of the detached tesserae, it is conjectured to have been the work of Greek artificers. A wide band of light as upon a dark ground forms the outer border of the pavement, which measures about 18 ft. 15 in. 6 in. The inner space is divided into a long oblong side panels and a square centre, the inner covered with an ornamental design of a frequent in Roman work; the latter surrounded by a second and richer border, and containing four eight-pointed stars formed by interlacing lines, in and between which are inserted figure designs, animals, with a background of landscape, birds, or vases. The execution of these designs is remarkably correct and forcible, and the colouring rich and harmonious.

The ground is composed of a yellowish limestone, except in the outer border, in the side panels, and in the border of the centre, where it is of dark blue-grey marble. The mosaic of different varieties give the more brilliant colours of the interlacing lines (yellow red), and of the pictorial compositions, which contain a good deal of bright green blue.

The mosaic, that is, the portion of it which escaped destruction, is in a state of excellent preservation, although, when discovered, it had sunk considerably from its original position (probably owing to the falling-in of a hypocaust below it), and was broken in several places.

**Portsea.**—The Church of Holy Trinity, Portsmouth, has just received a Munich stained-glass window representing the Adoration of the Kings. The window is by Messrs. Mayer & Co., Munich and London.

## STONE-SAWING AND MOSAIC MANUFACTURE.

An action at law involving some interesting and important points respecting the sawing of stone and the manufacture of mosaics has recently been determined, after a long and almost tedious hearing, by Mr. Justice Grantham, sitting without a jury in the Court of Queen's Bench. For the first time, we believe, an attempt has been made to apply machinery to the purpose of producing the tesserae for mosaic decorations, and, as it happens, the prompt first consequence has been litigation of a costly and protracted nature. The suit was initiated by Messrs. Hall & Co., of the Burley Engine Works, near Leeds, to recover something between 800*l.* and 900*l.* from Messrs. Burke & Co., of Newman-street, London, Paris, and elsewhere, for certain stone-working machinery supplied to the order of Mr. Burke. And in response, Messrs. Burke & Co. preferred a claim of over 4,000*l.* against the plaintiffs for breach of contract and consequent loss. The defendant, for the manufacture of mosaics, forms an amalgam of the waste pieces of marble and plaster of Paris. The admixture, becoming a solid block, is sawn into slices by horizontal saws. It is then further split into fingers or strips, and is finally cut into squares or tesserae, the plaster of Paris in the end separating from the marble. By this process the materials for mosaics are obtained with greater ease and speed than has been possible under the old methods, and at the same time a great saving is effected by the consumption of scraps and bits of stone which otherwise might be simply waste. According to the story disclosed in court, Mr. Burke visited the plaintiffs' works at Burley, and ordered certain horizontal saws, working on the pendulum principle, his reason for choosing that principle being that he required to place several machines within a small space. The plaintiffs had not a machine of this kind in stock, and in fact had not made any of that kind, but the defendant supplied drawings, showing the arrangement he desired, and from those designs the plaintiffs constructed the machinery which subsequently formed the ground of action. On being put to test after erection, the machines failed, the pendulum, saw-frame, and intermediate gearing being broken. Thereupon Mr. Burke refused to accept and pay for the machinery, his contention being that it was improperly constructed, the worm-gearing for working the sand-box being wrongly set out, and the pendulum, cross-heads, and saw-frame being made of cast-iron instead of wrought-iron. In the meantime he had discovered some Belgian machines which he considered better for his purpose; and this strengthened his objection to keep Messrs. Hall's machines. The trial occupied eleven sittings of the court; and a large number of witnesses were examined on each side. Among the exhibits were some mosaics about 2,000 years old, produced for comparison with those of modern machine-made specimens. Mr. Forbes, Q.C., and Mr. Edge were the plaintiffs' counsel, Mr. Lockwood, Q.C., and Mr. Hildbury representing the defendant. Although a great deal of evidence was given upon the merits of the machines, the real issue

eventually turned upon the question whether, as Mr. Burke had supplied the plaintiffs with drawings from which to work out his idea, the latter were simply acting as his servants for the time being, and were, therefore, not liable for the failure of the machinery. On the merits of the machinery the consideration arose whether a machine supplied for sawing stone (as these were) could be expected to be capable of cutting marble and granite; and upon this point Mr. Powis Bale, Mr. Turner (of Rodley, near Leeds), Mr. Roberts (of Bradford), and other experts, maintained that machines for sawing such hard substances as marble and granite must be made specially strong, and were distinct from frames required to saw building stone. Another point advanced by the plaintiffs was that the very limited space allowed for the machinery told seriously against its chance of efficient working; and Mr. Powis Bale, the chief witness for Hall & Co., held that for this mosaic marble-cutting process the crank principle, and not the pendulum principle, ought to have been adopted. The machinery was, however, made upon the defendant's own instructions, and in the end the Judge decided that by supplying the drawings Mr. Burke had relieved the plaintiffs from liability, and must take the consequences himself. He further took the view that by confining the plaintiffs to a too-restricted space the defendant had necessitated such a cramping of details as to increase the danger of breakage; and that Mr. Burke had, against the advice of the plaintiffs, adopted the wrong principle, this being shown by his having subsequently bought Belgian machines, working on the crank principle. Judgment was therefore given for Hall & Co., both on the counter-claim and on the original claim, with costs; although some slight reduction was made in the items, and the plaintiffs were ordered to remove a rubbing-bed found to be out of truth in one of the machines set up in London. In preparation for the action, several professional gentlemen on both sides visited Paris to witness trials of the machinery in question set up in that city.

## PLUMBERS' WORK.

SIR,—“A Practical Plumber” asserts (p. 390, ante) that plumbing generally costs more than it ought to do, and proposes as a remedy that the responsibility for the plumbers' work should be taken away from the general foreman. I mentioned in your issue for March 18th (p. 424) that although his assertion is correct, the remedy lies in a direction contrary to that which he indicates.

I say, without fear of contradiction, that upon a building there is no man whose presence is a more unmitigated nuisance than the man who is not under the direction and control of the general foreman. He requires more attendance, more “making-good” after, does more damage to other work, and causes more accidents, than all the other trades put together.

My contention is, that if the plumbers' work is to be brought out at a reasonable prime cost, the general foreman must have absolute control over every plumber employed, and that the detail of the work should be settled upon, and the specification placed in his hands, at a much earlier stage of the work than is now generally the case.

It frequently occurs that when a building is about to be erected, a lump sum of money is provided in the quantities for the plumbing, or at least for the internal plumbing, and there the matter rests until the roof is on. Much money is then wasted, and the cost of the plumbers' work materially increased, by having, in order to get courses for the pipes, to cut chases and holes which might easily have been left in the brickwork as the job was carried up, by altering joists and trimmers to get traps and fittings in position, and in doing other work at a heavy cost, which would have been done for comparatively little had it been taken in hand as the work progressed.

As these operations rarely tend to increase the stability, or diminish the cost, of the structure, this course of procedure constitutes, within my experience, a very serious evil; and I would therefore suggest that, when a job is about to be carried out, before a single brick is laid, the whole scheme and arrangement of the plumbing should be thoroughly considered and definitely decided upon, and a clear specification drawn up. A duplicate set of plans and sections should be obtained, and the courses of the pipes and positions of the fittings carefully drawn upon them. Thus fortified, the general foreman would be enabled to arrange for the due execution of the work in a proper and straight forward manner, the cost would be the lowest possible, and the work would probably be carried on even to the satisfaction of “A Practical Plumber.”

G. W.



## SEWER VENTILATION.

SIR,—The question put by you on p. 458 of your last issue,—"Where are the pipes to go, so as not to be either an eyesore or obstruction, or a concentrated danger to individual houses?"—is most legitimate. As to the eyesore objection, the plumber and architect should be able to settle that between them. If round pipes be objected to, use strong square ones. This objection has been overcome in other cases, and can be again. As to concentrated danger to individual houses, a good deal of that is imaginary if the outlet is placed high and above the chimneys. If the law were once passed that it must be done, it could be done, and people would get used to seeing sewer blow-offs just as they are with smoke blow-offs. W. P. BUCHAN.

## AN APPEAL.

SIR,—May I ask the favour of space in your columns to appeal to the building trade on behalf of one who has been and is amongst its most respected members?

He was the founder of one charitable institution connected with the trade, and a liberal supporter of all the others.

He is the son of a late well-known builder, and for many years has filled responsible positions in several large firms. In 1869 he started in business for himself, but, unfortunately, in 1879 became involved in a law-suit, and although only a small amount was in dispute, it lasted five years, and eventually resulted in the loss of his all for costs.

It is proposed to raise a fund for the benefit of those depending on him for support. His age (under sixty) precludes him from seeking the aid of those institutions with which he has had so much to do, even if he could bring himself to such a step. The case is well known to Mr. Alfred Mansfield, of South-street, Grosvenor-square, and to Mr. Grover, of Wilton-square, Islington. N. As to what form the assistance shall take depends mainly on the amount received. I shall be glad to give all information if any of my brother builders will write to me. STANLEY G. BRAD.

President of the Institute of Builders.  
22A, Upper George-street, W.

## A QUESTION OF SLATING.

SIR,—Can any of your numerous readers inform me if it is usual in letting slating of houses by the square, the owner fixing time to point with, and the carting of the slates to the building, and allowing the master slaters or contractors all the advantages in the measurement of slating, for the owner to deduct for skylights and chimney-stacks?

SLATER.

## A TAX ON BEAUTY.

SIR,—Architects and builders and their employes will do well to watch with care the present movement for the readjustment of local taxation. In the debate on Tuesday, Mr. Thorold Rogers seriously proposed a tax on costly houses, not because they let well, but because they do not. The proposition actually is that capital irrevocably spent in high-class workmanship and materials should be permanently taxed, and Mr. Rogers carried his preliminary motion.

The injury that any such practice would inflict on the architectural profession, the destitution it would cause among the employes of builders, and the general folly of the whole idea, are any reasons for asking you to warn your readers. WM. MUIR.

## PROVINCIAL NEWS.

**Chadwell Heath (Essex).**—A new Congregational hall was opened here last week to serve as a chapel and Sunday school. The building has been erected by Mr. Dowling, of Romford, from plans prepared by Mr. E. C. Allam, architect, Romford. The total cost of the building and furniture is between 400l. and 500l.

**Chilworth (Surrey).**—The Chilworth Gunpowder Mills, which are stated to be the oldest gunpowder works in England, having been established in the time of Queen Elizabeth, have just been enlarged and extended under the supervision of Director-General J. N. Heidermann.

**Derby.**—The Spring Exhibition now open in the Derby Corporation Art Gallery is described in the local *Advertiser* as one of the best ever held there. It includes a loan collection of works by well-known masters.

**Grimsbury.**—A committee appointed by the Board of Guardians for the Caistor Union to consider the desirability of building a union workhouse at Grimsby have decided to recommend that the Parliamentary borough of Grimsby should constitute a separate union, with its workhouse at Grimsby.

**Hedon (Yorks).**—The *Hull Times* states that a new race-course, and the necessary buildings in connexion therewith, are being completed at Hedon, under the auspices of the East Riding Club and Race-course Company.

**Hull.**—The work of erecting some new almshouses has been stopped by the Charity Trustees, at the desire of the Town Council, who propose an alternative site.

**Mildenhall (Suffolk).**—It is proposed to build a new public hall here, at a cost of about 700l.

**Newark.**—The chief corner-stone of the Church Mission-room in New Town, Newark, was laid on the 16th inst. The room will seat, when completed, about 800 people. There will also be a schoolroom attached, which will front Newton-street. The cost is to be 620l. Mr. Crossland is the builder, and Mr. Geo. Shepherd is the architect.

**Nottingham.**—The line of the new thoroughfare in Wheeler-gate is now clearly defined. Workmen are busy laying down wood pavement upon a solid bed of concrete at the Hounds-gate end of the new street, and the roadway up towards the Market-place is being rapidly prepared for paving. Already the foundations and basement of extensive premises abutting upon the new street line have been built, but no steps have been taken towards removing the buildings fronting South Parade, which are included in the improvement scheme.

**Preston (Lancashire).**—A new club-house for the Reform Club, Preston, is being erected in Chapel-street. Mr. David Grant, of Preston, is the architect.

**Southampton.**—A new font has just been presented by Mrs. Humphreys, of Southampton, to the church of St. Laurence, in that town, in memory of her daughter Rosalind. The design consists of an angel in a kneeling position, upholding a shell which forms the basin. The font, which has been executed in Sicilian marble, is the work of Mr. W. C. May, the sculptor.

**Speen (Newbury).**—A new parochial room is being built at Speen, at the cost of the Misses Majendie, on a site presented by Sir Richard Sutton. Mr. S. Gambier Parry is the architect.

**Wendesbury.**—The Wendesbury Local Board have made the disagreeable discovery that the cost of the sewerage scheme in which they are embarked will exceed the engineer's estimate by 5,844l., the total cost being now set down at 35,964l. instead of 30,120l., the sum originally computed. Of this increase, however, 3,607l. is entirely due to unexpected requirements of the Local Government Board to meet objections of property-owners to the outfall works being constructed near to their properties, and 606l. 10s. in respect of the diversion of the sewer from ground broken by mining operations to a safer bed, whilst the balance, 1,630l., including commissions, arises from excess of contract price over the engineer's estimate. Thus, provoking as is the increase, the bulk of it arises from no fault of the Board but from the pressure of rate-payers through the Local Government Board, and, if it permanently obviates the anticipated nuisance from the outfall works it will, after all, not be money ill spent. — *Staffordshire Advertiser*.

## CHURCH-BUILDING NEWS.

**Cauldon.**—The parish church of Cauldon, Staffordshire, has just been re-opened, after restoration under the supervision of Mr. J. R. Naylor, architect, Derby. The principal works now carried out include a new south porch of Stanton stone; open benches of red deal, with pitch-pine ends; floor of Minton's encaustic tiles; a new font of Stanton stone; a pulpit, with base, of the same, surmounted by a superstructure of pitch-pine; and a lectern of pitch-pine. The church is warmed with Porritt's heating apparatus. The work has been carried out by Messrs. Knowles & Son, of Brasington, Derbyshire.

**Coleford.**—A new south transept has been added to St. John's Church, Coleford, Gloucestershire, and it was opened on February 25th. Mr. Sydney Gambier Parry, of London, was the architect; and Messrs. Wall & Hook, of Brimscombe, Gloucestershire, the contractors.

**Fareham.**—A new parish church is about to be erected here, from designs by Mr. A. W. Blomfield, M.A.

**Farnborough, Kent.**—The chancel of Farnborough Church, which has been in a dangerous state for some years on account of the nature

of the site, has been rebuilt, with additions by the diocesan architect, Mr. J. Clarke, F.S.A., and was re-opened on the 26th ultimo. An organ chamber has been added. The lines of the old chancel have been followed, and the details preserved. Mr. E. Vaughan, of Maidstone, was the contractor.

**Little Wigborough, Essex.**—The church of St. Nicholas, Little Wigborough, is one of the churches destroyed, or nearly so, by the earthquake which occurred on the 22nd April, 1884. The whole of the church was shattered, and has to be nearly rebuilt, including the tower. Such parts of the old walls as could be preserved have been restored with the windows and old details. New open seats have been added instead of the former square pews, the chancel floor laid with ancient encaustic tiles by Messrs. Godwin, and proper choir seats introduced. The plans were prepared by Mr. Joseph Clarke, F.S.A., diocesan architect, and the work well carried out under his superintendence by Mr. George Dobson, of Colchester. The church was re-opened on the 4th inst.

**Oldbury-on-Severn.**—The parish church of Oldbury-on-Severn has been re-opened, after restoration, under the superintendence of Mr. F. S. Waller, architect, Gloucester. Mr. Gyde, of Brimscombe, was the contractor, and the total cost of the works has been 1,600l. The church has been new-roofed, an entire new floor has been laid, and the old-fashioned high pews have been removed, open seats of pitch-pine being substituted. The two arcades were found to be in a very defective condition, and the freestone of which they consisted was covered to the thickness of 1 in. with whitewash. The font has been removed, and an old one which formerly belonged to the church has taken its place. A reredos, provided at the expense of Dr. Bourne, of Salisbury, has been placed in the chancel. It consists of three panels, the one at each end representing the Alpha and Omega, the centre one containing a floriated cross, the whole being from the designs of the architect. The old pulpit has been removed, and one of similar design to the Perpendicular portions of the church substituted. This, as well as the reredos, is composed of Painswick stone, with panels of alabaster. The whole of the carving has been executed by Mr. Henry Frith, of Gloucester.

**Taunton.**—There have been some material additions made to St. James's Church, Taunton, under the direction of Mr. E. B. Ferrey, architect, and on the 17th inst. Mr. Henry Davis, builder, of Billefield, Taunton, presented to the church a handsome altar, substantially made of oak, from designs by Mr. Ferrey. The front of the altar is composed of five bays. In the centre bay, against a carved and gilded diapered background, stands a plain oak cross.

**Thirsk.**—The parish church was restored internally a few years ago, from the designs of the late Mr. Street, R.A., but from want of funds the work was stopped before the west south porch, and the external stone work generally, were in any way repaired. An effort is now being made to raise funds for the restoration of the porch, which is of considerable size, and has over it a parvise or upper chamber to which access is only gained with much difficulty by a small doorway high up in the wall of the south aisle. The work now proposed embraces a new staircase to the parvise, a suitable oak ceiling to the porch, re-leading and repairing the old oak roof, the removal of whitewash and general repairs to the stonework, and fitting the parvise as a clergy vestry, the church being at present without one. Plans for these works have been prepared by Mr. C. Hodgson Fowler, F.S.A., of Durham.

## DISSENTING CHURCH-BUILDING NEWS.

**Birkdale.**—The memorial stones of a new extension to Brighton-road Wesleyan Chapel, Birkdale, Southport, have been laid. The extension consists of four vestries and an infants' room fitted with a gallery, the whole being separated from each other and from the main building by movable partitions. The total outlay in connexion with the addition is estimated at 650l. Mr. H. E. Peach is the architect, and Messrs. Sargison & Anderson, of Birkdale, the contractors.

**Bolington.**—A new Wesleyan Chapel has been opened at Bolington, near Macclesfield. It will seat 700 persons, and is Early Gothic style. The total cost has been about 5,000l.



d the contract has been carried out by Messrs. H. & Bradburn, of Macclesfield, the architects being Messrs. Waddington & Son, of Manchester and Burnley. The plumbing work has been done by Mr. Westwood, of Macclesfield; and the hot-water apparatus was fixed by Mr. Harlow.

**Liverpool.**—The memorial stones of a Wesleyan Chapel have just been laid in West Derby, Tuebrook, Liverpool. The style of architecture will be Early English Gothic. The building will be faced with Yorkshire pitched parapets and Stourton stone dressings. Accommodation will be provided for 766 worshippers. The plans have been prepared by Messrs. Samuel Hurst & G. E. Bolshaw, architects, Southport, and the works are being carried out under their supervision. The sole contractor is Mr. Edward Burns, joiner and glazier, Danby-street, Liverpool.

**Wirksworth.**—A new Baptist Chapel here has been opened for service. It is capable of seating 300 adults, and has in addition a good school-room and five class-rooms. The cost, including purchase of site, heating apparatus, erection of organ, is estimated at £2,700. J. Wallis Clapman, of London, is the architect, and Messrs. J. Walker & Sons, of Wirksworth, were the contractors; Mr. Axe, of Leamington, supplying the woodwork; Mr. Parker, of Cromford, the gasfitting, plumbing work, and heating apparatus; and Mr. Haslam, of Derby, the ironwork.

## The Student's Column.

### OUR BUILDING STONES.—III.

ANY of the most important building stones consist chiefly of carbonate of lime and carbonate of magnesia in equal proportions. Such a stone is usually injured by the sulphuric acid in rain air. If the stone be crystalline it is usually good and durable; if, on the contrary, it should be amorphous,—that is, having determinate form,—it very readily decays, even the crystalline form is more or less attacked in a large city. We may here remark, that the action of acids in their combined state is very much less than when they are free. It is especially the case with sulphuric acid. Whether the stone is crystalline or the action of this acid, in a large city, turning either as free sulphuric acid or as carbonate of ammonia, is just the same, on the carbonate of magnesia. The sulphuric acid attacks the carbonic acid, and forms with the magnesia, a sulphate which is soluble in water, and results in the decay of the stone.

The mortar of walls may often be observed slowly swelling out and dropping off, owing to the conversion of the lime contained in it into sulphate by the action of sulphuric acid in the air.

It has lately been proved that in the atmosphere of a large town, with abundant coal-smoke, and rain, inscriptions on marble become white in half a century. It will be obvious, however, that much depends on the kind of stone.

Decays of lime, potash, and soda are also indicated by the impurities of rain-water. Mosses, lichens, &c., by keeping the surfaces always moist, provide means for the continuous action of water. Moreover, when these decay they supply organic acids, which play an important part in the decomposition of rocks.† There can be no doubt that a great deal of the decomposition of rocks, which has been attributed to the action of carbonic acids, is due in the first place to the action of organic acids, but that these organic compounds of such an unstable character eventually pass into carbonic acid, and thus their initial action is lost sight of. Their action as destroyers of building stone would not be very great in a town where the lichens did not grow, but in the country are often covered by

the power of these acids when they are in contact, from a chemical point of view, is very great. They even dissolve silica.

The prominence of oxygen in rain water, and its readiness to unite with any substance that

Dr. Angus Smith's "Air and Rain" (1872), p. 444, etc., "Proc. Roy. Soc. Edin." (1879-80), p. 518. Also A. A. Julien, "Amer. Assoc.," 1879, p. 2.

can contain more of it, causes oxidation to be a conspicuous feature in the decay of building stones. Thus, any stone containing an appreciable quantity of ferrous or manganous oxides will rapidly become discoloured.

The white spots and veinings found amongst red sandstones detract much from their value when appearances are considered. The red colour of the stone is due to the presence of ferric oxide, which, reduced by decaying organic matter (derived from the soil and atmosphere by rain) to ferrous oxide, is usually removed in solution as an organic salt or carbonate. When the deoxidation takes place round a fragment of plant or animal it usually extends as a circular spot; when water containing the organic matter permeates along a joint or other divisional plane, the decoloration follows that line.\*

From what has already been said it is evident that a stone that may be of a durable character in the pure country air may be of no value in a large city. The carbonic, sulphuric, nitric, and hydrochloric acids all conspire to rot the stone. It is, therefore, important for the student to know what to look for to counteract these deleterious agents. This becomes more urgent as our towns are growing into cities, where, for the most part, all our important edifices are erected.

One of the first things, then, is to learn something about the action of climate on stone, or "weathering," as it is called. We have sketched an outline of the more salient features of the action of air and rain on stone, but it is to be hoped that the practice the student must have to properly understand the subject will enable him to fill in this outline and more or less complete it. We have learned that it is an essential point to know the chemical composition of a stone, but we have also mentioned cases where this knowledge has been of little use. We must again urge that too much importance is not to be attached to the chemical composition of a stone, apart from other considerations. For instance, two rocks, which give almost precisely the same chemical composition, in every respect resemble one another in outward appearance, have both been laid properly, and under similar conditions, yet, as a matter of experience, have been found to weather very differently. A chemical analysis gives the aggregate composition of the stone, and we should thus know how much lime, or silica, or magnesia, &c., it contained, but it does not tell us how they are combined in any particular part of the stone, and we know that, as in the case of chalk and statuary marble, where the chemical composition might be identical, their resistance to weathering, respectively, is quite different. It is evident, therefore, that an insight into the structure of stones will place us on a better footing in guiding us as to their selection for building purposes. For this reason we shall appeal to the microscope to aid us.

Attempts have been made to produce artificially the action of rain and air on stone, as well as to estimate its purity. We may as well state at once that it is impossible to imitate in the laboratory the influence of climate in causing stones to decay, with any degree of accuracy. It is true that approximate results may be arrived at, which are exceedingly useful, but the element of time, which in all cases is necessary, cannot be successfully copied with.

Solutions of very weak hydrochloric or sulphuric acid have been made in which pieces of the stone under examination have been placed and left for several days. It is said that the action of these acids on the stone shows roughly whether it is capable of being durable or not in the atmosphere of a large town.

The purity of a limestone may be roughly estimated by chipping a piece off a block, and putting it in weak hydrochloric acid. If much impurity is present, it will be shown by an insoluble residue, which will remain behind. The acid may attack some of the impurities, but the proportion of non-calcareous matter so attacked is usually extremely small.

Mr. C. H. Smith proposed a test in which several damp pieces of the stone might be placed in a glass about one-third full of water. After a lapse of half an hour they should be agitated, and if the water then has a milky appearance, it shows that the stone is not thoroughly crystalline, but contains some earthy matter. If the water is very milky, it shows that the stone is not very durable.

\* Geikie, "Text Book of Geol." (1882), p. 332.

### ABSORPTION OF WATER BY STONE AND ITS DESTRUCTIVE EFFECTS.

The quantity of water a stone is capable of absorbing has material influence in determining its comparative durability.

All stones that have been examined contain interstitial or "quarry" water. It is not in chemical combination with the various minerals which constitute the rock, but is merely retained in their pores. A great deal of this water evaporates when the stone has been subjected to the influence of the atmosphere, and it is for this reason that stones used for building purposes should be well dried or "seasoned" before being made use of. If they be dried artificially it should be done very gradually indeed, for the heat will not penetrate to a sufficient depth to obtain the desired effect if the stone is too quickly heated.

Moreover, the heat when applied rapidly forms a cake or crust on the surface of the stone, which disintegrates when exposed for any length of time to the atmosphere, as will be seen later on. By far the most satisfactory and cheapest method is to let the atmosphere do the work, unaided by artificial heat. It is as well to somewhat protect the stones from the rain by putting them in an open shed.

A peculiarity connected with certain free-working limestones is that they become in some degree harder on their surfaces by exposure to the weather. This is said to arise from a slight decomposition taking place, which will remove most of the softer particles and leave the hardest and most durable to act as a protection to the remainder.\*

We find by experiment, exactly as might be inferred that the more water a stone absorbs the less durable it is; this must, therefore, be borne in mind when dealing with other considerations which affect its durability.

A simple method of finding how much water stones absorb is to dry them thoroughly, and then carefully weigh them with a spring balance. Then immerse the specimens in water for a day, after which they should be taken out and re-weighed. The additional weight shows the amount absorbed. This amount may be increased by exhausting the air from the specimens before immersion.† When water freezes it expands, and in expanding produces a tremendous pressure on the material which contains it. To give examples of this: bomb-shells and cannon filled with water, and hermetically sealed, have been burst in strong frosts, by the expansion of the freezing water within them. In winter weather, as plumbers are well aware of, water-pipes are frequently burst, in a similar manner.

When a stone, therefore, contains much water, the water in freezing forces the particles composing it, asunder. Consequently, when a thaw comes, the particles having lost their original cohesion are easily removed from the stone, which thus rapidly decays. Experiments have shown that the more a rock is weathered the more water it absorbs. So that when a stone has commenced to decay it will increase in a greater proportion as the decay of the stone proceeds.

Many experiments have been made to imitate the action of frost on stone. The following is one which has been much used in this country.

**Brard's Method.**†—The absorbent power of a stone, or the quantity of water absorbed on exposure of the surface to water, may be determined either with or without the use of the air-pump. On this absorption in some stones almost the whole weathering depends, while in the case of others it is but an indifferent guide. In order to determine the real extent of damage resulting from absorption an ingenious method was contrived by a French engineer (M. Brard). The method is based on the idea that the expansion produced during the efflorescent crystallisation of certain soluble salts on the evaporation of water from a saturated solution of such salts absorbed by the stone will resemble in its effects the expansion of the rain-water absorbed when the material is subjected to those changes of temperature, near the freezing point, to which much of the destruction of building material in our climate is generally owing. To determine the durability of a stone, therefore, a block is taken of convenient size (2-in. cubes are the most convenient) and boiled

\* Guide to the Mus. of Prac. Geol. (1877), p. 38.

† See further on this subject, Delessé, "Bull. Soc. Geol. France," 2me sér. xix. (1861-2), p. 65.

† Antied, "Phys. Geog. and Geol." (Orr's Circ. of the Sc.), 1856, pp. 205-8.



for half an hour in a saturated solution of *Glauber's salts* (sulphate of soda), consisting of about a pound of salt to a quart of water. When taken out the block is suspended by a thread over the vessel in which it was boiled, and within twenty-four hours it will be found to be covered with crystals. As soon as this is the case, it is dipped in the same water in which it was boiled, and the dipping must be repeated at intervals as often as the crystals appear during a period of four days. By each dipping the portions of stone forced out by the crystallisation will be left in the liquid; and at the conclusion of the experiment all the fragments of stone at the bottom of the water are collected and carefully weighed. It is considered that in the time mentioned (four days) the stone will have been so much disintegrated at and near the surface, by the forcing out and washing away of particles in consequence of the successive crystallisation of the salt, as to enable us to form an idea as to its relative durability. In the case of some limestones the quantity of stone lost may amount to as much as 20 grains, the original 2-inch cube in its dry state having weighed from 10 oz. to 12 oz. In other limestones the loss has not amounted to more than a tenth of a grain. The latter would be estimated to be ten times as durable as the former. In sandstones there is occasionally no result, and probably no very great dependence can be placed on the method, except in calcareous rocks, or at least in those which owe their compactness to a calcareous cement.

The late Mr. C. H. Smith showed that this process differs somewhat from the action of frost, because the crystallisation of Glauber's salt is unaccompanied by expansion, such as is produced by the freezing of water.

Another process of testing the action of frost is to freeze the specimens after moistening them with distilled water. This mode of experimenting is said to have the advantage over other processes in producing both the chemical and mechanical actions on the stone which naturally result from atmospheric humidity and a freezing temperature.\*

Each cube subjected to freezing should be carefully weighed and enclosed in a thin metallic box, furnished with a suitable covering, and the whole series of boxes containing the specimens placed within a larger vessel of thin metal, which is surrounded by a freezing mixture. Care must, of course, be taken that all the particles detached from each cube by the freezing should remain in its own box. After about thirty repetitions of the freezing process, the specimens should be re-weighed to see how much they have suffered from the treatment.

### Books.

*Laxton's Builders' Price Book for 1886.* Originally compiled by WILLIAM LAXTON Sixty-ninth Edition. London: Kelly & Co., and Simpkin, Marshall, & Co. 1886.

**T**HIS work adds to its bulk every year, and the present edition has many additions to its predecessors. Many of the faults we found in the last edition remain unrectified; much of the excavator's work is low in price, and much of the bricklayer's high.

There is an item on page 22 of brickwork in half place and half stocks, and another of one-third place and two-thirds stocks; surely this word "place" is an error, and should be "grissels"; place bricks are not allowed to be used according to one of the clauses of the most recent of the Metropolitan Buildings Acts; they are miserably soft bricks, and certainly under no circumstances should be mixed with stocks, while grissels are reasonably well-burned.

Most of the prices remain unaltered from last year's edition; the day-work labour is low, as low as some of the prices are high. Wilkinson's pavings are varied in price, see page 69.

The later editions of this Price Book give many very useful memoranda for each trade, many explanatory notes, and much useful information, as to the methods of making cements, measuring work, &c., that former editions did not give; and each year adds to these notes, certainly the most complete and most useful ever given in any book of the kind.

\* Dubou, "Règles de Maçonnerie et Stonecutting," 1873, Appendix, p. 131.

In the Plasterer, page 79, the "labour only" (added in this edition) and the labour and materials, are set side by side; the price set down for ganging is high, while many of the prices for labour only are low for good work, this addition, though of prices for labour only, is a welcome one; but it should be stated, we think, to whom this list of "labour only" applies: are they the prices the builder should pay his workmen, or do they bear profits for the builder to receive?

In the Carpenter, page 103, fir timber, no labour, is given at 2s. 6d. per foot cube, while the next item of lintels, wood bricks, plates, and sleepers, is given at 2s. 8d., i.e., 2d. per foot cube for labour, cutting to sizes, and fixing (worth at least 4d., including profit), and the fir framed in floors is priced at a further increase of 2d. per foot cube, worth at least 3d. to 4d. as a low price. The roofs and partitions should not be classed together, the roofs are worth 2d. more than floors, and the partitions 2d. more than these; workmen will ask 10d. per foot cube for frame partitions, and then there is sawing waste, nails, and profit to add. Turning back to page 91 we find the prices given there for carressing (i.e., for labour only in it) are 26s. to 36s. per load of 50 ft., this is 4d. to 8d. per foot cube, — not enough.

The notes on sanitary work and drainage are very full and explicit, and have several new traps, interceptors, &c., added, notably the "Kenon" and Bamber's Covers, for inspection shafts; and again, "ventilation" has its share of attention, and a very complete list of ventilators of almost every kind.

In the Painter, special paints are treated by a list of prices given for extra colours, the prices of the ordinary being set down at the same as common colours.

The book, however, in spite of some deficiencies, is a very full and useful one, and has evidently had a vast amount of labour spent on it to make it what it must be admitted to be, the best of its kind.

*Precautions to be adopted on Introducing the Electric Light.* By KILLINGWORTH HEDGES. London and New York: E. & F. S. P. Non.

THERE appears to be strong grounds for the opinion that electric lighting is on the eve of considerable development in this country, as Mr. Mundella has stated his conviction that material modifications will have to be made in the Electric Lighting Act, 1882, which, though framed with the best intentions, has well-nigh strangled a new industry at its birth. If this development should take place on any large scale there is a risk that the work of carrying out installations may occasionally be placed in inexperienced hands, and the author of this little treatise has done well in republishing, with additions, the article which appeared in this journal six months ago (October 24, 1885, p. 569). Mr. Hedges points out clearly the risks that are inseparable from slovenly work and incompetent handling, and gives clear directions for carrying the main and branch conductors and the lamp wires, and for calculating the sizes of the various leads according to the number of lights to be worked. He insists very properly that some regular system should be followed, so that it should always be known which is the positive and which the negative wire, — in other words, which wire leads from the machine to the lamps, and which is the return. In addition, however, to showing this by mere position, i.e., by placing the positive wire on the left side of the negative if vertical, and under it if horizontal, we should strongly recommend that the insulating covering should be of different colours on the two wires, and thus any accidental displacement would not be of consequence. The author devotes considerable space to the subject of fusible cut-outs, an excellent form of which he has invented; but we rather doubt whether they would be quite so useful as he imagines in saving lamps, for, if too sensitive (that is, if fusible by a current slightly in excess of the normal current which the lamp is made for), the probability is that after a short time the cut-outs would fuse with less current, and the lamps would be unnecessarily extinguished. As to the main cut-outs, we quite agree with the author that 40 per cent. extra current is not too low a margin to provide for. Practical rules and instructions are given for working the dynamos, laying the wires, fixing the lamps, &c.; also the Phoenix Fire

Office Rules and the American Insurance Regulations, all of which are good and deserve careful attention. We cannot, however, congratulate Mr. Hedges on his clearness in some of the calculations which he gives. For instance, we are told, in connexion with the use of turbines for providing the motive-power for dynamos, that "from the following table the H.P. speed and quantity of water used by turbines working under various heads can be calculated." The table consists of columns of figures, of which the following is a specimen:—

Diam.	H.P.	Speed.	Gallons.
6	·0205	222	·85

and we think this about as perplexing a collection of figures as we ever saw, the fact being that these figures are simply constants by the use of which the desired information as to speed, &c., can be obtained by elaborate calculations. It is unfortunate that the proof sheets have not been more carefully revised, as there are a number of errors which might easily have been avoided. Where has the author ever seen a gas-burner that uses 500 cubic feet per hour?

*Wages and Earnings of the Working Classes.* Report to Sir Arthur Bass, M.P., by LEONIE LEVI, F.S.S., F.S.A. London: John Murray, 1885.

THIS book of 150 pages is so full of statistics that at first a person may be repelled from taking it up. But, in truth, statistics are often more eloquent and striking than many words, and the surest way to obtain a clear insight into the condition of our working classes is to peruse leisurely from time to time a few pages of this book. Any person of ordinary intelligence can then form his own conclusions. It is impossible to notice this book as if it were an ordinary piece of writing; it is only possible to extract some conclusions, and to recommend our readers to study it carefully. *Prima facie*, there can be no doubt that the working-classes are better off than they were twenty years ago: this is evident from the fact that they "are in receipt of 30 per cent. more in 1884 than they were receiving in 1857, or, in other words, that if the total weekly receipts of a family from all sources in 1857 amounted to 24s., now they reach at least 32s. a week." In addition, we have to bear in mind that every article of consumption except meat is now cheaper, and, indeed, when the statistics of this year come to be taken, it is not unlikely that meat will be found to have dropped considerably in price. Against an increase in wages, and a decrease in the price of necessities may be set an increased cost of locomotion and rent in our large towns, but not sufficient to counterbalance the advantages from wages or prices. It should be observed, however, that we have no statistics for the year 1885, and, therefore, it does not follow that Professor Levi's results are applicable to this present time. On the other hand, some fall in the rate of wages has certainly not brought them to anything like their former level, and it seems probable that had wages and prices been now as they were in 1857 the present distress would have been far more widespread and formidable than it is. Taking, for example, bricklayers' wages in Manchester, we find that in 1850 they were 26s. a week; in 1860, 30s.; in 1870, 32s.; in 1877, 43s. 1½d.; in 1883, 38s. 7d. These figures show that, even allowing for a drop at the present time, bricklayers in Manchester, at least, are better off now than they were in 1870, though not so flourishing as in 1877.

*François Boucher.* Par ANDRÉ MICHEL. Paris: J. Rouam. 1886.

THIS is one of a series of small books on "artistes célèbres," and forms a very good and interesting monograph on the gay, facile, and licentious painter who expressed so truly in his art the spirit of that thoughtless and corrupt French society which laughed and intrigued almost on the very verge of the Revolution. It is prefaced by a brief memoir and portrait, illustrated by more than forty engravings giving many of the most characteristic and graceful of Boucher's designs, keeping clear of the class of work in which he pandered to the taste for the indecent which he painted. The artist's history of the time, for whom he painted, is given in considerable detail, and the critical remarks on his work are marked by excellent judgment and impartiality, doing justice to Boucher's real powers without condoning his faults, artistic and moral.



RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

8,251, Cupboard Turn. W. and W. G. Lovie.

The spindle is square in section, and has a screw-cut on it. A nut is first screwed on, then the plug, which is formed with a square shoulder, is used on, and, finally, a lock-nut is screwed on.

15,805, Ventilators. G. S. Buchanan.

A series of cylindrical or slightly conical concentric tubes, with expanded mouths, are arranged above a gas pendant. The outer tubes being of a certain length, and the whole terminating in a conical opening, communicating with the exhaust. A spirally-coiled sheet of metal may be used place of the concentric tubes if desired.

15,857, Surfacing Compound. A. Hoxter (avaria).

A planed or planished surface of wood, metal, or other material is coated with a composition of boiled linseed oil, a sicative, and oil of turpentine. After drying, the surface is gone over with a filling material, varnish, &c. The surface may be polished or it has hardened.

16,023, Sanitary Trap. T. Durran.

A dip-tube is screwed into the body of the trap, the joint being made air-tight by the seating of an angled flange on the top of the tube. The pipe is fixed internally in the form of a spiral to give the waste water a rotary motion for the purpose of making the trap self-cleansing. The outlet has a ledge-piece, upon which a check valve is seated to prevent the back-flow of sewer-gas.

6,792, Slatting Roofs. G. Ross.

The slates are laid as in open bond slating, but with all slates interlocking into the spaces occurring in a bond under the points of the larger slates. The nails by which the slates are fixed may be made to pass through a notch in the heads of one in the course below, and thus prevent the slates from shifting sideways. The alternate courses, according to another method, be laid as in close bond, and the remaining courses in an open bond, with the slates filling the open spaces. These smaller slates may be of different colour or variously shaped, and are thus utilised for the purpose of ornamentation.

6,821, Sash-bar Cramp. Herbert & Colley.

A screw working in a hole through one end of an angled or other shaped frame operates a sliding sash-piece, which is guided by the sides of the frame.

NEW APPLICATIONS FOR PATENTS.

March 12.—3,480, G. Newman, Pneumatic Doorings and Checks.—3,492, F. Moore and W. D. House, Backs for Grates, Stoves, &c.—3,520, Higgin, Locks and Latches.—3,521, W. Allcock, Cakes and Confectioners' Ovens.

March 13.—3,544, J. and J. Mason, Hanging Window-cases, &c.—3,547, G. Brodie and J. Prior, Grates.—3,549, S. Warburton, Chisels for forming Dovetail Grooves and Pins.—3,550, J. O. Gullies and Drain Traps.—3,559, J. Dyson, Boards or Bricks for Preventing Damp Walls.

March 15.—3,613, H. Hawkins, Sash-fasteners.—3,614, W. Berridge, Water-closets, Urinals, &c.—3,615, E. Walford, Slide Rails.—3,645, O. Lindner, Construction of Wood, Paper, &c. 3,658, F. Aspinall, Locking and Unlocking a series of Doors.

March 16.—3,665, H. Allison, Floor and Wall-papering.—3,668, J. Walker, Locks.—3,694, H. Hall, Window-fastening.—3,698, R. Porteus, Portable School Desk.—3,704, T. Brass, Self-igniting Burner.—3,711, W. Bain, Standards for incandescent Bar-fencing.—3,712, D. Sutherland and McIntosh, Bakers' Ovens.

March 17.—3,757, L. Baum, Bending Ebony.—3,758, J. Wheeler, Warming and Ventilating Rooms.—3,762, C. Peach, Screw-making Machinery.—3,763, R. Sharlow, Venetian Blind.—3,783, J. N. and E. Adams, Pipe Joint.

March 18.—3,806, R. Robson, Boilers for generating steam.—3,832, W. Constable, Artificially-made.—3,834, A. Salmon, Air-heating Grates.—3,835, J. Monier, Composite Iron and Steel Pipes, Tanks, &c.—3,866, J. Blazek, School tables or Tables.

PROVISIONAL SPECIFICATIONS ACCEPTED.

44, G. Smart, Building Blocks, Tiles, Slabs, &c.—3,807, R. Essery, Indicating the Names of Streets and Houses.—1,744, T. Harcourt, Floors and parts of Floors in Bridges and Buildings.—3,808, W. Howie and R. Henderson, Windows.—3,809, J. & J. Mason, Frames for Window Sashes.—2,141, L. Baudouin, Bakers' Ovens.—2,399, H. J. Concrete-mixing Apparatus.—2,458, J. H. Holst, Slide Rails.—2,499, W. Howie and R. Henderson, Window Frames and Sashes.—2,500, C. Kinnell, G. Rothnie, Opening Casements, Sashes, or Windows.—15,587, F. Howcroft, Supporting Windows.—1,988, J. Shanks, Connections for Sinks, &c.—2,145, J. Doulton, Urinals for Sinks, &c.—2,397, R. Lacey, Latches.—2,378, R. Lacey, Latches.—2,513, A. Peacock and J. Colley, Metal Floorings for Horizontal Partitions for Buildings, Bridges, &c.—2,551, A. Roberts,

Portable Dust-bins.—2,566, P. Bawden, Brick and Tile Making Machinery.—2,596, J. Williams, Double Argand Shop-window Lamp.—2,701, W. Stanley, Chandeliers and Gas Pendants, &c.—2,850, H. Owen, Chimney or Ventilator Tops.—3,102, T. Weekes, Portland Cement.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to opposition for two months.

4,438, A. Oakden and W. Sharpe, Cooking Ranges.—5,137, R. Roberts, Window Fasteners.—6,112, H. Channellor, Automatic Window Fastener.—6,643, R. Hunter and J. Turnbull, Kitchen Ranges.—7,252, J. Anderson, Cabinet-makers and Automatic Dovetailing Machines.—2,165, W. Telfer and J. Sharrd, Cooking Ranges.—6,244, G. Smart, Tiles, Slabs, Building Blocks, &c.—6,412, H. Whitley, Draught Preventers for Doors, &c.—6,709, J. Gilmore and W. Clark, Pipe Union or Joint.—6,844, F. Bosshard, Metallic Paints.—7,057, W. McGill, Opening, Closing, and Fastening Sliding Windows.—11,228, J. Totton, Treads to Staircases, Passages, &c.—2,251, A. Boulton, Saws.

RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

MARCH 16.

By H. O. MARTIN.  
East Molesey—"Corfe House," freehold, £1,300  
By DEBENHAM, TAYSON, & CO.  
Baywater—38 and 41, Forchester-terrace, 63 years, ground-rent 46s., 6,200  
Ground-rents of 65s. a year, term 52 years 1,050  
Hyde Park-square—No. 10, term 40 years, ground-rent 25s., 3,420  
Baywater—41, Princes-square, 68 years, ground-rent 21s. 1s., 1,840  
Ridge-way—12, Cambridge-street, 36 years, ground-rent 7s., 1,450  
Shepherd's Bush—25, Wood-lane, 88 years, ground-rent 7s. 10s., 440

MARCH 17.

By W. HALL.  
Pinner—"The Freehold Residence 'Springfield'" 750  
West Hampstead—Ground-rents of 30s., reversion in 97 years 705  
Ridge-way—No. 285—A profit rental of 68s., term 6 years and the reversion for 12 years 560  
A profit rental of 30s. a year, term 6 years 100

MARCH 18.

By BRITAIN & SON.  
Hoxton—61, Moneyer-street, 16 years, ground-rent 12s., 250  
By BEAN, BURKETT, & BLINDEN.  
Putney—7, 9, and 11, Cromford-road, 97 years, ground-rent 18s. 10s., 610  
By NAYLOR & H. BURGESS.  
Kenish Town—2, Prince-terrace, 63 years, ground-rent 5s., 315

Lower Kennington-lane—38, 39, and 40, Renfrew-road, 41 years, ground-rent 12s., 1,085  
Vauxhall—12, Durham-street, 14 years, ground-rent 4s., 140  
Upper Holloway—3 and 4, Schofield-road, 76 years, ground-rent 4s., 230  
Stoke Newington—45, Chesholme-road, 58 years, ground-rent 6s., 230  
Camden-road—63, Camden-square, 58 years, ground-rent 10s., 855  
Islington—28, Canonbury Park South, 50 years, ground-rent 8s., 600  
Holloway—15, Jackson-road, 75 years, ground-rent 6s. 6s., 400

By S. R. BENT.

Tottenham Court-road—No. 192, term 10 years, ground-rent 75s., 420  
Camden Town—94 and 95, Camden-square, 64 years, ground-rent 8s., 570  
Harlesden—3, Park-road, 90 years, ground-rent 8s. 6s., 600

By S. R. BENT.

Tottenham Court-road—No. 192, term 10 years, ground-rent 75s., 420  
Camden Town—94 and 95, Camden-square, 64 years, ground-rent 8s., 570  
Harlesden—3, Park-road, 90 years, ground-rent 8s. 6s., 600

By S. R. BENT.

Tottenham Court-road—No. 192, term 10 years, ground-rent 75s., 420  
Camden Town—94 and 95, Camden-square, 64 years, ground-rent 8s., 570  
Harlesden—3, Park-road, 90 years, ground-rent 8s. 6s., 600

By S. R. BENT.

Tottenham Court-road—No. 192, term 10 years, ground-rent 75s., 420  
Camden Town—94 and 95, Camden-square, 64 years, ground-rent 8s., 570  
Harlesden—3, Park-road, 90 years, ground-rent 8s. 6s., 600

By S. R. BENT.

Tottenham Court-road—No. 192, term 10 years, ground-rent 75s., 420  
Camden Town—94 and 95, Camden-square, 64 years, ground-rent 8s., 570  
Harlesden—3, Park-road, 90 years, ground-rent 8s. 6s., 600

By S. R. BENT.

Tottenham Court-road—No. 192, term 10 years, ground-rent 75s., 420  
Camden Town—94 and 95, Camden-square, 64 years, ground-rent 8s., 570  
Harlesden—3, Park-road, 90 years, ground-rent 8s. 6s., 600

By S. R. BENT.

Tottenham Court-road—No. 192, term 10 years, ground-rent 75s., 420  
Camden Town—94 and 95, Camden-square, 64 years, ground-rent 8s., 570  
Harlesden—3, Park-road, 90 years, ground-rent 8s. 6s., 600

By S. R. BENT.

Tottenham Court-road—No. 192, term 10 years, ground-rent 75s., 420  
Camden Town—94 and 95, Camden-square, 64 years, ground-rent 8s., 570  
Harlesden—3, Park-road, 90 years, ground-rent 8s. 6s., 600

By S. R. BENT.

Tottenham Court-road—No. 192, term 10 years, ground-rent 75s., 420  
Camden Town—94 and 95, Camden-square, 64 years, ground-rent 8s., 570  
Harlesden—3, Park-road, 90 years, ground-rent 8s. 6s., 600

THURSDAY, APRIL 1.  
Parker Museum of Hygiene.—Dr. Louis Parker on "London Ventilation, and the Administration of Sanitary Law in the Metropolis." 8 p.m.  
Society of Antiquaries.—8.30 p.m.  
Royal Archaeological Institute.—4 p.m.  
Edinburgh Architectural Association.—Mr. H. M. Wardrop on "Architectural Sculpture." 8.30 p.m.

FRIDAY, APRIL 2.  
Society of Arts (Indian Section).—Mr. James Gibbs, O.B.E., on "The History of Archeology in India." 8 p.m.  
Junior Engineering Society.—Mr. G. F. Harris, F.G.S., on "The Relation of Geology to Engineering." 7.45 p.m.

SATURDAY, APRIL 3.  
Association of Public Sanitary Inspectors.—Dr. Alfred Carpenter on "Sanitary Legislation." 6 p.m.  
Society of Arts (Special Lecture).—Professor George Forbes on "Electricity." 8 p.m.

Miscellaneous.

**The Proposed Bridge at Teddington.**—A Local Government Board Inquiry was opened in the Assembly Rooms, Teddington, on Saturday week last, by Major-General De Courcy, in reference to the application of the Teddington Local Board for sanction to borrow the sum of 1,500l. towards the construction of a foot-bridge across the Thames at Teddington. Mr. Walton, instructed by Mr. Frail, appeared on behalf of the Board; and Mr. Cohen represented a number of ratepayers, who objected to the construction of the foot-bridge. Mr. Walton urged the need for the bridge, which would open up communication between the two sides of the river at that point, and increase the attractiveness of a wide district. The Local Government Board had received memorials from 6,000 inhabitants in favour of the bridge, and many persons had promised to contribute liberally to the cost of it. Some of the materials of the old bridge at Hammer-smith would be utilised in the construction of the proposed bridge. The Thames Conservancy approved of the scheme. The loan was only to defray the cost of the portion of the bridge which would be in the parish of Teddington. The plans had been prepared by Mr. George Pooley, and a contract had been provisionally entered into with Messrs. Dixon to construct the bridge at a cost of 2,000l. Evidence in favour of the proposal having been called, the inquiry was adjourned till Tuesday last, when Mr. Cohen called Mr. Arthur Payne, who gave evidence in opposition to the bridge, which he stated would bring no place but Ham nearer Teddington. He had examined the agreements, and he believed that if the bridge were swept away the Local Board would be liable for all damages. The foundations were to be only 4 ft. below the bed of the river; but he should not like to erect the bridge on the proposed site without a foundation 20 ft. below the bed of the river. He thought there was a risk in having the bridge only 13 ft. high, as proposed; and that a heavily-laden barge coming in contact with the lattice-work of the bridge would damage it considerably. In fact, if the bridge were constructed according to the proposed plans, great risk would be run. It was not a fact that London clay was exceptionally free from any susceptibility to scouring. Old Westminster and Blackfriars Bridges were instances of failure in the construction, owing to scouring. If piles were driven down near the lattice-work it would prevent damage being done by the debris brought down by a flood; it would also withstand the scouring. The inquiry was resumed on a subsequent day, when the evidence in opposition of the scheme was concluded. The report of the Local Government Board on the application for the loan will be issued in due course.

**Bartholdi's Statue of Liberty in America.**—For some time past the enormous pedestal on which M. Bartholdi's statue of "Liberty Enlightening the World" is to be placed has been in process of preparation, and, according to contract, will be completed on the 1st of April. The American Government proposes, however, to defer the official inauguration of the monument until the 3rd of September next, being the anniversary of the day of the signature of the treaty which established the independence of the United States.

**Old Glasgow.**—Messrs. David Bryer & Sons announce the forthcoming publication of a set of sketches of "Quaint Bits still existing in Glasgow," drawn by Mr. David Small, with descriptive letter-press by Mr. A. H. Millar, F.S.A.

MEETINGS.

SATURDAY, MARCH 27.

Architectural Association.—Visit to the Royal Courts of Justice. Members to assemble in the Great Hall at 3 p.m.  
Edinburgh Architectural Association.—Visit to Niddrie Marischall.

MONDAY, MARCH 28.

Royal Institute of British Architects.—Business Meeting, 8 p.m.  
Edinburgh Exchange.—Annual Meeting of Members, 3 p.m.  
Society of Arts (Lecture).—Mr. Boynton Redwood on "Petroleum and its Products." IV. 8 p.m.  
Liverpool Architectural Society.—Mr. R. B. Preston on "The Ancient University and City of St. Andrews." 7 p.m.

TUESDAY, MARCH 30.

Institution of Civil Engineers.—(1) Further discussion on "The Economical Construction and Operation of Railways in newly-developed Countries, or where small returns are expected." (2, time permitting) Dr. Percy F. Frankland on "Water Purification: its Biological and Chemical Basis." 4 p.m.  
Manchester Architectural Association.—Paper by Mr. Talbot. Election of officers. 7.30 p.m.

WEDNESDAY, MARCH 31.

Carpenters' Hall, London Wall.—Mr. James Doulton on "Terra Cotta." 8 p.m.  
Builders' Foremen and Clerks of Works' Institution.—Quarterly Meeting of Directors. 8.30 p.m.



**The Metropolitan Board and the Sewage Question.**—Commenting on the proposals of the Metropolitan Board for dealing with the Metropolitan sewage (for which see last week's *Builder*, pp. 467-8), the *Lancet* says:—"As to the disposal of the effluent we quite agree that it must be disinfected somehow before it goes into the river. At present the sewage must be treated at the existing outfalls, for the danger of the present system is urgent, and some chemical disinfectant must, therefore, be used. Whether permanganic acid is the best we cannot say, possibly it is. But, although it is inapplicable at Barking and Crossness, land irrigation is a better means of purifying sewage-effluent than any chemical disinfection; and, when the sewage goes down to Sea Reach, as we trust it will before many years are past, the final purification will probably be done by the soil, and an almost perfectly pure effluent thrown into the river. The committee, indeed, so enamoured of their permanganate disinfection that they have quite given up the idea of moving from their present outfalls. They say, on the authority of the chemists who advise them, that 'the necessity for land filtration no longer exists, and thus the great objection to the treatment of the sewage and the discharge of the effluent at the present outfalls is overcome.' To this we most strongly demur. We are more than ever convinced that the sewage of all London ought not, even after chemical treatment, to be thrown into the river at Barking and Crossness; and we decline to receive on this point the assurance of certainty from chemists who, three years ago, were equally sure that no important injury was done to the river by the raw sewage. We are sorry that the Board persists in this obstinate resistance to the recommendations of the Royal Commission. They have been forced into their present action, after a hard fight, by the pressure of scientific and public opinion, and now, instead of giving in gracefully and obeying the wish of the nation, they contest every inch of ground in their retreat."

**The Free Lectures to Artisans at Carpenters' Hall.**—We print on another page the conclusion of Mr. John Slater's admirable lecture on concrete, of which we published the first portion last week. On Wednesday evening last the sixth lecture of the course was given, when Mr. H. H. Statham treated of "The Fine Art Aspect of Woodwork." We will give a report of this lecture in our next.

**Buildings in Countries liable to Earthquakes.**—*Nature* gives a brief account of a paper read by Professor Milne at the last meeting of the Seismological Society of Tokio, describing the results obtained from a seismic survey of the ground in the neighbourhood of his house. Some experiments were also made with a view to discover the best method of constructing buildings which would stand earthquake shocks with least damage. The practical conclusion of the investigation was that there were three ways by which residents could escape from very much of the motion which disturbs an ordinary building. These were (1) by a seismic survey they might select a site where there was relatively little motion; (2) they might build up from the bottom of a pit, which might be utilised as a cellar, the walls of the houses not touching the sides of the pit; (3) when obliged to build on soft ground, when a pit could be excavated, a light one-storied building of wood or iron might be rested on a layer of cast-iron shot.

**Art Needlework.**—A paper by Miss Higgin, for long well known in connexion with the Royal School of Art Needlework, on "The Revival of Decorative Needlework," will be a leading feature in the *Art Journal* for April. The paper will be illustrated with designs for embroidery by Walter Crane, Wm. Morris, Geo. Aitchison, A.R.A., Selwyn Image, and Mrs. Wardle, of Leek.

**Petroleum.**—We are asked to mention that the representative collection of specimens and apparatus used in illustrating the Cantor lectures on "Petroleum and its Products," which are now in course of delivery at the Society of Arts, in the Adelphi, by Mr. Boverton Redwood, will remain open to inspection in the Society rooms during the ensuing fortnight. After Monday next the collection will include all the principal forms of oil lamps and stoves for burning this mineral oil. Any person interested in petroleum manufacture can obtain admission by applying to the Secretary of the Society of Arts.

**The New Buildings around Spitalfields Market.**—A large number of new buildings, containing shops, with residences above, are at present in course of erection at Spitalfields Market, which is intended to be entirely surrounded by buildings of this character, erected at the cost of the lessee of the market. The buildings, when completed, will have frontages to Commercial-street, Brushfield-street, and Lamb-street, each about 300 ft. long. The most advanced portions of the buildings are those in progress in Lamb-street. The whole of the property on the west side of that street from Crispin-street to Commercial-street, will be cleared away for the new market buildings. Altogether, when finished, there will be nearly one hundred of these shops and houses, all of which are intended to be occupied for market purposes in connexion of the area of the market proper, which they enclose. The buildings, which throughout will be uniform in their external architectural appearance, contain three stories above the ground-floor, in addition to a basement. The shop portions on the ground-floor are faced with red and blue glazed brick piers, and the upper floors with red brick, the first and second floors containing bay windows. The elevations are surmounted by gables faced with cement, enclosing the attic or dormer floor. There are iron balconies at the foot of the first and second floors. There will be spacious approaches to the interior of the market proper from each of the three street frontages. Mr. Sherrin, of Finsbury-square, is the architect; and Messrs. Harris & Wardrop, of Limehouse, are the contractors. Mr. D. Macdonald is foreman of the works.

**The Teak Forests of Upper Burma.**—An agitation is being stirred up in various quarters against the monopoly which the Bombay-Burma Trading Company is supposed to enjoy in regard to the teak forests in Upper Burma. The Allahabad paper, for instance, has lost no opportunity of raising its voice against the conditions at present governing the exportation of timber from the Upper to the Lower Province, and now we find that the "Moulmein community" is preparing a memorial to the Viceroy urging that forest leases should be cancelled, and that the forests should be worked directly by Government. The attitude of Moulmein is intelligible enough. It is itself the centre of a large teak district, and any narrowing of the limits of competition would, of course, be to its interests. Any restriction of the kind contemplated by the Moulmein community, however, would have the immediate effect of inordinately running up the price of teak, and driving people to employ iron where wood now is used. It has also been a frequent complaint at Moulmein that the Bombay-Burma Trading Company has made it a practice to export under-sized timber. On the contrary, we think it may safely be said that the company has consistently opposed the denudation of the forests. If the company held a short lease, say for four or five years, there might be some inducement to cut down trees indiscriminately; but when the terms of the lease gave it possession for forty or fifty years, it would be a sheer disregard of its best interests to export under-sized timber.—*Bombay Gazette.*

**Clocks.**—A large church clock has just been erected at Tichmarsh, Northants, by Messrs. John Smith & Sons, of Derby. It strikes the hours and chimes the Cambridge quaters. It is fitted with all modern improvements, and the wheels are machine-cut so as to be perfectly accurate and smooth. The same firm have also just completed a large clock at West Bromwich, which strikes the hours, and shows time upon four large dials, which are illuminated at night. Automatic apparatus is provided for turning the gas up and down.

**Works in Dublin.**—The *Freeman's Journal* reports that, in anticipation of the payment of the first instalment of a Government loan of 100,000l., extensive paving works have been commenced in the city. A large water-main is about to be laid along the South Circular-road, with a view to increase the water supply in the south-western districts of the metropolis. The Corporation have just agreed to a contract with Messrs. Hammond for the erection of a block of artisans' dwellings at Barnack-street and Tighe-street, for a sum of 9,000l. It is probable that the City Engineer will shortly set about the completion of the new street from Blackhall-place to Barrack-street.

**Plymouth.**—An addition of great decorative importance has been made to the interior of St. Peter's Church, Plymouth. There are three lancet lights over the sanctuary arch, which, from necessity, were originally filled with plain cathedral glass. These lancet lights have now been filled with very rich glass, almost mosaic in character. The general design has been carefully and thoroughly carried out by the well-known artists in stained glass, Messrs. Clayton & Bell, of Regent-street, London. The central light represents the opening of the Books as described in the Revelations. The highest portion of the window portrays the throned Deity under a rich canopy; in the centre is St. Michael with drawn sword; and angels in kneeling posture, with trumpets, fill up the lower part. In the heads of the side lights are the two supporting angels of Justice, and the remaining portion is occupied by the twelve apostles, each holding an emblem, sitting on thrones as assessors. The windows have been given in memory of the late Mr. Thomas Merrill Vicary, who was the vicar's churchwarden for no less than thirty-six years. The central light was given by Mrs. Vicary, and the two side-lights by numerous friends. The plaster space between the sanctuary arch and the sills of the window seems now to call more loudly for mural decoration, and a design for this has been made by Mr. E. A. Fellowes Pryne, the subject being the Church Triumphant.—The chapel of the Plymouth, Devonport, and Stonehouse Cemetery has just received a three-light Munich stained-glass window representing the Raising of Lazarus. The work has been designed and carried out by Messrs. Mayer & Co., of Munich and London.

**Wellingborough Church Steeple.**—The *Northampton Herald* reports that a few days ago Mr. J. T. Parker, one of the churchwardens of Wellingborough, communicated with the firm of Wright & Parker, of Oldham, who are doing some work near Finedon in connexion with the Glendon Ironworks chimney, and that subsequently one of the men employed by the firm made the ascent to the weather-cock by means of a series of ladders placed on the west side of the steeple. They were expeditiously fixed one above another by means of hooks, blocks, and ropes, the whole process not occupying more than a couple of hours. The man found the top of the southern pinnacle to be loose. The height of the spire is 155 ft., and it is hexagonal in form. In 1844 it was found necessary to take off the top of the spire in consequence of its dilapidated state. It had been braced with iron at some earlier date, but the stone had fallen away and the top became dangerous. The work was entrusted to Mr. John Horberts, of Raunds, who had done similar work at Raunds and other churches, and he took the top of the spire off several yards down, and replaced it with its present top.

**The London Hydraulic Power Company.**—We are informed that Mr. J. Stannah is constructing hydraulic machinery, to be worked by the above power, for Messrs. Grosvenor & Chater, of 68, Cannon-street; Messrs. W. & J. R. Hunter, of 56, Moorgate-street; and Messrs. Crowden & Garrod, of 62, Southwark-street. For lifting purposes the use of the above power is rapidly extending.

#### PRICES CURRENT OF MATERIALS.

TIMBER.		£.	s.	d.	£.	s.	d.
Greenheart, B.G.	ton	6	0	0	10	0	0
Teak, E.I.	load	12	10	0	7	0	0
Sesqui, I.S.	foot cube	0	2	0	0	3	0
Ash, Canada	load	3	0	0	10	0	0
Birch	load	3	0	0	4	10	0
Elm	load	2	10	0	4	10	0
Fir, Dantisc, &c.	load	1	10	0	4	10	0
Oak	load	3	0	0	6	0	0
Canada	load	5	10	0	6	10	0
Pine, Canada red	load	3	0	0	6	0	0
" yellow	load	3	0	0	6	0	0
Larb, Dantisc	fathom	3	10	0	6	0	0
St. Petersburg	load	4	0	0	6	0	0
Waincot, Russia	load	2	10	0	4	10	0
" Odessa, crown	load	3	10	0	3	10	0
Deals, Finland, 2nd and 1st	std. 100	7	10	0	8	10	0
" 4th and 3rd	std. 100	6	0	0	7	10	0
Rica	load	6	0	0	8	0	0
St. Petersburg, 1st yellow	load	9	0	0	14	0	0
" 2nd	load	7	0	0	8	15	0
" white	load	7	0	0	10	0	0
Sweden	load	6	0	0	15	0	0
White Sea	load	7	0	0	17	10	0
Canada, Pine 1st	load	17	0	0	30	0	0
" 2nd	load	12	0	0	17	0	0
" 3rd, &c.	load	6	0	0	10	0	0
" Spruce 1st	load	8	0	0	11	0	0
" 3rd and 2nd	load	6	0	0	7	10	0
New Brunswick, &c.	load	6	0	0	7	0	0
Battens, all kinds	load	4	0	0	12	0	0



100

METALS.		Lined		HEMEL HEMPSTEAD.—For the erection of new slaughter-house and stabling, for Mr. John Youngman, Lower Marlows, Hemel Hempstead. Mr. W. A. Fisher, architect and surveyor, Hemel Hempstead.	
—Pig in London	0 0 0	20 5 0	20 12 6	Payne	235 0 0
—Pig, Welsh, in London	4 17 6	29 0 0	29 10 0	E. Horn	344 10 0
—Pig, in Wales	4 5 0	25 15 0	26 0 0	S. Monk	338 0 0
—Pig, Staffordshire, London	5 15 0	35 0 0	35 0 0	S. Monk	338 18 6
—Pig, single, in London	6 8 10	23 10 0	23 0 0	C. Monk	232 0 0
—Pig, all-roads	6 0 0	21 10 0	21 0 0	A. P. Tomlin	232 10 0
—Pig, all-roads	6 15 0	27 0 0	27 18 0	[All of Hemel Hempstead.]	
—Pig, cake and ingot	45 10 0	26 0 0	40 0 0	HEMEL HEMPSTEAD.—For four new shop-fronts and rooms, set at League-square, for Mr. W. Beckley, Mr. W. A. Fisher, architect and surveyor.	
—Pig, selected	47 0 0	15 0 0	15 0 0	W. Seal	234 0 0
—Pig, strong	53 0 0	8 0 0	8 13 0		
—Pig, India	48 0 0	19 6 0	19 6 0		
—Pig, Australian	42 17 6	13 0 0	13 0 0		
—Pig, bars	42 17 6	43 10 0	43 10 0		

## CONTRACTS.

PUBLIC APPOINTMENTS.				
Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page.
York and Valuer.....	Hendon Union .....	Not stated .....	April 6th	xvi.

H. Tuten & Sons (accepted).....\$316 10 0



LONDON.—For the erection of workshops in rear of No. 195, Green-street, Bethnal Green, E., for Mr. Thompson. Mr. C. E. Jackson, architect.—

Willings	£450 0 0
Edwards	318 0 0
Ames	287 0 0
Maleuvre	248 0 0
Brooks	230 0 0
Everard	216 0 0
Connell Bros. (accepted)	209 0 0

LONDON.—For rebuilding No. 1, Broad-street (corner of Berwick-street), Golden-square, for Mr. W. Borden. Messrs. Borden & Milnes, architects.—

Jarrard	£1,836 0 0
Brand & Gould	1,797 0 0
Scrivener & Co. (accepted)	1,789 0 0

LONDON.—For alterations and repairs at 30 and 31, Beech-street, Barbican, Mr. Delissa Joseph, architect.—

T. Pryor, Kingdall	£280 0 0
Holmes & Belcham	264 0 0
W. Heath (accepted)	257 0 0

LONDON.—For alterations at Nos. 229 and 232, Camden-road, for Mr. E. Barnes. Mr. C. E. Collins, architect.—

Dearing & Son (accepted)	£200 0 0
--------------------------	----------

LONDON.—For repairs and alterations to No. 44, Baker-street, for Mr. H. Bingey. Mr. G. Jackson, surveyor.—

Bush	£245 13 3
Wall	424 0 0
Brass	281 0 0
Lyerhann	269 0 0

LONDON.—For building residential chambers and shops at No. 33, Pantion-street and No. 25, Oxenden-street, W. Mr. T. Milbourn, architect. Quantities supplied.—

J. O. Richardson, Peckham (accepted)	£3,979 0 0
--------------------------------------	------------

LONDON.—For building warehouses at No. 2, Heron-street, Walworth, S.E., for Messrs. Creighton, Mitchell, & Co. Mr. Banister Fletcher, M.P., architect.—

E. G. Greenwood (accepted)	£500 0 0
----------------------------	----------

LUTON.—For new residence, warehouse, &c. for Messrs. Oakley Bros. Mr. W. J. Pearson, architect. Quantities not supplied.—

E. Ford	£295 0 0
D. Dunham & Son	888 0 0
Slough Bros.	875 0 0
D. Perkins	839 0 0
C. Wright	838 0 0
Smart Bros.	800 0 0
J. Sinfield	790 0 0
Neville Bros.	754 0 0
Cox Bros.	749 0 0
J. Saunders (accepted)	686 0 0

LUTON.—For villa-residence, Dunstable-road, for Mr. E. Deacon. Mr. W. J. Pearson, architect. Quantities not supplied.—

D. Perkins	£1,659 0 0
D. Dunham & Son	1,498 0 0
Smart Bros.	1,475 0 0
Neville Bros.	1,460 0 0
Slough Bros.	1,391 0 0
A. Linsman	1,385 0 0
Cox Bros. (accepted)	1,240 0 0

MARTOCK (Somerset).—For Ham Hill stone for the Wesleyan Chapel, Martock.—

C. Trask & Sons	£2473 0 0
J. Trask & Co.	494 0 0
B. & J. Staple (accepted)	385 0 0

PADDINGTON.—For rebuilding the Masons' Arms, Harrow-road. Messrs. Raymond & Webbe, architects. Quantities by Messrs. Ba'stone Bros.—

Oldrey	£2,270 0 0
Green	2,090 0 0
Babey & Son	1,988 0 0
Hitchin	1,987 0 0
Walker	1,893 0 0

RICHMOND (Surrey).—For ironfounder's work. Mr. Walter Brooks, Assoc.-Mem. Inst. C.E., Town Surveyor.—

Franklin & Son, Richmond	net schedule prices.
J. & G. Peirce, Richmond	16 per cent. off.
R. H. & J. Pearson, Notting-hill	25 "
F. Bird & Co., 11, Gt. Castle-street, Regent-street.	27 1/2 "
Reynolds & Co., Richmond	32 1/2 "

\* Accepted.

RICHMOND (Surrey).—For ironmongery. Mr. Walter Brooks, Assoc.-Mem. Inst. C.E., Town Surveyor.—

R. H. & J. Pearson, Notting-hill	625 to 10 per cent. off schedule prices.
Reynolds & Co., Richmond	33 1/2 "
J. & G. Peirce, Richmond	25 "
Bird & Co., Regent-street, London	27 1/2 "
Franklin & Sons, Richmond	12 "

\* Accepted.

TENDRING (near Colchester).—For alterations and additions to the Live and Let Live, for Messrs. T. Daniell & Sons, West Bergholt (proprietor finding all bricks and tiles). Mr. J. W. Start, architect, Colchester.—

Hassell, Southend-on-Sea	£294 0 0
Eade, Kirby Cross	255 0 0
Wilkinson, Clacton-on-Sea (accepted)	237 0 0

WALLINGFORD.—For erecting St. Leonard's rectory-house, Wallingford. Mr. A. J. Style, architect, Westminster-chambers. Quantities by Mr. F. Dudley, 19, Queen Anne's Gate:—

	House.	Walls, &c.
Holly & Butler	£3,036 0 0	£175 0 0
Silver & Son	1,893 0 0	168 0 0
Symms & Co.	1,877 0 0	144 0 0
A. D. dd.	1,777 0 0	159 0 0
Brasler & Son	1,731 5 0	141 7 0
G. Cooper & Co.	1,726 10 0	144 10 0
S. Elliott	1,672 0 0	152 0 0
Bottrill	1,654 0 0	163 0 0
Higgs & Son	1,650 0 0	168 0 0

**SPECIAL NOTICE.**—Lists of Tenders frequently reach us too late for insertion. They should be delivered at our office, 46, Catherine-street, W.C., not later than Four p.m. on THURSDAYS.

#### TO CORRESPONDENTS.

Registered Telegraphic Address, "THE BUILDER, LONDON."

H. P.—S. P.—A. W. (74, Margaret-street, Cavendish square, W.).—H. R. G.—H. C. R. It is very bad, but we do not know how we can interfere; your best advice was to call the attention of the district surveyor to H. R.—W. M.—J. S.—C. L.—V. S. H. D.—W. C. (Ilchester).—G. N. (amount not stated).

All statements of facts, lists of tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication. We are compelled to decline pointing out books and giving addresses.

Note.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications beyond mere news-items which have been duplicated for other journals, are NOT DESIRED.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; all communications relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

#### PUBLISHER'S NOTICES.

Registered Telegraphic Address, "THE BUILDER, LONDON."

#### CHARGES FOR ADVERTISEMENTS.

SITUATIONS VACANT, PARTNERSHIPS, APPRENTICESHIPS, TRADE, AND GENERAL ADVERTISEMENTS.  
Six lines (about fifty words) or under ..... 6s. 6d.  
Each additional line (about ten words) ..... 6s. 6d.  
Terms for series of Trade Advertisements, also for special Advertisements on front page, Competitions, Contracts, Sales by Auction, &c. may be obtained on application to the Publisher.

SITUATIONS WANTED.  
FOUR Lines (about thirty words) or under ..... 2s. 6d.  
Each additional line (about ten words) ..... 3s. 6d.  
PREPAYMENT IS ABSOLUTELY NECESSARY.

\*\* Stamps must not be sent, but all small sums should be remitted by Cash, in Registered Letter or by Money Order, payable at the Post-office, Covent Garden, W.C. to

DOUGLAS FOURDRINER, Publisher.

Addressed to No. 46, Catherine-street, W.C.  
Advertisements for the current week's issue must reach the Office before THREE o'clock on THURSDAY.  
The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c. left at the Office in reply to Advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

**SPECIAL.**—ALTERATIONS IN STANDING ADVERTISEMENTS OR ORDERS TO DISCONTINUE same, must reach the Office before TEN o'clock on WEDNESDAY mornings.

PERSONS Advertising in "The Builder," may have Replies addressed to the Office, 46, Catherine-street, Covent Garden, W.C. Free of charge. Letters will be forwarded if addressed envelopes are sent, together with sufficient stamps to cover the postage.

#### TERMS OF SUBSCRIPTION.

"THE BUILDER" is supplied direct from the Office to residents in any part of the United Kingdom, at the rate of the per annum. PREPAID To all parts of Europe, America, Australia, and New Zealand, 25s. per annum. To India, China, Ceylon, &c., 30s. per annum. Remittances payable to DOUGLAS FOURDRINER, Publisher, No. 46, Catherine-street, W.C.

#### Best Bath Stone, for Winter use.

WESTWOOD GROUND,  
Box Ground,  
Combe Down,  
Corsham Down, and { Summer  
Fairleigh Down, and { Dried.  
RANDELL, SAUNDERS, & CO., Limited,  
Corsham, Wilts. [ADV.]

#### Box Ground Stone

is the best for use in all exposed positions being a well-known and tried Weather Stone. 50,000 ft. cube in stock.

PICTOR & SONS,  
BOX, S.O., WILTS. [ADV.]

#### Doubling Freestone.

The stone from these quarries is known as the "Weather Bed," and is of a very crystalline nature, and undoubtedly one of the most durable stones in England. Is of the same crystalline nature as the Cheltenham Stone, but finer in texture, and more suitable for fluted mouldings.

#### THE CHELYNCH STONE.

#### THE BRAMLEDITCH STONE.

#### HAM HILL STONE.

Greater facilities have been provided for working these quarries, and the stone can be supplied in large quantities at short notice.

Prices, and every information given, on application to CHARLES THASK & SONS,

Norton-sub-Hamdon, near Ilminster, Somerset.

London Agent—Mr. E. WILLIAMS,

16, Craven-street, Strand, W.C. [ADV.]

#### Doubling Free Stone

For prices, &c., address S. & J. STAPLE

Quarry Owners, Stone

and Lime Merchants,

Stoke - under - Ham

(Ground or Lump), Ilminster. [ADV.]

#### Ham Hill Stone! Ham Hill Stone!

For Ham Hill Stone of best quality and workmanship, apply to JOHN HANN & SON, Quarry Owners, Montacute, Ilminster. Established 1837. Agents, MATTHEWS & GEARD, Albany Wharf, Regent's Park Basin, N.W. [ADV.]

#### Asphalte.

The Seyssel and Metallic Lava, Asphaltic Company (Mr. H. Glenn), Office, St. Poultry, E.C.—The best and cheapest materials for damp courses, railway arches, warehouses, floors, flat roofs, stables, cow-sheds, and mill-rooms, granaries, tin-rooms, and terraces. [ADV.]

#### Asphalte.

Seyssel, Patent Metallic Lava, and White Asphaltes.

M. STODART & CO.

Office:

No. 90, Cannon-street, E.C. [ADV.]

#### EVERY DESCRIPTION OF

SEASONED WOODS AND VENEERS IN

EXTENSIVE QUANTITIES.

#### B. J. HUDSON & SONS,

Millbank Sawmills, Grosvenor-road, S.W. 1.

Whitfield-street, W.

And Store-street, London, W.C.

Telephone No. 3,152, and Private Wire connecting Business Premises.

# BANNER VENTILATORS.

The Strongest Exhaust Ventilators for all Buildings, Public Halls, Churches, Billiard-Rooms, &c.

HIGHEST PRIZES at all the most important Exhibitions.

## BANNER SYSTEM OF SANITATION AND SANITARY APPLIANCES

WERE AWARDED AT THE

International Health Exhibition, 1884, One Gold Medal, Three Silver Medals, and One Bronze.

For further Particulars and Prices apply to

**BANNER BROS. & CO. Sanitary and Ventilating Engineers**  
11, BILLITER SQUARE, LONDON, E.C.



# The Builder.

Vol. L. No. 2523.

SATURDAY, APRIL 3, 1896.

## ILLUSTRATIONS.

Laver Marney Towers, Essex: Details of Main Gateway.—Measured and Drawn by Mr. A. B. Mitchell.....	508-509
Laver Marney Towers, Essex: South Elevation and Plans.—Measured and Drawn by Mr. A. B. Mitchell.....	512-513
Design for South Transept Window for Denver Cathedral, Colorado, U.S.A.—By Mr. Ed. Frampton.....	516, 517
Design for a City Warehouse.—Mr. Arthur Ardron, Architect.....	529
Trewrgie Board Schools, Redruth.—Mr. J. R. Nichols, Architect.....	521

## CONTENTS.

Laver Marney Towers, Essex.....	497	New Board Schools, Trewrgie, Redruth.....	505	The Student's Column: Our Building Stones.—IV.....	625
Notes from Paris.....	500	No. 1 and 2, St. Mark's-court, Ludgate-hill.....	506	Books: Miller's Interior Decoration (Wyman & Sons); Bou-	
Notes on Artisans at Carpenters' Hall: The Fine Art	502	Laver Marney Towers, Essex.....	508	cho's Dictionnaire des Marques et Monogrammes des	
Aspect of Woodwork.....	503	The Rocky Mountain Railway.....	509	Graveurs (Rouan).....	508
Best Railway to Aberdeen Corporation Gasworks.....	504	Visit of the Architectural Association to the New Law Courts.....	509	Recent Patents.....	508
Disposal of the Metropolitan Sewage.....	505	The New House of Commons.....	510	Recent Sales of Property.....	508
Architectural Societies.....	506	R.L.B.A. Charter.....	514	Meetings.....	507
Architectural Association 20048.....	506	Concrete Floor.....	514	The Parker Museum.....	507
Laver Cathedral Transept Window.....	506	Royal Academy.....	524	Miscellaneous.....	507
		Stained Glass.....	524	Prices Current of Building Materials.....	508

Laver Marney Towers, Essex.



LAYER MARNEY HALL is, perhaps, as good an example as exists of the English mansion at the time when it was passing from the castellated to the domestic stage. It seems to possess

a little of the fortified manor-house, and yet retains the leading idea of a great gateway and flanking towers so usual in buildings of the preceding reigns. Layer Marney, however, is so perfect as Oxburgh in Norfolk, which is a little earlier in date and is the finest example of its date we have left. The contrast between the two is noteworthy, and deserves careful attention, as illustrating the advance which had been made to meet the growing needs of the time. The general plan of Oxburgh exhibits much the same arrangement as Layer Marney, and has the advantage of being complete, or nearly so. The great gate tower gives access to the quadrangle, measuring 118 ft. by 70 ft., round which the principal rooms are arranged. The south side was pulled down in 1848, and this portion included the great hall. Fortunately, we have a hall of much the same description at Hengrave, in Suffolk, and so are enabled to form a correct judgment of the plan. The entrance gateway is flanked by octagonal turrets, rising to a height of 70 ft. out of the moat, somewhat similar in design to those at Layer Marney, but with a difference, which should be noted, that in the latter all the eight stories, including the ground-floor, are pierced with windows in each of the octagon, but at Oxburgh the light is admitted by loopholes only on the ground-floor, and in one of the towers this treatment is continued for the whole height. The apse has been further strengthened by a bridge over the moat already referred to, this important means of defence is absent at Layer Marney. Nor is it likely that a tower ever existed here, for there is no trace of such an arrangement, and the nature of the ground is such that it would have been almost impossible to construct one. One point of resemblance between the two buildings should be observed, and that is, that the towers in the great rooms over the entrance command a view over the country, besides looking inwards to the courtyard. This was gradually becoming a common feature, but is never to be found in the earlier castles, where the large windows only looked into the internal quadrangle, and is an indication of the lateness of the work. The

machicolated parapet over the entrance at Oxburgh is a feature wanting at Layer Marney, and its absence serves as a good example of the manner in which the builders were gradually freeing themselves from old customs which had no longer any useful purpose.

Layer Marney Hall takes its name from the ancient family of Marney, or, as spelled variously in old manuscripts Mareny, Marigni, Marney, Marigny, and Marini. The last seems to be the most ancient, for Hugo de Marini had the Prebend of Tottenhall in the Church of St. Paul's, London, and was Dean of that church from about 1160 to 1181. Dugdale, in his Baronage, says:—"The first mention I find of the family is in 2 E. III., but a further mention beside that already stated occurs; for under Richard I. Werry de Marinis was excused by a writ from paying scutage." There are several other notices of the family; as, for instance, William de Mareny had to pay a fine of twenty marks to King Henry III. for having married a lady who was the king's ward. Another entry states that "William de Mariny, by payment of x libr., obtained licenses for granting to a laic a tenure in Leirmarney, with the advowson of the church there." This was temp. Ed. III. In Burke's "Roll of Battle Abbey," the name of Marney is stated to be one of those who came over with William the Conqueror, but Domesday Book says nothing about any grant of lands at Layer Marney or elsewhere, at the general distribution; but it is known that in the year 1166 William de Marney held a knight's fee under Henry de Essex. In all probability the family came over soon after the Conquest, and received a grant of lands; for the king would naturally be anxious to surround himself with foreign friends in order to strengthen his authority.

The member of the Marney family with whose name the present building is associated is Henry, the first Lord Marney, of whose life the Essex Archaeological Society (Vol. iii., "Proceedings") has published the following interesting particulars:—"Lord Henry Marney, numerous and splendid as were the honours which he acquired, started in life as plain Henry Marney, Esquire, and belonged to a class described by Henry VIII. as 'scant well-borne gentlemen, of no great lands.' He inherited the paternal property, but this, probably, in the king's eyes was 'scant' compared with the large holdings of some noblemen in those days, and with the noble domains and large acres afterwards conferred on Henry Marney by the king himself, on the Duke of Buckingham's forfeiture. Henry Marney stands recorded amongst 'English Worthies' and amongst the 'Noted Sheriffs' of Essex, but his first entrance on the path of court

advancement appears to have been when he assumed some office in the household of Margaret, Countess of Richmond, mother of Henry VII. That he discharged with credit the duties of his office is apparent from the fact that the Countess appointed him one of her executors, and the early partiality with which he was viewed by Prince Henry, afterwards Henry VIII., is evinced by the youth's request to his father, Henry VII., that Henry Marney might be made a Privy Councillor. The appointment was repeated by Henry VIII. himself when he succeeded to the throne; and both before and after the favourite was employed by his patron on various confidential services. The following is a list of honours and appointments conferred on Henry Marney:—

1. Previous to the accession of Henry VIII.—Sheriff of Essex; Chancellor of the Duchy of Lancaster; Officer of the Countess of Richmond's household; Privy Councillor to Henry VII.

2. After the accession of Henry VIII.—Privy Councillor to Henry VIII. (a distinct appointment); Knight of the Garter; Lord Privy Seal; Captain of the Body Guard; Baron, by title of Lord Marney.

Henry Marney served frequently as a soldier in the civil contests under Henry VII. Under Henry VIII. he served repeatedly in France, especially in the campaign including the "Battle of the Spurs," in which the king was present in person. He seems to have had a glorious quarrel with Cardinal Wolsey. This was before he was made a Baron. One would like to know how he contrived to survive the Cardinal's wrath in those ticklish times, and to win the peerage in spite of hostile influences.

Lloyd, in his "State Worthies," says:—"Sir Henry Marney was one of young Henry's first Council, who loved his person well, and his prosperity better; and impartially advised him for his good, and modestly contested with him against his harm; that council that was hand as well as head, and could perform as well as advise; this was the searching judgment that discovered Buonviso, the Lucchese, his letters to the French king betraying our designs as soon as thought on, and instructing him for prevention before our king was ready for the attempt. Industry and thrift overrules princes; this personage has no time to transcribe intelligence, but what he borrowed from his sleep; nor money to buy it, but what he saved out of his allowance; yet he understood more than any one prince of Europe, and was more consulted than any one statesman. His judgment was solidly safe, rather than that which was superficially plausible; as one who was a stranger to the wisdom of the latter age (as Sir Francis Bacon describe



it), which is rather fine deliveries and shifts from inconveniences than solid and grounded courses for advantage. His foresight was large, and his spirit larger: he considered all circumstances that occurred to him; judged what he considered, and spoke what he judged, with that resolution as to his opinion, that argued he understood the matter in question, with that modesty to his superiors that showed he understood himself. He would say that he that could not with the camoleon change colour with the aire he lived in, must with the camoleon live only upon aire."

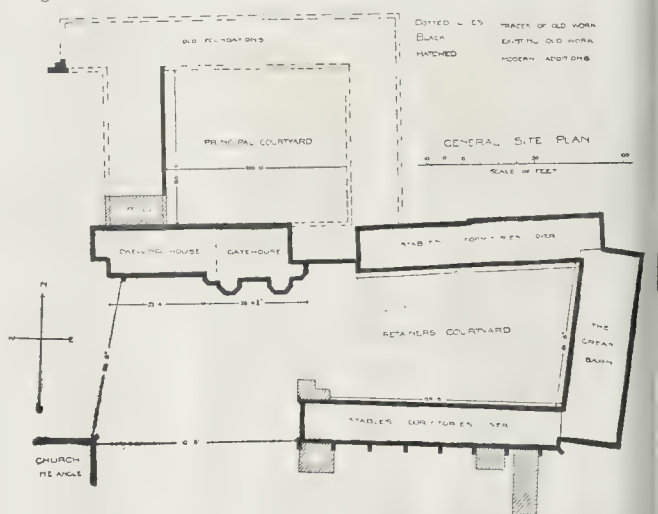
Such was Lord Henry Marney, a man in high Court favour, yet with none of the meannesses commonly incidental to Court life; learned, even amongst his contemporaries, which included such names as Wolsey, Erasmus, and Michelangelo. Can it be a matter of surprise that, living as he did, in an age of the revival of literature and art, he should endeavour to erect a building which should remain a monument to his greatness and an example of the splendour of the times?

A reference to the plan will at once suggest the leading idea on which the building was arranged. The principal courtyard was entered under the great gate tower, which still stands, and this formed the means of access to the chief apartments, which were grouped around it. Of these only the south-western wing remains, with a few fragments of walls and foundations, just sufficient to indicate the site once occupied by the whole. The secondary courtyard is more perfect, standing in very much the same state as when first erected. The north and south sides are long, low buildings of brick, in good preservation. The eastern end is occupied by the great barn; while the remaining side is entirely open, and presents no appearance of ever having been intended to be enclosed. The third and last feature in the general grouping is the church, which certainly ought not to be omitted in a description of the Towers, for it almost seems to form a part of the buildings themselves. Not only is the greater portion of the work of the same date; but the history of the church is so interwoven with the history of the Towers that a description of the one necessarily involves constant reference to the other. Take, for instance, the north aisle, which consists entirely of the Marney Chapel, begun by Henry, first Lord Marney, and continued by John, his son. This contains the elaborate and beautiful tombs which they had directed in their wills should be erected to their memory. To these further reference will be made. The north-eastern corner of this chapel is indicated on the general site plan.

The magnificent gate-house claims primary notice. (See lithographic illustration.) It rises to a height of about 70 ft. from the ground, and forms an imposing object when viewed from the south where the country is open. Standing on a slight eminence, it commands a fine view over the estuary of the Blackwater and the surrounding country, while on the horizon the sea may be plainly distinguished. This gatehouse consists, as will be seen from the drawings, of a central block of three stories in height, flanked on either side by two octagonal towers on the south, and two square turrets on the north, each divided up into eight stories. In the principal front, which faces south, each of these floors is lighted by windows in three faces of the octagon. These towers are again flanked by smaller semi-octagonal turrets some 7 ft. less in height than the principal ones, but the use to which these were put is not quite clear, though it is not unlikely that they were merely added for ornamental purposes in order to give more breadth and apparent solidity. The great four-centred archway on the ground-floor gave access to the courtyard within, and over this are the two principal rooms, lighted both back and front by large five-light windows with transoms. In the north-western turret is a fine wooden newel staircase, from which all the rooms are approached. On the first principal landing of this staircase is a door of communication with the only perfect part of the courtyard buildings still remaining. Here it may be well to state the

results of a careful examination as to how much of the building was really completed in accordance with the original scheme. Various opinions have been expressed on this point, some contending that the whole building was finished, and has since fallen into decay and ruin, leaving but few remains behind; others hold that the building was never completed except that portion which still stands, and that this is in the state finally intended by its designers, and, in support of their argument, point to the toothings which are evidently as first built. The foundations and fragments that are to be found scattered about the site, they attribute to a former building. A third theory is that these scattered fragments are remains of Lord Marney's work, but that the building was never very far advanced, either because of want of funds, or owing to the owner's absence abroad; hence, what little had been done disappeared in the course of a few years, leaving the block now existing, because that was the only portion which had been finished. This last opinion seems to be much nearer the truth than the former ones, but even this does not appear to be the whole truth. There can be no doubt whatever that a previous manor-house stood upon the site, as many references are made to it and to its owners, but no fragments of any kind of this building are left. The whole of the remains

alone has to be dealt with. An examination of this elevation and a comparison with the adjoining tower will certainly suggest the idea of its being unfinished. The mean-looking eaves gutter over the terra-cotta mullioned windows, and the poor lath-and-plastered gable, as a finish to the solid brick walling and elaborate work of the lower floors, bear no resemblance to the rich parapet and cornice of the gate-house. Either the work was intended to be finished the same height as at present, or another story was to be added. The former can hardly have been the case, for all the materials were at hand ready for completion; the terra-cotta moulds had been made and the work simply required casting. That the same moulds would have been used is extremely probable, for the windows, which are terra-cotta, are similar throughout. Is the idea, therefore, of another story being part of the original design tenable? As has been already mentioned, there is communication from the staircase in the south-western turret, with the dwelling-house on the first floor, and there is evidently a blocked-up doorway on the ground level. On the second floor a recess is found to occur in the west wall of the landing of this staircase, and an examination of the external wall clearly shows that a doorway had been intended on this floor also, but had, like that on the ground-floor, been blocked up. Of



Block Plan of Layer Marney.

discovered are of brick, but of bricks precisely the same in material, colour, size, and method of laying as the still perfect portions of the towers. It must be remembered also that the art of brickwork had only in recent times been re-introduced into this country. From the time of the Romans it was but seldom used, and even when this was the case, it was only in small quantities. One of the earliest, if not quite the earliest, specimens of the revival of this method of building of any considerable extent is at Caister Hall, in Norfolk, the date being about 1420, only some eighty years previously to the erection of Layer Marney Hall, and from that time instances of its use multiplied rapidly. But it would be difficult to imagine that the manor-house at Layer Marney had been rebuilt at this period in that material, only to be pulled down to make way for Lord Marney's building, about the date of which, 1506, there is no question. It may fairly be concluded, then, that the whole of the remains now in existence are the work of Lord Marney. But here a further question arises as to whether those portions we have left are complete as was originally intended. This has hitherto been assumed to be the case,—but the conclusion hardly appears to be borne out by facts. It is evident that the gate-house is complete, so that the western dwelling-house wing

course, in the present dilapidated state of the building, it would not do to make too much out of such an occurrence, but when the things are pieced together they appear to supply exactly the clue which was wanting in order to explain the present apparently unfinished condition, and the conclusion seems a reasonable one that another story was intended to be added, and that the present roof was merely a temporary expedient, for preserving from decay that part of the building which was in advance of the rest, from some cause or other the work was stopped.

The terra-cotta work, which is so plentifully used, deserves remark, for it exhibits a very early example of the influence of the Italian Renaissance on the architecture of this country. When burned, the clay is of a rich buff colour, and has a very pleasing effect in contrast with the red brickwork, which forms the general body of the walling. It is of even texture and tough; the blocks vary in length from 8 in. to 1 ft. 3 in., and have been carefully modelled. The detail is a little mixed, for though the egg-and-tongue and the guilloche ornament are distinctly Classic features, as are also the dolphins which crown the cornice, the trefoiled cusping beneath can hardly be included under this head. An explanation of this mixture is to be found in the employment of Italian



workmen on the building; these, doubtless, were entrusted with the more ornamental details. Coming from Italy, they would be familiar with the style which was fast becoming the fashion in England at the time, and, therefore, only the plain parts of the work would be left to the local workmen. Presuming this to be the case, it may help to clear away doubt as to the date of the buildings which surround the secondary wing, or retainers' courtyard. It has generally been supposed that this portion is slightly earlier than the great gate-house and the remains of the house adjoining; and the reason given is that the work is more English in appearance, and contains none of the Classic terra-cotta work so conspicuous in the larger buildings. It is true such may be the case, but the materials and the mode of execution in this portion differ in no wise from other parts,

panels corresponds exactly with that on the towers, while the material is precisely the same; and it is remarkable that the well-known sedilia in Wymondham Church, Norfolk, are evidently designed and executed by the same man, as the work here also is the same as at Layer Marney. The view given will explain better than any description. The general arrangement was carefully carried out in accordance with the will of its owner, and it only needs to be added that the material throughout, with the exception of the figure and the slab upon which the figure rests (which are of black marble), is the buff-coloured terra-cotta used elsewhere. Little skill, however, has been shown in its erection, for, strange to say, in the main cornice the egg-and-tongue pattern can be observed peacefully reposing upside down, seemingly quite unconscious of the incongruity of such an arrangement.

invisible. Many of these chimneys (some of which are engraved by Parker) were standing in 1884, but were shaken down in the earthquake which occurred in the Eastern Counties on the 22nd of April in that year. Layer Marney Towers appear to have been quite in the centre of the disturbance and suffered a good deal, many of the roofs being injured and scarcely noticeable fissures in the walls became alarmingly apparent. These do not seem to affect the real stability of the pile, but are very unsightly and will tend to hasten the decay and ruin which seem inevitable. It is a pity that such should be the case, but the outlay needed to restore the Towers to anything like a sound and habitable condition would be so large that the chance of the work ever being done appears remote indeed; but that this would repay the trouble and expense involved there cannot be two opinions.

The interior arrangements have been so modernised that it is almost impossible to discover the purposes to which the rooms were put, except in the long, low ranges of farm buildings which form the north and south sides of the retainers' courtyard. The lower floor has been built for stables, while the apartments on the upper floor Parker describes as "dormitories," and this was evidently the use to which they were put. A detail of the interesting roof to these rooms is given, and a perspective view of the same will be found in Parker's "Domestic Architecture." The timbers of this roof are solid, and well framed together with large oak pins; the principals are carried some way down the walls, so as to relieve them as far as possible of thrust; and this end is further attained by iron tie-rods at the floor-level, and the termination of these has been made a feature in the elevations. A reference should be made to the remarkable brass in memory of John, the second Lord Marney, and his wife and her first husband. This brass is in the chancel of the church at Little Horkeley, and was placed there in accordance with the will of the lady. She survived Lord John, and died in 1549, directing that her effigy should be placed between those of her husbands,—Lord John on her right hand, and Mr. Thomas Finderne on her left, and that they should have their full coats of arms. Evidently the good lady was not a little proud of her husbands, and wished posterity to see with what distinguished families she had been allied. The drawing of this brass is taken from an engraving in the Suckling Papers.

It will be interesting, in concluding these remarks, to extract a few passages from the wills of the two owners of the Towers,—Lord Henry Marney and his son John,—which are published very fully in the Transactions of the Essex Archaeological Society, vol. iv. The will of the former is dated 22nd May, 1523. After many directions about prayers to be said

Here under kneche Dame Brigete Marney late the wyffe of John lord Marney and Sometime wyffe to Mr Thomas Fynderne Blagier and deceydyd the xxx day of September in the yere of our lorde God mycccc xliii



The Marney Brasses, Little Horkeley.

as can be discovered; while points of difference would in all likelihood occur in buildings erected at different periods, even where they were only parts of one whole. That both were built at the same time may be decided, however, with the more English appearance when we consider that the number of foreign workmen employed would be limited now at the time of the introduction of the style, and these would certainly concentrate all their energies on the principal court, leaving the less important buildings to the care of workmen, who could, and in this probably did, carry out their portion in any in which they had been brought up. It can be no doubt but that the same hand modelled the terra-cotta work for the buildings was employed on the elaborate beautiful tomb belonging to Lord Henry Marney in the church adjoining, which is still in a fair state of preservation, though broken in places. The design of some of the

The brickwork is of a deep red colour, diapered all over the building with diagonal patterns of blue vitrified bricks which break the wall surface in a not unpleasant manner. The courses rise four in 10½ in. and have joints measuring as much as 5-8ths in. in width. In the moulded portions of the work the same dimensions are retained, and this, on a close inspection, presents a coarse and rugged surface, which, however it may have looked when first built, now harmonises well with the ruinous conditions of the Towers. This effect of dilapidation and decay is increased by the plaster (which, in many places, had been used to imitate stone quoins) peeling off, exposing a veritable sham, which, until lately, the old builders had been deemed incapable of resorting to. Unfortunately but two of the beautiful cut brick chimneys, which were once such an ornament, now remain; and these are so hidden away up at the top of the Towers as to be almost



The Marney Arms.

for himself and his forefathers, together with directions as to his burial, he goes on to say,— "Also I will that there be a convenient herse made aboute in the church according to my degree, w<sup>th</sup> my armes and other things belonging unto me as by myn executors shalbe thought convenient, and my body to be conveyed as shortly as may be. . . First I will



that with the profits of all my said landes that the chapel which I have begon adjoyning to the chauncell of the parishe church of Ileyer Marney forsaide be new maide and fully fynnyshed according to the same proporcons in length, bredith, and heith as it is bogon, with a substancial flat Roofe of Tymber, and also with the profit of my said landes that myn executors cawse to be made a Tumble of marbull to be sett in the wall betwixt the chauncell and the said chapell, which wall I will it be newe, and to be vawted over w<sup>t</sup> marbull and workmenly wrought w<sup>t</sup> suche works as shalbe thought convenient by my executors, and my Image to be made of black marbull or Towch [touchstone] w<sup>t</sup> everything convenient and appurtenyng to the same, and to be leyde and sett upon the said Tombe, and I will that two Images of laton [brass] be made w<sup>t</sup> the pycours of my two wife w<sup>t</sup> ther cote armers upon them, that is to say Thomasyn, and she to lie on my right side, and Elizabeth, she to lye on my left side upon the same Tombe." Proved 15th June, 1523.

The will of Lord John, who succeeded his father, but survived him little more than a year, is of even greater interest to the antiquary, but treats of many matters which it would be out of place to quote here. "IN THE NAME OF GOD, AMEN, the tenth daye of the moneth of Marche. In the yere of our Lorde God a Thousand fyve hundred twenty and four, in the fyfteenth yere of the Reigne of our Sovereigne lorde Kinge Henry the eight, I John Marney Knyghte, Lord Marney of Marney in the countie of Essex being whole of mind &c. . . . bequeth my soule to the blessed Trinite, to our lady Saint Mary to Saint John the Baptist and to all the holy company of hevyn, and my body to be buried in the newe Ile in the north side of the parishe church of Ileyer Marney in the middles of the said Ile, directly agens the myddes of the newe chapell, six foote from the petition betwene the chapell and the Ile, in a vawte of bryke to be made so large that two bodies may be leyed therein, over the which vawte I will there be a Tombe sett and made of suche stone as my father's is made of, yf it may be gotten, or ells of graye marbul, the which Tombe I wol shalbe eighte foote long and fyve foote brode and four foote high, and to be wrought in every condicion as my father's Tombe is, except the vawte over and above my father's saide Tombe, and the armes about the Tombe I will to be changed after the device of the har-ode (Herald), and round aboute my said Tombe I will there be made a grate of waynscott, and at every corner of the same grate a principall pyller w<sup>t</sup> a white lybard upon the top thereof [these lybards or leopards have now been removed and are affixed to the corners of the pews in the nave of the church], and upon which Tumble I will have an Image for myself of the same stone that my said Tombe like unto my said father's tombe shalbe made, yf it may be gotten, or ells of freestone, my said Image lying upon the midds thereof porteryd w<sup>t</sup> my cote armor, with my helme and creste at the hede and a white leopard at the feet, and on either side of my said Image I will myn executors ley oon Image of brasse for every of my two wyves, Dame Crystian and Dame Brygett. The Image of my wife, Dame Brygett, is to be laid on my right hande and the other of my left hande, and bothe the said Images to be pyktyrd with ther cote armors, and at the west ende of the said Tombe I will there be made an awter where I will have a preest synging for me perpetually after such ordences and devices as here in this my present will hereafter I have shewed and declared."

The remaining tomb in the church is of a much earlier description, somewhat plainer than those just described, constructed of a very beautiful marble resembling alabaster and panelled round with quatrefoils containing shields. The whole tomb has indications of rich-coloured decoration, and is supposed to be the one erected in accordance with the will of Sir William Marney dated 1414.\*

\* We will give some further illustrations of this interesting house in our next.

## NOTES.

**A** GREAT difference of opinion as to the value of Mr. Mundella's Railway Bill appears to exist among those who would be affected by it. The agricultural interest are very dissatisfied with the clauses relating to undue preference, many going so far as to denounce the whole measure. Representatives of other industries express equal irritation at the facilities afforded for appeal,—though, of course, they would have the same privilege in this respect as their opponents, and the *locus standi* clauses will, to a certain extent, place them upon a more equal footing in point of strength. The railway companies, on the other hand, view the Bill with the greatest apprehension and alarm, and are making every preparation to oppose it. In the circulars issued by the directors calling upon the shareholders for their assistance, the rates clauses are represented as amounting to nothing short of confiscation; and the effect of the *locus standi* clause is also exaggerated and misrepresented. In a resolution passed last week by the Metropolitan Company, it is stated that the Bill is calculated most seriously to injure the companies, "with a view possibly to ultimate purchase." Such assertions as these as to the effect of the Bill upon railway property,—in which, of course, many in the House are interested, besides those actually connected with railway management,—may cause members to hesitate before declaring in its favour; while, on the other hand, many are pledged to their constituents to support it. As regards the Government, it does not seem at all likely that the dissatisfied attitude assumed by various parties will deter them from pressing the measure, though they will doubtless be willing to adopt such amendments as would remove objections without lessening its value. Indeed, Mr. Mundella has received several deputations from both sides, and will probably somewhat modify his proposals. The *Standard* of Saturday last, in a temperate review of the measure and the objections raised to it, remarks that the alarm which it is exciting is altogether unnecessary and unwarranted. This observation is certainly justifiable as regards the circulars of the London and North-Western and Midland, the former of which, especially, is calculated to thoroughly frighten timid and uninformed shareholders.

**I**N another column we print an important report on the Metropolitan Sewage Question, adopted by the Metropolitan Board of Works at its last meeting. The adoption of the report was moved by Mr. F. H. Fowler, deputy chairman of the Board, who made a long speech recapitulating the history of the subject, and the motion was seconded by Mr. Selway, who truly observed that the subject was the most important one with which the Board had been called upon to deal since the question of devising a comprehensive sewerage scheme for the Metropolis first came before it. The method of treating the sewage now recommended by the Committee would, he believed, be found successful. A brighter effluent could no doubt, he said, be obtained by a larger use of chemicals, but its increased brilliancy would not be of sufficient value to counterbalance the increased quantity of the sludge which would result from the use of greater quantities of chemicals. The nature and extent of the problem to be solved may be judged from some figures quoted by Mr. Selway. He said that London sends down its sewage outfalls 150,000,000 gallons of sewage per day, yielding, after precipitation, no less than 3,000 tons of sludge, which, after being subjected to great pressure by mechanical means, could only be reduced to 850 tons per day. Mr. John Jones, another member of the Board, while not opposing the adoption of the report, criticised the action of the Board, and contrasted the admissions of the reports now made public with its strenuous denials, made only a few years ago, that the discharge of the metropolitan sewage into the Thames caused any nuisance. These denials, he pointed out, had been persisted in as long as possible, at the

expense and to the detriment of the ratepayers, and though the Board and two of the chemists who advised it had recanted their views, there was, he thought, reason to fear that the suggested expedients would not be found to be all that could be desired. A suggestion made in the course of the discussion was that the pressed sludge might, for some years to come, be used to raise the level of the many thousands of acres on the Kent and Essex shores of the river which are lower than the level of high-water, and which are at present protected against flooding by raised banks or walls of earthwork.

**T**HE case of Barlow v. The Kensington Vestry which was last week decided by the House of Lords, has gone from Court to Court with varying results. Our readers must by this time be pretty well aware of the case, as we have commented on it from time to time. In the first instance Vice-Chancellor Bacon decided in favour of the plaintiff, a police magistrate having previously been of a contrary opinion. Then the Court of Appeal gave judgment in favour of the Vestry, and now the House of Lords has reversed that judgment. The question turned upon whether or not a corner house, partly in De Vere-gardens and partly in Kensington-road, with its entrance in that thoroughfare, was beyond the general line of buildings in De Vere-gardens. As a matter of fact the inside of the house, so far as it was in De Vere-gardens, extended 7 ft. beyond the front of the other houses in that street; that is to say, it extended to the pavement, whereas the other houses had an area of 7 ft. in width between them and the pavement. The Superintendent Architect of the Board of Works called it in his certificate "a house in Kensington-road, at the corner of De Vere-gardens." The Lord Chancellor has decided that the house is in the Kensington-road for the purposes of the Metropolis Local Management Act, 1862, the Court of Appeal having held that it was both in De Vere gardens and the Kensington-road. But the Lord Chancellor carefully guarded himself against laying down the proposition that a corner house cannot be, for the purposes of the Act, in two streets, "each case must be decided on its own merits, having regard to all the circumstances." It seems clear, therefore, that a corner house such as the one in question, with its front in one street, must usually be regarded as being in that street, and then that it may project beyond the general line of what may be called the side street. This seems to be the practical result of this long litigation, with which we may have occasion to deal finally, and *in extenso* on a future occasion.

**SIR FRANCIS BOLTON** has just issued his Report of the water supplied by the several metropolitan water companies during the month of February last. He states that the highest flood state of the river at West Molesey during the month was 4 ft. 5 in. above summer level mark, and the lowest 10 in. above that mark, the rainfall at West Molesey being 0.44 in. during the month. He continues to lament the absence of a fixed standard of filtration, and considers that the gelatin examination will be of assistance in enabling some such standard to be arrived at. The results of this examination, contained in a letter addressed to the Local Government Board by Dr. Percy F. Frankland, are interesting. The following is the statement:—

Name of Supply.	Number of colonies obtained from 1 cubic centimetre of water.
Thames:—	
Thames water (unfiltered) .....	15,800
Chelsea .....	305
West Middlesex .....	80
Southwark .....	234
Grand Junction .....	203
Lambeth .....	265
Lea:—	
Lea water (unfiltered) .....	20,600
New River .....	74
East London .....	252
Deep Wells:—	
Kent (taken direct from the well) ..	5
Kent supply .....	149

In his letter Dr. Frankland points out that



samples of unfiltered river water, taken for comparison, were obtained at Hampton and Chingford respectively, remarking that the number of micro-organisms found in the unfiltered river waters was only about half as great as the number found in the water collected during the previous month, and in nearly all cases the filtered waters exhibited a similar reduction. There is, however, little or no change in the condition of the East London and Chelsea waters in regard to micro-organisms (these companies have the greatest storage capacity), a fact which Dr. Frankland attributes to the probability of the water in their reservoirs having been taken from the rivers when they were in a less favourable condition. It will be noticed that the water taken direct from the well in the case of the Kent supply is remarkably free from micro-organisms.

AN American sanitary journal gives a description of Heynsinger's apparatus for cremating the remains of the dead. Where this apparatus is used, it is proposed to proceed with burial in the usual way, "thus avoiding any shock to the feelings of friends who have dread of cremation as usually performed," the funeral rites are proceeded with as in ordinary burial, and the grave filled up. Then the cremating apparatus is brought to the grave, and the body burned in its resting-place. The way in which this is done, or proposed to be done (for we do not gather that the method has yet been practically applied), is, briefly, as follows:—The ordinary wooden coffin, containing the remains, is placed in a terra-cotta case, with tight-fitting lid. This case is just large enough to receive the coffin and to leave an air-space all round the latter, as or projections on the bottom of the casing made for the coffin to rest upon. A terra-cotta flue or pipe is fixed at each end of the case, and these rise to within a short distance of the surface of the ground, being covered with caps when the operation has been completed. The crematory furnace is portable, and is attached to the flues just mentioned, so as to drive a double current of the incandescent gases and air into the terra-cotta case, consuming the body, the products of combustion being led under the grate of the furnace, the process being continued until a thermometer shows that no more aqueous gases are passing. Fans or blowers are proposed to be used for driving the gases through. If this mode be practicable, and that at a moderate cost, which seems somewhat doubtful, it may be an impetus to the use of cremation, inasmuch as it may satisfy popular prejudices in favour of burial while combining the sanitary advantages of cremation. We shall be curious to hear more of this invention.

APPRECIATIVE reference is made in the last number to hand of the *Chicago Sanitary Journal* of the efforts which are being made in this country for the registration of efficient plumbers. Many advocates of the work which has been so vigorously taken in hand by the Municipal Company of Plumbers, at the instigation of Mr. George Shaw, the Master, have cited American precedents in support of the action of the Company, and as far as we can ascertain, registration has been carried out for several years past with very satisfactory results in America. Sometimes, it appears, mere pretences seek to get their names inscribed on the register, but without success. An amusing incident is described in the journal before mentioned. It is that of a so-called "practical plumber" who had associated himself with a hardware and implement company, carrying on business in a town in Kansas, and who sought to join the local Plumbers' Association. The committee was appointed to wait upon the applicant and to inquire into his eligibility for membership, with the result detailed in a long list of questions and answers, from which we select the following specimens:—

Q.—How is a trap ventilated? A.—Never let it stay.

Q.—What are the different patterns of traps commonly used? A.—Do not remember.

Q.—What is a lead safe? A.—A pan under a water-closet to catch leaks.

Q.—Is there a pipe leading from the safe usually? A.—Yes, going direct to the sewer.

Q.—Are you sure you are a practical plumber? A.—Oh yes.

It is not to be wondered at that before the examiners had put many more questions they dismissed the candidate with "That is all." In their report the committee say that the man who gave these answers is a fair sample of the "practical plumber" found in the "tin-shops and hardware stores" of Kansas, yet, say the reporters, such men have the "unadulterated gall" (whatever that may be) to apply for membership to the Master Plumbers' Association. We learn that in the end "the applicant was most respectfully told to stick to bell-hanging."

THE case of De Souza v. the Trustees of the British Museum, decided last week, is of importance to those in charge of public libraries. It is unnecessary to comment on the facts, but two things are apparent from the judgment of Mr. Justice Chitty. The first is that before a reader can properly be excluded from the use of the library for alleged misconduct he should be put in a position to answer any charges which may be made against him. The second is that though the governing body should be judicial in considering the charges, they are not bound to do more than specify them to the person complained of in an ordinarily clear manner, so that if he desires he may be in a position to refute them. This seems, after all, only to be plain common sense; but it will assist those who manage libraries, reading-rooms, and similar institutions to have the law laid down from the Bench.

THE Exhibition of Fine Arts now open at Rome includes in the section "Metal-work" a department of special interest,—*i.e.*, a room devoted to such ancient bronzes as have been recently excavated, or as represent points of special note as regards subject or technique. The centre of the room is fittingly occupied by a now famous colossal statue, the finding of which we some months ago gave an account. At the left-hand of the end of the room stands the scarcely less famous statue of a nude athlete, which gains much in effect by its present erect position. Near this last statue is the beautiful bronze Bacchus found on the 20th of last September very near the island of San Bartolommeo, in the Tiber. Ovid mentions a temple of Faunus on this island, and it seems possible that the statue may once have stood within its precincts. We are glad that the statue is now exhibited in a popular exhibition, as it gives a chance to the general public of becoming acquainted with a very fine and delicate specimen of ancient work in remarkably good preservation. The figure is perfect but for a fracture above the right ankle. The thyrsos held in the left arm was found in three pieces, and has been put together. Considering that the statue was found by the workman feet uppermost, it is extraordinary that the head should be in such perfect preservation. The god is crowned with ivy, and wears the head-gear of a woman; two long locks (attached separately) fall on his shoulders, the lips are inlaid with brass, and the eyes made of *marino palombino*. Behind the left knee there is clearly to be seen the impress of a coin, which numismatists decide to be an aureum of the first century of the Empire. This figure of Bacchus may safely be attributed to the best Græco-Roman times. Besides these three famous statues there are a series of smaller exhibits. Prince Maffeo shows two interesting statues, one of a Roman Senator dressed in the toga, in the attitude of an orator; a second, of Etruscan style, representing a somewhat archaic type of a god holding a cornucopia. From Civita Vecchia is a curious piece of bronze, once apparently forming the coating of a galley, and shaped at the end into a female head of archaic style. It was fished up out of the sea, and is now the property of Signor Ardita. Count Spinelli, whose excavations on his estate at Acerra have yielded such valuable results,

also exhibits a case of bronzes, and a third case contains objects found in the excavations of 1873 at the Monte della Giustizia, among which the most remarkable is a double lamp of great beauty. It is chased all over with very rich decorations, and on the cover stands a graceful figure of a Lar. The exhibition includes a large collection of reproductions of ancient bronzes. The example here set of bringing first-rate antiques before the public is doubly profitable. It encourages popular interest in local excavations, and it gives the modern craftsman the opportunity of comparing his own technique with that of Classical times.

THE loan collection of drawings at the Gallery of the Society of Painters in Water-colours unfortunately closes on Saturday this week, and we presume that preparations for the annual exhibition in May render it useless to hope for any further extension of the time. The exhibition has formed a kind of summary of the water-colour art of the early part of this century, and is most interesting in a historical sense, as well as in regard to the beauty of many of the works. Among other things, the spectator was reminded of the fine things done in the old broad and rather colourless style by Havell, whose name has dropped out of general recollection, while that of Girtin, whom Havell at his best certainly equalled, has survived. Perhaps Girtin was partly drawn along the path of fame by the greater glory of Turner, who in his early days was more or less linked with Girtin in talk and criticism. Girtin is pretty well represented, also David Cox (in quality if not in quantity). Some of Mrs. Angell's exquisite flower and bird paintings are there, also flower and bird paintings not much inferior to hers, by a predecessor,—Rosenberg; also, in the way of still life, F. Walker's splendid study of "Mushrooms." The water-colour replica of the "Harbour of Refuge" is also in the collection. Other well-known names, old and recent, are well represented. The attendance at the exhibition appears to have been nothing like what its high interest would have led one to expect.

THE French Gallery in Pall-mall, which opened on Monday, is not so interesting as it usually is. The collection contains two works of Meissonnier, into which the artist has not put much effort, but which exhibit that wonderful ease and thoroughness in portraying the whole attitude, costume, and character of a single figure, which has become a kind of second nature with him. These are "Le Sommeil" (46) and "Le Fumeur" (50), the latter a figure of which we seem to read the whole history and character, but it is a very common-place one. Seiler's "On the March" (10), is a painting Meissonnier might almost have signed, a small group of military men in a tavern, finished with wonderful delicacy. The same painter's "A Rare Proof" (47), and "Writing his Leader" (48), should be noted. Oeder's "Approaching Storm" (34) is a powerful landscape with a good deal of individuality of style. "The Traitor Tracked" (53), a Servian subject of P. Joannawits, is one of the best figure paintings in regard to point and expression; the exponentatory and yet weak and unnerve manner of "the traitor" is very well given. The painting by Israels (63) is a smaller edition of one of his finest and most pathetic works, the widow watching by her dead husband's coffin, which has been seen in the same gallery, and on the fine and pathetic quality of which we commented at the time, though we cannot now recall the title under which it was then exhibited. The larger picture is in a private collection in London. Heffner's "Repose" (60) is one of the finest efforts in his impressive but rather artificial manner. "Princes of the Church" (13), two aged dignitaries descending from the Sanctuary, by Aug. Holmberg, shows some very brilliant painting of architectural and decorative detail, which is its chief interest, though the figures are good and characteristic. "Prayer" is a small but good specimen of Gérôme's work (135), and



interior of a mosque with figures in the act of worship. "The Evening Hymn," an interior with two figures of girls seen against a window (130), by W. Firlie, is an expressive painting. Kramer's large work with many figures (119), "He that is without sin among you," &c., contains fine points, especially in the expression and action of some of the subordinate figures who look on; but the Christ is weak and theatrical.

THE exhibition at Messrs. Tooth's Gallery in the Haymarket contains no very remarkable work except Sir John Millais's picture of "Bubbles," which we have already noticed. There is a good work of Mr. Faed's, "Alone" (6), and a clever but very ugly picture by Eisenhut of "A Tartar School in Baku" (60). Mr. Boughton's "Forget-me-not" (62), a life-size three-quarter length of a handsome girl, is a pleasing work. Others, by Messrs. Waterlow, Gallegos, Heffner (a fine example), Davis, De Blaas, Pasini, &c., are worth looking at.

THE "on view" of the late Mr. Graham's pictures at Christie's this week has afforded an opportunity of seeing together many works by some remarkable modern English painter which will not be so fully and collectively represented again for many a year to come. There were a great number of Mr. Burne-Jones's works, including the "Six Days of Creation," the first (and most beautiful) edition of "Venus's Mirror," that modern Giorgione the "Chant d'Amour," and a good many others. There was a room full of Rossettis, including that strangely pathetic early work, "Found"; pity the painter did not pursue this path of truth and nature more, instead of giving his powers to producing impossible feminine animals with preternaturally long necks and large lips. There was F. Walker's "Bathers," where the figures of two London youths among the crowd are treated with almost Greek style and dignity, and yet are natural, and his "Vagrants," with the powerful figure of the woman with folded arms, and the smoke drifting across her figure, which once seen can never be forgotten. There was Sir John Millais's "Blind Girl," about which such paper warfare ensued a quarter of a century ago, and which we still think "will not do"; and his "Vale of Rest," which is a fine poem in its sombre feeling and rich evening light, and is a work that is not likely to lose in position as time goes on. The same can hardly be said of "Apple Blossoms," the figures in which are absolutely alarming. Among other works of interest we noticed some landscapes by Mr. Legros, with which we were not familiar, and which have a rare merit of their own, in their fine and poetic composition, and soft aerial tones. The occasion was one of remarkable interest to lovers of pictures, and that it was felt to be so the crowd in the rooms fully attested. It will be curious to see for what sort of prices the Rossettis and the early pictures by Sir J. Millais will go at the sale. "The Vale of Rest" is certain to command its value, but of some others, and of the Rossettis, we feel somewhat doubtful. Among the spectators in the Rossetti room there was a good deal more criticism (sometimes rising to sarcasm) than enthusiasm.

NO more charming exhibition has ever been seen in the rooms of the Society of Fine Arts than the collection of works by Mrs. Allingham, under the title "Surrey Cottages." Everyone knows the general character of her work, but one must see a number of examples together (there are sixty-six at the gallery) to realise how various, how complete, and how true both to nature and art are these little transcripts of bits of English scenery, with their homes and inhabitants. The drawings are broadly grouped under the heading of Spring, Summer, Autumn, and Winter (only a few of the latter, however). The elements of the scenes are much alike: a bit of garden or a part of a meadow, with wood rising behind it, an old, half timber, half brick, thatched house, and two or three figures; but the variety within this restricted path is

wonderful, and not less the thoroughness with which every portion of the work is finished, yet without a touch of hardness. The composition of the little scenes is a model of that kind of art which is so carefully considered as to seem quite natural and spontaneously; the figures, however small, are never without a little point or history; the mother looks out after her children going to school; a neighbour calls over the gate to the mistress of the house; a child comes out to give a penny to the fiddler, watched by the others over the wall; the action and expression of each is complete in itself, but they all fall into their places as part of the scene. We had begun to mark some special favourites in the catalogue, but it would have ended in marking them all. All who love the spirit of English rural scenery, and who can appreciate art that is unobtrusive, modest in its aims, but true to the backbone, should visit this collection, which sends one away with the mind full of pleasant images and associations.

#### LETTER FROM PARIS.

On the 28th of January last, M. Paul Haag, Engineer-in-chief of Roads and Bridges, delivered an interesting lecture before the Société Centrale des Architectes on the great works in Paris, the undertaking of which was according to him, intimately connected with the construction of a high-level metropolitan railway. In our February letter we briefly alluded to this project, mentioning the general objection felt in Paris to the idea of a city railway on the surface, which would cause, it was thought, vibration dangerous to buildings, fill the streets with smoke, &c. On the other hand, it is extremely difficult to establish an underground railway below the sewer levels in a city like Paris, where the houses are both very lofty and very deeply cellared, and where the space under the streets, what with water, gas, sewerage, and networks of telegraphic and telephonic wires, is as complicated with passages as the basement of a theatre.

Accordingly, both with the public and the Government, there seems to be a turn in favour of M. Haag's high-level idea, which has already been carried out successfully in New York, Vienna, and Berlin; and although no decision has yet been come to, we may take the opportunity to sketch in a general way the principal features of a project which has considerable chance of being accomplished, and which, as it involves no subterranean excavation, may be carried out in time to help the extra traffic of the '89 exhibition.

The leading idea of M. Haag is to make his Metropolitan Railway not an isolated system, but the complement of the suburban system and the uniting of the great lines which penetrate into Paris. It is important to add that, though serving the central part of the city, the railway is to interfere with no important building in any way, and will respect the artistic physiognomy of Paris. A new road would be opened from west to east of the City, 42 mètres wide, on the centre of which will be placed the metal viaduct, 12 mètres wide, with an ordinary roadway of 15 mètres on each side of it. This main road, which will serve in its course the Boulevards, the theatres, the Halles Centrales, the Hôtel des Postes, and the Hôtel de Ville, will branch at its extremities to join the great lines and the suburban railway, crossing the Seine at the Halle aux Vins, with no necessity for tunnels except at the Pantheon and the Trocadéro. Without entering on any discussion of a project, the attractive side of which is obvious, but which has given rise to criticisms too lengthy to formulate, we may say that M. Haag calculates the expense at 400 million francs, with a net receipt of 17 or 18 millions from the rent of stores and shops bordering the railroad. That is the state of the question submitted to the Government. It is to be hoped it will be satisfactorily entered on, and do something to amend the stagnation in labour from which we have been suffering.

The above-named lecture was one example only of the importance and interest of the meetings of the Société Centrale. The other day M. Hielard read a paper on the future Bourse de Commerce, and its financial aspect; and next M. Vielcastel has given us some information on the art of the far East. In a few days, M. Marius Vachon will discourse to us

on national Russian art; and M. Georges Berger, Commissioner of the Foreign Sections in the Exhibition of 1878, will exhibit in turn the plan of the future exhibition, with the statement of the financial combinations calculated to ensure its success without falling heavily on the taxpayer. We may here observe, in regard to the Société Centrale, that the conference of this year will take for its chief excursion *extra muros* the town of Troyes, a selection which will probably draw a large number to join in a visit to a place of such special architectural and historical interest. The works of M. Guilbert Martin, to whom may be credited the revival of mosaic art in France, will also be visited. He has created at St. Denis a school of mosaic, and he carried out the mosaic work at the Pantheon, after the design of Hébert, and also the decoration of the Daru staircase at the Louvre. This latter includes eight cupolas executed in enamel, after the designs of M. Leneveu.

On April 7th the artists elect the jury for the Salon of 1886. In the mean time the jury of admission, presided over by M. Bouguereau, is working without cessation at the task of choosing from among the 5,000 pictures sent to the Palais d'Industrie the 2,500 which the regulations admit.

There is another exhibition, of which we shall have to give account, and which is announced under the most favourable auspices, that of the works of Paul Baudry, at the Ecole des Beaux Arts, which the Mobilier National is decorating for the occasion with fine tapestries. This, which will remain open during the months of April and May, includes 170 original pictures, twenty-three copies, and 170 drawings. The receipts are intended, as already mentioned, to go towards erecting a monument to Baudry in Père Lachaise. The subscriptions for this object already amount to nearly 40,000 francs.

Since our last letter the Académie des Beaux Arts has proceeded to fill up the place of the deceased painter; and though, in the order of presentation, M. Emile Lévy was in the first rank, it is M. Jules Breton who has been victorious, after four votings. This success falls in happily with that attained in America by a work of the same artist, at the Morgan sale. This is a subject of melancholy reflection to Parisian painters, who are not accustomed to such strokes of fortune, for the sales at the Salle Drouot have fallen far below their former success, and the artists are the first to suffer under the general stagnation which reigns here. Under these circumstances it is necessary to stimulate public attention by successive exhibitions, which do not always attain their end. That of the Water-Colour Society has been much less successful than in former years; and the same with the exhibition of Black and White installed in a rather makeshift manner in the sheds of the Tuileries. There are some remarkable drawings there, but they are exceptional points in an ocean of common-places which look like the works of pupils in the primary schools. Let us hope better for the exhibition of Pastels (a very brilliant one last year), which will open in the Galerie Petit on April 2nd.

The Académie des Beaux Arts has had to decide recently on the competition for the architectural prize founded by Achille Leclère. The subject was a museum on a private property. M. Conil Lacoste, pupil of M. Gninain, had obtained the prize, while "honourable mention" was accorded, *ex æquo*, to MM. Delestré and Baudoin, pupils of M. Guadet. The Académie has also decided on the first competition for the "Grand Prix de Rome" (architectural section). The jury had to examine forty-eight sets of drawings. Ten young architects have been admitted into residence for the final competition. These are:—MM. Deffrasse, pupil of M. André; Louvet, pupil of M. Louvet; Sortais Gninain; Delemer, pupil of M. André; Sortais Gninain; Daumer and Girard; Leroy, pupil of M. Daumer and Gerhardt; Debué, pupil of M. Guadet; Conil Lacoste, pupil of M. Gninain; Lesclapart, pupil of M. Gninain; Despradelle, pupil of M. Pascal; and Gaston Cousin, pupil of M. Coquart and Gerhardt.

Meddling a little too promiscuously in political the Council Municipal is at the same time occupied about some interesting and useful public works. They may be justly reproached, certainly, with giving a dangerous degree of moral support to those engaged in the Decazville strike; but they have certainly given an impulse to some public works which the Govern-



ment has not ventured to initiate. Thus the Council has again moved, and this time with apparent chance of success, for that suppression of the fortifications which has been twice refused. The new Ministry of War shows itself, in principle, favourable enough to that suppression; they have had consultations with M. Alphand on the subject, and unless a fresh Ministerial crisis supervenes, it seems likely that his ideas will be carried out. The circle of fortifications being about 36 kilomètres, a commencement would be made by demolishing the portion between Auteuil and the Porte de Romainville, about 18 kilomètres in extent; at least, this would be the best course. Here the Municipality would have no private property to buy up, as in the usual roadmaking projects; they would, on the contrary, have the right of sale of the sites reclaimed from the fortification zone, after a space of about 72 mètres had been reserved for a double boulevard planted with trees, on each side of the city boundary railing. Later on, after the entire suppression of the fortifications, the double boulevard, bordered by gardens and villas, would create around Paris a great sanitary avenue from the Bois de Vincennes to the Bois de Boulogne, the two reservoirs of pure air at the two extremities of the city.

In combining this operation with that of the Metropolitan Railway, we shall, perhaps, solve the problem of cheap lodgings, accompanied by sanitary conditions. In the very heart of Paris also all is prepared for the indispensable prolongation of the Rue du Louvre, which, with the new Bourse de Commerce, will quickly do away with all the conglomeration of narrow unhealthy houses left in the centre of Paris. On the side the Government is seriously occupied about completely isolating the Opera Comique theatre, and giving it a new and fine façade towards the Boulevard des Italiens. This project, which will cost about three million francs, is to do away with the danger from the fire which has often threatened the edifice. It is to be hoped the Government will not be so flattery in this matter as about the restoration of the Porte St. Denis.

The Municipal Council, in spite of its activity in other directions, seems determined to do nothing about the continuation of the Boulevard Haussmann, perhaps from a hatred of the name of the "reactionary" initiator of the scheme, though the ostensible pretext is economy, and the adjournment of operations which are described as *de iure*. Meantime the suburban communes, which have not the same reasons for economising, continue to embellish their districts with monumental edifices as Mairies. A competition is to be opened at Mureaux for the building of a Hôtel de Ville, and in the course of the year three new Mairies will be inaugurated, at Boulogne, Arcueil, and Pantin. The latter will be made the object of some important artistic decoration. The ways and means are also under consideration for reconstructing the Mairies of Vincennes, Levallois, Perret, and Charenton,—a considerable aggregate of work. The same energy will have to be shown within the city before we can quote the Parisian proverb, "Quand le bâtiment va, tout va."

The Government ought to take some steps about the ruins of old buildings as well as the building of new, and clear away, at least before the approaching exhibition, the walls blackened by communal petroleum which still rear themselves on the Quai d'Orsay. The unhappy idea has been mooted, indeed, of establishing here a Museum of Decorative Art so long announced. At the members of the Union Centrale, who seem inhabitable a region of pure utopianism, have at last made to comprehend that the proper treatment for such a museum would be in the industrial quarters and among the art-workmen whose benefit it is intended. The quarter called "Du Marais," and especially the ancient Hôtel Thoiry formerly occupied by the École Centrale (and described in the *Builder* last year), could be a convenient and suitable neighbourhood, but nothing will be done yet. It takes me, you see, in such an atmosphere of routine and indifference, to get up anything like a rival to South Kensington.

Every year the Fête Nationale gives occasion for the inauguration of a statue, making part of the programme of the day. This year it will be Diderot who will have the honour to exhibit in bronze effigy to the Parisian populace on the 4th of July, with the accompaniments of masonry, crackers, and official discourses. The

work is by M. Jean Gautherin, and will be placed on the Place St. Germain des Prés, at its intersection with the Boulevard St. Germain.

The museum of the Luxembourg, to which reference has more than once been made, will be opened to the public about the time these lines appear. We have already described the building; but we may add here that the first gallery is reserved for works in sculpture, while the paintings, drawings, and water-colours occupy the second gallery. There is here a collection of about 460 works of the best known modern artists, very well arranged by M. Etienne Arago, the venerable curator of the museum.

The last bit of artistic news is that the "Manufacture des Gobelins" has completed the sumptuous tapestries intended for the Palais du Luxembourg, as well as the large decorative panels intended for the Bibliothèque Nationale and the Palais d'Élysée. The latter, which symbolise Painting, Art, Science, and Poetry (Lyric, Pastoral, and Satiric), are executed after cartoons by M. Galland.

We have to mention the decease of two landscape painters, MM. Victor Navlet and Joseph Lecomte. The first was best known by his views of Paris and Rome. The latter, who obtained the "premier grand prix" for historic landscape in 1849, was a pupil of Picot and d'Alligny; he has died at the age of sixty-three, leaving a considerable amount of very important work behind him.

#### FREE LECTURES TO ARTISANS AT CARPENTERS' HALL.

##### THE FINE ART ASPECT OF WOODWORK.

THE sixth lecture of the present course was delivered on Wednesday, March 24th, by Mr. H. H. Statham, who took for his subject, "The Fine Art Aspect of Woodwork," or woodwork regarded from an artistic point of view. The word "art," he pointed out, was now very often used in a very conventional manner. People talked about "art colours," by which they meant certain dull tertiaries which it had become the fashion to use; and about "art furniture," by which they meant furniture made after a certain style, which happened to be much admired for the time. As a matter of fact, all furniture ought to be art furniture, and anything which professed to be so specially was probably rather the opposite. Now, in speaking of art as applied to woodwork, he was not going to say anything about the higher work of sculpture in wood, but should confine himself to decorative work and work made for use, without excluding ornament. Now, he had never seen any definition of what "art" meant in connexion with such matters which was so comprehensive and suggestive as one which was given by John Stuart Mill, in an address to the University of St. Andrew's, many years ago, which was as follows:—

"If I were to define art, I should be inclined to call it the endeavour after perfection of execution. If we meet with any piece of mechanical work which bears the marks of being done in this spirit, which is done as if the workman loved his work and tried to make it as good as possible, even though something less good would have answered the purpose for which it was ostensibly required, we should say that the workman had worked like an artist."

That was a broad and accurate summing-up of the truth of the matter, and the remarks he (the lecturer) had to make would have special reference to its application to woodwork. Beginning at the beginning with the mere way of constructing woodwork, it had been very well pointed out by the late M. Viollet le Duc, the eminent French architect, in the article "Menuiserie" in his "Dictionnaire," that in treating woodwork ornamentally it should, as a rule, be so treated that the ornament should not interfere with the portions which had to be joined,—the portions, in fact, where the points of construction came in. As an instance of this, trellis-work with square openings constructionally could be ornamented very effectively by chamfering-out the inner edges of the openings so as to impart a circular or other outline to them. Another instance of the way in which the simplest lattice work in wood could be ornamented was seen in the screens of Arabic work so much used for windows in Egypt and the East, these screens, effective as they were, consisting merely of small squares of wood connected together by other small pieces of wood turned in the form of dwarf columns or balusters. Reverting to Viollet le Duc, his

practice was not always equal to his preaching; indeed, some of the examples he gave were very much opposed to the principles laid down by him. For instance, he gave, as an example for imitation, a mimic column with capital and base rising up to support the underside of an arch. Now not only was the arch not a form of wooden construction, but it was opposed to all constructional laws to put a column under what, in a stone arch, would be the keystone. It was true that the example referred to had been executed in Medieval times, but it was not necessarily right on that account. The arch was essentially a stone form, and should not be executed in wood at all, and where an opening in a wooden construction needed dividing into two or more divisions it should be done not by regular architectural columns with capitals and bases, but by something more in the nature of balusters designed for the situation. Another mistake in woodwork was seen in the carving of panels so as to imitate something other than wood, as, for instance, in the "linen-pattern" panels so often imitated. These were things which surely did not fulfil Mill's law; in fact, they belonged to the category of mere sleight of hand. If, instead of having flat panels, it was desired to carve or otherwise vary their surface, there were plenty of ways of doing it in a more fit and sensible manner. One fault very common in modern woodwork, though it was found in some old examples, consisted in making the upright divisions of the framing take the form of mimic stone buttresses, with set-offs, &c. These features, when executed in wood, were not only meaningless, but ridiculous. But, unfortunately, much worse things were done every day, in the way of imitating stone construction in wood. For instance, cornices from Greek temples, of a contour specially designed for marble or stone, were imitated in wood, and recommended for imitation in almost identical section, in some so-called text-books for the instruction of workers in wood. These things were done almost universally in the early part of the present century, although they were absolute shams. The construction of such wooden cornices for cabinets, &c., involved an amount of hollow "cradling" admirably adapted for the collection and retention of dust. Another sham of the same era, and not yet defunct, was the hollow "Doric" column, put together with 1½ in. strips of wood. Next referring to some sketches of specimens in the Jones Collection of Furniture in the South Kensington Museum, the lecturer pointed out the necessity of articulating the legs of furniture well with the superstructure, as well as designing them so as to get a firm and slightly-spread base. Other points touched upon in connexion with specimens in this collection were the need of an apparently strong junction, as well as a really strong one, between the top and legs of a table, and the necessity of all ornamentation being suitable to the material and confined almost entirely to the parts which would not be weakened in appearance by it. The lecturer condemned as "an old humbug" a bulbous-shaped and apparently very massive table-leg, which purported to be turned and carved out of one piece of wood, the fact being that the real leg was no more substantial than its smallest dimensions, the bulbous carved work being *appliqué*, and glued on in sections. After referring to an example of Sheraton's work in the form of the foot of a work-table, and to an ancient Egyptian chair now in the British Museum, the lecturer contrasted two arm-chairs,—the one plain, but artistic, because well designed and appropriately constructed; and the other, "would-be-artistic," having for its arms carved dolphins sloping at a very inconvenient angle, these arms being apparently utterly devoid of any constructive articulation with the other parts of the chair, and obviously without any continuity of design. In this latter specimen, the ornamentation was utterly misplaced. By way of emphasising his point that the ornament should never be allowed to interfere with the practical use of the object to which it was applied, the lecturer exhibited (by the kindness of Messrs. Searle, the well-known boat-builders) a rowing scull, which, as he pointed out, was a thing very fine in its lines, and necessarily so, because it had to be very carefully made to fit it in the best way for its purpose. It had to be strong enough to take a good pull, while, at the same time, it had to be made as light as pos-



sible, as every ounce of unnecessary weight would tell upon the man who used it, and the strength of the stem had to be fined off gradually into the broad thin blade. Now, although there was not the least bit of ornament about it, it was an elegantly and fitly-shaped object; and it would not be rendered more "artistic" if it were covered with the surface ornament and carving with which certain barbaric peoples decorated such implements, because its utility would be very much impaired. The lecturer next referred to some eccentricities of woodwork, which he called "German gimcrack," such as the centre-bit style, the "spikey-style," as sometimes exemplified in the barge-boards of houses built by speculating builders; and the "bottle-stopper style," a familiar illustration of which was afforded by the ends of common wooden "cornice-poles" or curtain-rods. Most of these vulgarities were to be found in some of the text-books intended for the instruction of youth in "artistic woodwork." But there was English "gimcrack" as well as German "gimcrack," and he was sorry to say that some of it was by so excellent a workman as Chippendale, whose works were, unfortunately, indiscriminately worshipped and sought after by people, many of whom were purchasers of Chippendale's work, or of imitations of it, without knowing why or wherefore, except that it was "the fashion." Chippendale was undoubtedly one of the most conscientious workmen who ever lived, but much of his work was very inappropriate in design. For instance, his tables with open or perforated legs, with gimcrack pediments and crockets stuck on and in them, were very unsatisfactory, and the same must be said of his ribbon-backed chair, which he had himself described as "the best chair ever made!" No doubt it was one of the best put together, but in point of design, where was the sense in a man carving elaborate knots of ribbons for the user of the chair to lean against? Many much better chairs had been made than that, — by Sheraton, for instance, who was a far better artist than Chippendale. Having referred to a mantelpiece cabinet made up from old oak work by Mr. Harry Hems, as a good example of solid work, the lecturer said a few words as to individuality in the treatment of street-doors. As Sir Gilbert Scott had said, a man ought to know his own door by some other token than that it is No. 37 or 43. As an instance of admirable work throughout, the lecturer instanced a German cabinet now in the South Kensington Museum. It was decorated with ornament carved on the surface of the cabinet itself, nothing being stuck on. In the larger forms of wooden construction, such as roofs, much had been done decoratively by the great Mediaeval artists, as was to be seen in the roof of Westminster Hall and that of the Middle Temple Hall, the former being the most satisfactory in treatment.



Late Gothic Oak Carving: Conventional Treatment of Thistle.

Having offered a suggestion for the ornamentation of a common queen-post roof, incidentally remarking that in a book intended to give popular instruction in woodwork, and favourably reviewed by the *Times*, a queen-post roof was described as that form of roof in which the post stood on the middle of the tie-beam, and supported the apex (!), the lecturer referred to some sketches of Renaissance and Scandinavian ornament, pointing out that naturalistic and conventional ornamentation should rarely or never be associated in the same work. A sketch was exhibited of an Italian Renaissance mirror frame now in the South Kensington Museum, which was spoken of in terms of high commendation, especial stress being laid upon the enthusiastic and loving spirit of the artist who made it, as evidenced by the fact that in lieu of providing a mere cover for the steel mirror, to serve the

utilitarian purpose of keeping it from the dust, he had delicately carved the surface of the panel in low relief, the centre containing a most beautiful head. Amongst other specimens of old work referred to was the choir-screen in Lancaster Church, believed to have been looted from one of the old abbeys. The treatment of the finials and moldings in that work was very fine. In conclusion, the lecturer referred very briefly to some inlaid and other chairs exhibited by Messrs. Collinson & Lock; to some casts and specimens lent by Messrs. Farmer & Brindley; and to some exhibits lent by Mr. G. A. Rogers from his well-known collection, including a very good specimen of Grinling Gibbons's work, concerning which he said it was very much to be regretted that so much technical skill in execution should have been wasted upon work which was so utterly lacking in all the qualities of real design, and which consisted merely of festoons of flowers and fruit, fish, musical instruments, &c., all strung together. It was noteworthy how even the most ordinary and commonplace articles of domestic use might be made more or less artistic where there was a real desire for art. As an instance of this, the lecturer pointed to an Icelandic fish-pot (from the collection of Mr. Rogers), a mere common kitchen utensil, made of wood and very elegantly carved on the exterior, of which a sketch is subjoined.



Icelandic Wooden Fish-pot.

On the motion of Mr. Clifford Smith, seconded by Mr. Preston, the Clerk of the Company, a vote of thanks was given to the lecturer and to the gentlemen who had lent specimens, &c., for exhibition. Besides those already mentioned we may state that Professor Roger Smith lent

#### STREET RAILWAY TO ABERDEEN CORPORATION GASWORKS.

THE use of locomotives for the haulage of goods is extending to a considerable degree, so far as regards the quays and wharfs of many of the principal shipping ports. A railway along the ordinary streets of a town being of rare occurrence in this country, the following notes descriptive of that now in course of construction at Aberdeen, from the Docks to the Corporation Gasworks, may prove of interest to our readers.

The gasworks, which lie at the extreme east end of the city, were, with the remainder of the gas undertaking belonging to the Aberdeen Gas Light Company, transferred by statute to the Aberdeen Town Council as at 1st August, 1871. Since that date the continued increase of the population within the gas limits, and a corresponding growth in the demand for gas, has necessitated various additions to and extensions of the works, the chief feature being the erection of three large new gasholders. Several different qualities of coal are employed in the manufacture of the Aberdeen gas. These coals are brought to the city partly by rail and partly by sea. The gasworks are distant about half a mile from the docks and three-quarters of a mile from the South Railway station, and hitherto the gas coal required has been carted to the works by horse haulage in the ordinary way. It was frequently represented that the cartage system was becoming unmanageable, the gas superintendent pointing, as strong disadvantages, to the difficulty of thus conveying in a sufficiently limited time cargoes from the ship's side, and to the fact that it did not give due facility for storage and checking of weights of the various qualities of coals used.

So far back as 1880 various schemes for the construction of a railway to the gasworks were brought under the consideration of the Town Council, but it was not until the introduction of a City Improvements Bill in 1882 that the railway or tramway under notice was definitely proposed. The statutory plans of the railway were lodged in Parliament along with those of the City Improvements Scheme. Considerable opposition was at first offered to this as well as to the other projected works. Eventually such opposition was withdrawn, and, although the railway was not favourably reported on by the Board of Trade Inspector, the Bill (including it) was passed in 1883, with certain regulations as to the speed at which the coal trains should pass along the streets and as to the hours at which such traffic should be conducted. Great hostility was afterwards shown by the East-end inhabitants, the School Board, and a large minority of the Town Council to carrying this portion of the Bill into execution. The objections put were danger to the lieges, especially children; smoke nuisance, noise, and failure to secure economy. These objections were, however, overruled, and the minority outvoted by a majority of the Town Council, who resolved to go on with the work.

The Parliamentary and also the working plans have been prepared by Messrs. Jenkins & Marr, civil engineers and architects, Aberdeen. The contract for supplying the rails, — which have all been delivered, — was secured by Messrs. Nicoll & Sons and Messrs. Brown & Tawse, both of Dundee. The contract for the construction of the line was let a few months ago to Mr. Robert Gair, contractor, Aberdeen; and the points, crossings, bolts, &c., were contracted for by Messrs. James Abernethy & Co., Ferryhill Foundry, Aberdeen. The works are now in active progress, and will be completely finished before many weeks have elapsed.

The length of the railway is 3 furlongs, 48 yards, with numerous sidings and loop line or lyes within the yards, coal-sheds, and other buildings at the gasworks. The whole length including these sidings, is about a mile. The railway commences by a junction with the existing lines of harbour rails on Waterloo Quay, near the south end of Church-street. The line will be single, and will traverse the pass along the centre of the following public streets, viz., Church-street, St. Clement-street, and Summer-lane; the length of line along these streets being about 411 lineal yards. A present both Summer-lane and St. Clement-street are obstructed by two very awkward points or projections at Baltic-street and Garvock Wynd. In order to make the line of railway as straight as possible, these projecting buildings are to be

some drawings of timber roofs, and Mr. J. D. Sedding some rubbings of bench-ends in Cornish churches. Among other objects exhibited was a very fine piece of late Gothic carving, a conventionalised treatment of the thistle, lent by Miss Rowe, the superintendent of the School of Art Wood-carving at South Kensington, and of which also a sketch is subjoined. The lecture was also illustrated by a series of upwards of fifty sketches, prepared by the lecturer and lithographed and presented to each person present.

The seventh lecture of the present course was given on Wednesday evening last by Mr. James Doulton, who chose as his subject "Terra Cotta." Mr. Alfred Preston presided, and the lecture was illustrated by the "throwing" of terra-cotta ware and the incising of the ware by the loop tool. A report of the lecture will appear in our next.



removed, and these streets widened considerably; and, apart altogether from the question of the railway, this will be a decided street improvement. Church-street is also to be widened (where necessary) from 23 ft. 6 in. to about 47 ft., which will be the uniform width along its whole length, and the width of none of the streets traversed will be much less than the latter figure. This, it is expected, will allow ample room for the ordinary wheel and foot traffic, even when coal trains are passing.

The track of the railway will be of the ordinary 4 ft. 8½ in. gauge. The rails throughout are of steel. Those in the public streets are 8 in. broad, and weigh 67 lb. per yard. There is a small groove along the middle of the upper surface of the rails in which the flanges of the wheels of the engines and trucks will run. It may be noted that no special waggons are required in the working of the railway, which has been devised so as to allow usual railway coal-waggons being shunted direct on to it from the lines of the ordinary railway system. No transverse sleepers are required for the track so far as it is on the public streets. The rails in those streets are fish-plated, with counterunk bolts, and spiked, at 3 ft. apart, on to longitudinal run beams of 8 in. by 7 in. creosoted edwood. These beams, or sleepers, are embedded in 6 in. thick of cement concrete in the proportion of six to one, the breadth of the concrete track being 7 ft. The surface of the tracks is paved with square-dressed granite away stones in the usual way, and the top of the rails will be flush with the surface of the streets. It has not been thought necessary to "diamond" the surface of the rails the same as those on which the passenger tramcars run in their parts of the city, or to take any other means to prevent them getting smooth. There are numerous curves on the line, the sharpest in the streets being 135 ft. radius, and the beams have been bent to the radius by saw-cuts on the outer edge, with edges driven in. The steepest incline is in Church-street, where the gradient is one in thirty-eight.

The rails within the gasworks are the ordinary flat-bottomed rail, weighing 56 lb. per lineal yard. Where the line is straight these rails, which are fish-plated throughout, are spiked down to transverse sleepers, 9 ft. long by 10 in. by 5 in., placed at about 3 ft. from centre to centre. In the curved portions the rails are laid and spiked upon longitudinal sleepers, 8 in. by 7 in., checked into transverse sleepers of the same dimensions as those above described, but placed at 5 ft. apart from centre to centre. The hole of the sleepers within the gasworks are Scotch fir, creosoted, and all the permanent way within the works is ballasted with the linker refuse from the furnaces, the box being 6 ft. wide, and the depth of ballast varying from 1 ft. 3 in. to 1 ft. 9 in., all thoroughly raked round the sleepers and longitudinal beams. Within the coal-sheds and buildings a surface is finished with square-dressed granite casework.

The curves on which the locomotive engine will work vary from 220 ft. to 120 ft. radius, while some of the minor branches, or sidings, within the coal-sheds are only 50 ft. radius. In laying these curves the outer leg of the rail has been kept up in some cases as much as 4 in., and in order to afford some play to the wheels, and facilitate the passage of trucks round these sharp curves, the gauge has been kept ½ in. full. There are in all seventeen points and crossings, raked in the usual way, by levers and boxes.

There will be a Pooley's steelyard at the point where the line enters the gasworks, for weighing the trucks and coals when entering and co-waggons when going out. The cost of the works as contracted for is only about 2,500, while the expense of the buildings (eight number) which the corporation had to remove and which are already all taken up has been about 4,500. The railway to be worked under contract by the Great North of Scotland Railway Company for seven years from the opening of the line, after which no the corporation may make any other arrangement found advisable. A small steam locomotive, specially constructed to suit the traffic, will be employed on the line. Apart from the cartage of refuse from the furnaces, the quantity of coal and other material required to be conveyed to the gasworks amounts to the respectable figure of 35,000 tons annually, and the promoters expect that by the

use of the line a saving of 200l. or thereby per annum will be effected as compared with the present mode of conveying the coals and stores by horses and carts,—an anticipation the accuracy or inaccuracy of which only the crucial test of actual results will determine.

#### THE DISPOSAL OF THE METROPOLITAN SEWAGE.

At the meeting of the Metropolitan Board of Works on the 26th inst., the Works and General Purposes Committee presented the following important report on the Metropolitan sewage question:—

"Your committee, on the 8th inst., made a report\* on the subject of the treatment of the sewage of the metropolis, with a view to preventing its being a source of nuisance or a cause of complaint in future. They now think it desirable to make a further report, setting out the various modes of dealing with the question which have been submitted for their consideration, and the course which, after long and careful examination, they have decided to recommend the Board to adopt.

The two reports of the Royal Commission on Sewage Discharge were laid before the Board on February 8 and December 12, 1884, respectively, and were referred to your committee for consideration and report. The principal conclusions and recommendations of the Commissioners to which it was necessary to direct attention were the following:—

(2) That in the opinion of the Commissioners it is neither necessary nor justifiable to discharge the sewage of the metropolis, in its crude state, into any part of the Thames.

(3) That some process of deposition or precipitation should be used to separate the solid from the liquid portions of the sewage.

(4) That such process may be conveniently and speedily applied at the two present main outfalls.

(10) These conclusions were qualified by the opinion that the liquid so separated would not be sufficiently free from noxious matters to allow of its being discharged at the present outfalls as a permanent measure. It would require further purification; and this according to the present state of knowledge can only be done effectually by its application to land.

(5) That the solid matter deposited as sludge can be applied to the raising of low-lying lands, or burned, or dug into land, or carried away to sea.

(6) The entire process of precipitation and dealing with the sludge can be and must be effected without substantial nuisance to the neighbourhoods where they are carried on.

The Board's Engineer, Sir Joseph Bazalgette, had, it will be remembered, during the sittings of the Royal Commissioners, laid before them a plan by which the sewage from the Barking and Crossness reservoirs might be conveyed through a culvert to Thames Haven, thirty-four miles below London Bridge, and there discharged in its crude state into the Thames at ebb-tide. The attention of your committee was necessarily directed to this proposal as indicating one of the possible solutions of the problem under examination. It was, however, by no means clear to your committee, especially when they came to consider the estimates of cost, that the carrying of the sewage to Thames Haven would be either the most effective or the most economical way of dealing with it. Moreover, the proposal was open to the objection that, although places near the metropolis, such as Erith, would be relieved of the presence of the sewage, other places nearer the mouth of the river would consider themselves injured by its conveyance to their neighbourhood. This was sufficiently indicated by a communication which the Southend Local Board, immediately on hearing of the project, addressed to the Board, protesting strongly on behalf of the inhabitants of Southend against any attempts to carry out the proposal.

In connexion with this suggestion for carrying the sewage lower down the Thames, it may be mentioned that the Board received from the Home Department communications which had been addressed to the Secretary of State by Colonel A. S. Jones and Mr. Bailey Denton, bringing before him a scheme for conveying the sewage to Canvey Island, and dealing with it there. The authors of the scheme seem to have propounded it on the assumption that the Board would decide to carry the sewage to Thames Haven, a course which your committee were not prepared to recommend. It was a further element of this scheme that the Board should deliver the whole of the London sewage over to Messrs. Jones & Denton, and should make them an annual payment of 110,000l.

The view taken by your committee, and also by the Board itself, upon this part of the scheme was that it would not be consistent with the Board's duty to hand over the sewage to be dealt with by other persons in consideration of a very large annual payment, and that the Board could not rid itself of its responsibility in that manner. The Home Department and the promoters of the scheme were informed to that effect.

Your committee may here mention that they have had before them numerous suggestions from persons whose attention seems to have been given to the sewage difficulty, but that none of them have seemed to your committee to contain the promise of a satisfactory solution of it.

It appeared to your committee that the Board ought, in the first instance, to apply itself to the determination of the question whether by chemical and mechanical treatment of the sewage the liquid might not be separated from the solid matter, and further be freed of its noxious and offensive character to such an extent as to enable the effluent water to be discharged into the river without giving rise to any nuisance. The precipitation of the solid matter, and the consequent clarification of the sewage waters, could, it was found after careful experiment, be satisfactorily effected by mixing with the sewage proper proportions of lime and proto-sulphate of iron, and then allowing it to subside in settling-tanks. This, however, would not be sufficient to insure complete immunity from small arising from secondary fermentation and a fresh development of offensive gases in hot weather. Such immunity, however, it was deemed absolutely necessary to attain.

The Royal Commissioners seem to have been of opinion that the only effectual way of attaining it was, after precipitation of the solid matter, to further purify the liquid by a process of filtration through earth, and they advised that such a process of filtration should be adopted if it were decided to discharge the sewage effluent into the Thames in the neighbourhood of the present outfalls.

The acquisition of sufficient land, however, in the neighbourhood of Barking and Crossness, to enable the vast quantity of London sewage to be effectually filtered through the soil was found, upon examination, to be attended with such great difficulty, to say nothing of cost, that the Board conceived it to be its duty to endeavour, under competent advice, to find some other method sufficiently effective to obviate the necessity of earth filtration. What was required seemed to be an oxidising agent which would not only effect the immediate destruction of any offensive odour still remaining after chemical precipitation, but which would at the same time prevent the development of offensive gases. It was found that permanganic acid was effectual in accomplishing both these objects.

Your committee were extremely anxious that there should be no mistake in the conclusion arrived at upon this important point, as upon it would mainly depend the determination of the course which the Board should be advised to take. The opinion of four of the most eminent chemists in England (one of them a member of the Royal Commission here referred to) was accordingly obtained by the Board. They all, after careful observation of the experiments made, gave it as their opinion that, if the effluent produced as above mentioned by precipitation with lime and proto-sulphate of iron were subsequently treated with manganate of soda and sulphuric acid, it would be deodorised and purified to such an extent as to render its discharge into the river unobjectionable at all states of the tide.

With this authoritative opinion before them, your committee felt that the filtration difficulty might be regarded as overcome, and that the Board might safely conclude that the adoption of the process of precipitation, with the further resort to permanganic acid in hot weather, as proposed, would effectually render the discharge of the sewage into the river innoxious and inoffensive all through the year.

This valuable conclusion arrived at, the next question your committee had to consider was how the solid matter of sludge resulting from precipitation should be disposed of. This question, which forms the subject of the fifth recommendation in the report of the Royal Commissioners, has received long and careful attention on the part of your committee. It was thought

\* Printed in the Builder for the 20th ult., p. 457 ante.



that, whatever might be ultimately resolved upon as the best method of disposing of the sludge, it would be necessary, in the first instance, to press it into cakes. Suitable machinery for this purpose was accordingly set up at Crossness, and was found to work with such success that the Board soon deemed it expedient to supplement the first press by a much larger one. Both of these are now in operation, in connexion with the daily treatment of nine million gallons of sewage, and there seems reason to hope that the sludge, or the cake into which it is pressed, may be found useful for agricultural purposes, and that a demand for it may thus be created. Should that hope, however, not be realised, it will be for the Board to try the alternative suggested by the Commissioners, of carrying the sludge away to sea. It may be mentioned that the Board, acting upon one of the suggestions made by the Royal Commissioners, tried for some time the process of burning the pressed cake, but this process was found to be open to objection, owing to the fumes resulting from the combustion. In anticipation of an ultimate resort to conveyance of the sludge to sea, estimates for a suitable vessel were, some time ago, invited by public advertisement, and a number of persons having complied with the invitation, the plans and estimates sent in are now being examined by the Board's Engineer and the President of the Institute of Civil Engineers, preparatory to a report to the committee.

In considering this question, it is necessary to bear in mind the enormous quantities of material that have to be dealt with. It is estimated that about 150 million gallons of sewage are daily carried down to the outfalls. Supposing this quantity to be treated according to the methods mentioned in this report, there would be a residue of 3,000 tons of sludge, which, when pressed, would leave 850 tons of cake to be disposed of daily.

It remains for your committee to refer to the cost of the operations recommended in this report, and in doing so it may be well to compare the cost with that of the only other proposal which it seemed open to the Board to adopt,—that is to say, the proposal to convey the sewage into the river at Thames Haven or Hole Haven. From information given by the Board's Engineer, it appears that the capital cost of conveying the sewage to Thames Haven, and of the works that would have to be constructed there, would be 3½ millions sterling, whereas the capital expenditure required for dealing with the sewage at the present outfalls at Barking and Crossness would be only about three-quarters of a million. Comparing now the annual cost of the two proposals, it appears that the annual cost of treating the sewage at the present outfalls, including interest on capital, depreciation of plant, wear and tear, and all other expenses, is estimated at 118,000*l.* a year, whilst the estimated annual expenditure involved in the conveyance of the sewage to Hole Haven and its treatment there by precipitation is estimated at 215,000*l.*, or nearly 100,000*l.* a year more.

Your committee conclude this report by expressing their hope that the result of their long deliberations upon this important question will meet with the Board's approval, and that the course which they have recommended for adoption will, when fully carried out, be found to effect the object which the Board has so long had in view, viz., the disposal of the sewage of the metropolis in such a manner that no nuisance shall hereafter arise from it."

On the motion of Mr. F. H. Fowler, seconded by Mr. Selway, the report was unanimously adopted.

#### ARCHITECTURAL SOCIETIES.

**Manchester Architectural Association.**—The last general meeting was held on the 30th ult., at the Diocesan Buildings. Mr. L. Booth (president) in the chair. The following gentlemen were elected as officers for the ensuing session:—President, Mr. Lawrence Booth, F.R.I.B.A.; vice-presidents, Messrs. J. H. Woodhouse and F. W. Mee; committee, Messrs. P. E. Barker, J. Brooke, T. Chadwick, F. R. L. Edwards, E. Hewitt, O. C. Hill, H. Talbot, F. W. Ward, and G. H. Willoughby; treasurer, Mr. A. H. Davies-Colley; librarian, Mr. J. S. Hodgson; registrar, Mr. F. W. Mee; secretary, Mr. J. D. Mould. A discussion on the proposed new charter was opened by the President, in which Messrs. Woodhouse, Colley, Hodgson,

Talbot, and Mee took part, which resulted in the following resolution being carried unanimously:—

"That this meeting of the Manchester Architectural Association, composed, for the most part, of architectural students and junior members of the profession, called together for the special consideration of the question of 'Federation,' desires to record its cordial approval of the project generally, and its best thanks to those who, though not agreeing in all matters of detail, are actively engaged in its promotion."

"That in the opinion of this meeting no scheme of 'Federation' is either practicable or desirable that does not include the Royal Institute of British Architects as the central and controlling power; and that such powers as the Institute already possesses under its charter could be enlarged on liberal and comprehensive principles so as to enhance the usefulness of the Institute and confer greater benefits on the community."

"That, having regard to the increased and increasing importance of the duties of an architect, powers should be obtained to prevent practising of the profession by other than qualified members."

**Northern Architectural Association.**—A conference was held on Tuesday afternoon, March 30th, in the Old Castle, Newcastle-on-Tyne, under the auspices of the Northern Architectural Association, to consider the question of federating existing Societies of Architects practising in the United Kingdom into one common society. The chair was occupied by Mr. E. Shewbrooks, F.R.I.B.A., when the following resolution was carried:—

"That this meeting approves of the principle of federation, and will support the effort to be held in London under the auspices of the Society of Architects, and that a scheme for federation, if possible, be drawn up by a committee representing existing architectural societies and district meetings."

#### THE ARCHITECTURAL ASSOCIATION SOIREE.

The members' *soirée* of the Architectural Association took place on Friday, the 26th ult., in the Westminster Town-hall, and was very well attended. The play of the evening was entitled "Forced; or, The Compulsory Examination," with the following cast:—*Paust*, Mr. Herbert D. Appleton; *Meghistogheles*, Mr. J. Alfred Gotch; *Valentine*, Mr. Arthur Young; *First Student*, Mr. A. C. Bulmer Booth; *Second Student*, Mr. F. Stephen Granger; *Third Student*, Mr. Thomas Edward Pryce. Symbolical characters: *Marguerite* (Architecture), Mr. C. Gordon Killmister; *Mother* ("The Institute the Mother of Architecture"), Mr. W. Cranstone. The scenes were indicated by labels to be as follows:—I., "Dr. Faust's Study." II., "The Home of Architecture, 9, Conduit-street." III., "West Front of St. Alban's Abbey." IV., "The Westminster Town-hall." Without attempting to indicate the "plot" of the piece, we may mention that the dialogue bristled with good-humoured allusions to the Obligatory Examination, to the Charter question, and to other departments of what may be called professional politics. There were some atrocious puns and some very much contorted words, but, of course, these only served to heighten the fun; and there were some amusing songs interspersed. *Paust* and *Valentine* were "made up" with just sufficient fidelity to real life to suggest rather than to indicate with precision the corporeal presence of two well-known members of the Institute. The whole piece passed off very well, and all who took part in it acquitted themselves with credit. We quote the following lines from the opening of Act II., scene 3 ("The West Front of St. Alban's Abbey"):—

[Enter *PAUST* and *MEGHISTOGHELES*.]

*Paust*. Where are we now? What's this that looms on space,  
Like a foul rash upon an old friend's face?  
What ill-assorted masses here abound,  
Perch'd like a nightmare on the affrighted ground!  
'Tis Gothic out of tune! I had it said  
To think what *Pite* would say of this facade.  
*Meph*. Peace! 'Tis St. Alban's Abbey. Are you blind?  
*Paust*. The effect is most an abbey, to my mind.  
Who comes to worship here must surely feel  
It would be better if he'd gone to Neale.  
From what mad brain did this abortion grow?  
Who was the architect? You only know.  
*Meph*. To Canterbury I've no doubt you've been,  
And where a Beckett met his death you've seen.  
Beckett was murder'd by design, it's clear;  
Design was murder'd by a Beckett here.

The choruses were well rendered by the Sutton Orpheus Glee Club, while the instrumental music was provided by Mr. Stewart's Orchestral Society.

**Colonial and Indian Exhibition.**—Her Majesty the Queen has been graciously pleased to intimate her intention of opening the Colonial and Indian Exhibition on Tuesday, May 4th.

#### Illustrations.

##### TRANSEPT WINDOW IN DENVER CATHEDRAL.

THIS window is the companion one to the Resurrection window in the south transept, previously designed and executed on the same colossal scale. The figure of Our Lord is draped entirely in white, the only bit of colour being a rich girdle. The field of colour behind, consisting of rays of glory, is painted of amber glass, varied in tint, which extends to the side lights where the angels occur, also robed in white. The group of apostles below is richly coloured, the background consisting of graduated blue glass. The figure of Our Lord in the cartoon is over 10 ft high, the centre light being 30 ft. long.

In the entire treatment of the subjects the aim has been to produce work of what may be termed "Raffaellesque" character.

##### NEW BOARD SCHOOLS, TREWIRGIE, REDRUTH.

THESE schools now in course of erection are situate at the south-west part of the town, and comprise accommodation for 350 boys, 175 girls, and 175 infants, each having separate entrance in connexion with cloak-rooms and lavatories.

The boys' school-room is 76 ft. by 20 ft., with five class-rooms and teachers' room. The girls' school-room is 54 ft. by 20 ft., with two class-rooms and teacher's room. The infants' school-room is 50 ft. by 22 ft., with one class-room and teacher's room.

The materials used are local stone, with granite dressings. The roofs, covered with slates, are partly open, and the ceilings boarded, stained, and varnished. The dados of the schools and class-rooms are of wood, stained and varnished, and the floors are laid with wood blocks. The porches and passages have a deal of white glazed bricks, and the floors are paved with Staffordshire quarries.

The lavatory fittings are of Macfarlane manufacture, and the latrines are fitted up with Wilcock & Co.'s and Doulton & Co.'s apparatus. The schools are heated by open fireplaces, the flues being constructed with Doulton & Co. blue-pipes.

The architect is Mr. John Robert Nichol of the firm of G. B. Nichols & Sons, of Birmingham, whose design was selected in competition. Mr. Arthur Carkeek, of Redruth, the contractor, Mr. W. Whetter being clerk of the works.

##### NOS. 1 AND 2, ST. MARTIN'S-COURT, LUDGATE-HILL.

THIS building is in course of erection on a site at the junction of Little Bridge-street and St. Martin's-court, City.

The external fronts facing the streets have been executed in Portland stone, the internal work is of a very plain and simple character.

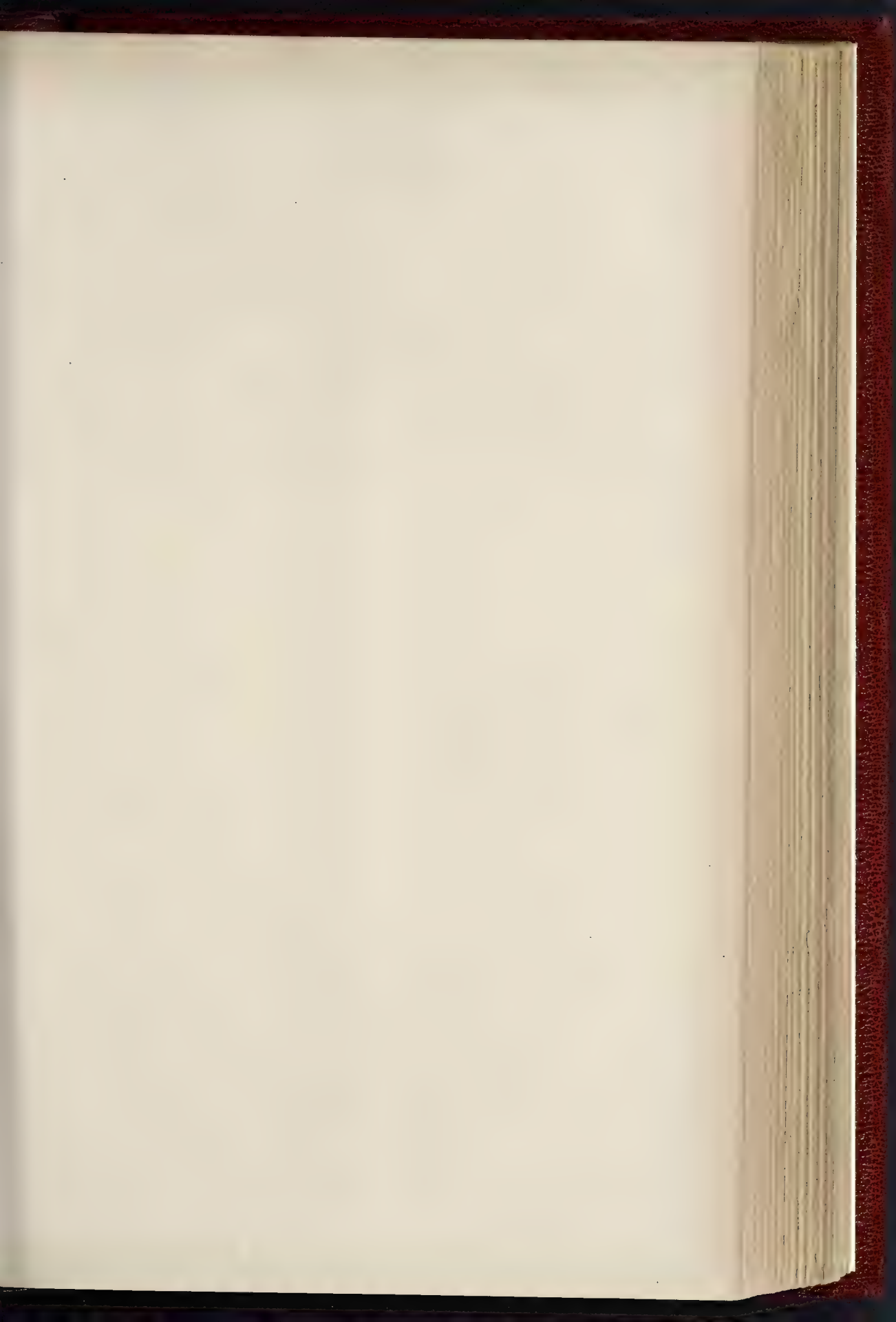
In excavating the site for the foundation along the Little Bridge-street frontage a portion of the old London Wall was encountered, and, owing to its great hardness, some difficulty was experienced in its removal.

The building was designed by Mr. A. Arden, architect, for Messrs. Farebrother, Ellis, Clark & Co.; the builders being Messrs. Perry & Co. of Tredegar Works, Bow.

##### LAYER MARNEY TOWERS, ESSEX.

FOR A description of these sheets of illustrations, see the first article in this week's *Builder*.

**The Institute Charter and the Associates.**—Mr. Mark H. Judge writes to us to express his dissatisfaction with the action (inaction) of the Associates' Committee in regard to the subject of the new Charter and his position in the Institute, and asks us to state as there is no time to send a circular, that the Committee having neglected to call a meeting of Associates to give expression to their view on the new Charter, some one else must take the initiative if the Associates as a body are to make their views known to the Institute before the new Charter is passed, and he, therefore, invites the Associates to a meeting to be held at the Langham Hotel on Monday next, at 10 o'clock, for the purpose of considering the report of the Charter Committee, and to pass resolutions as may be thought desirable for submission to the Special General Meeting of the Institute.



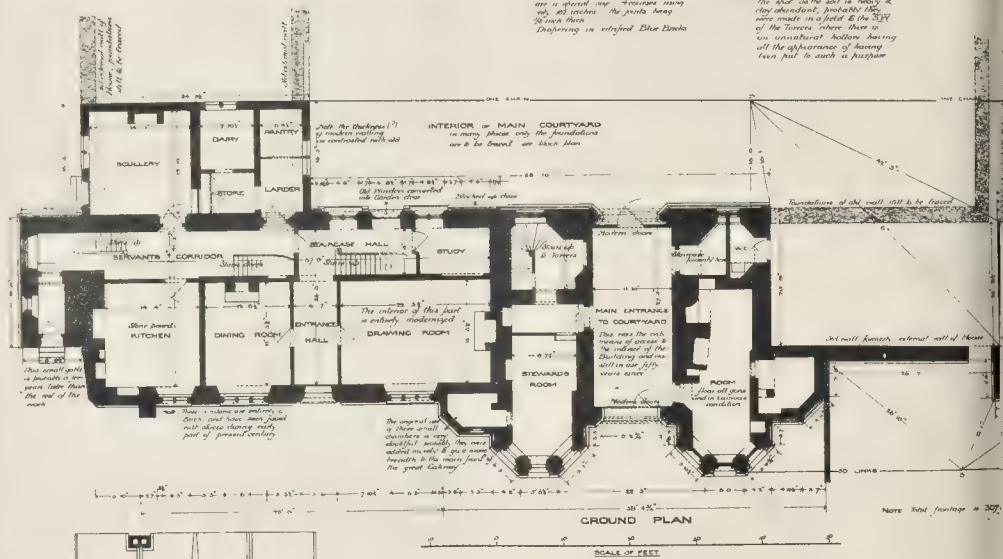




SOUTH ELEVATION

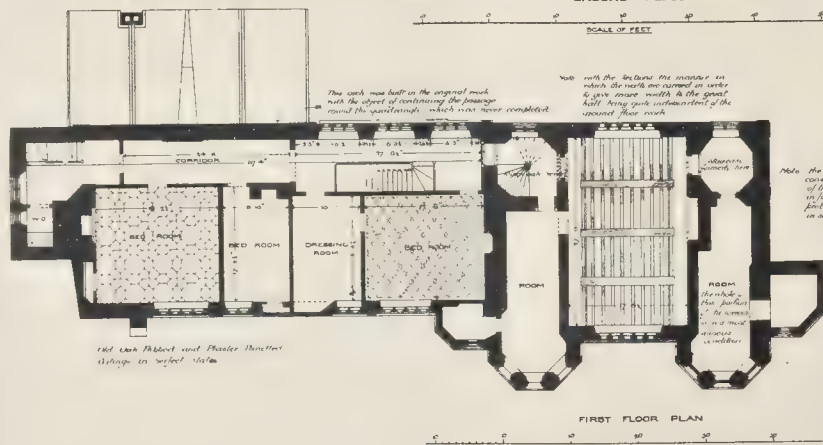
NOTE: The fence and in all the old work are a special one. The fence being the same brick. The fence in original Blue Brick.

NOTE: The fence were all made in the shot on the wall in heavy & they abundant. The fence were made in a field & the 2nd of the fence. There is an unbroken fence having all the appearance of having been put in such a purpose.



GROUND PLAN

SCALE OF FEET

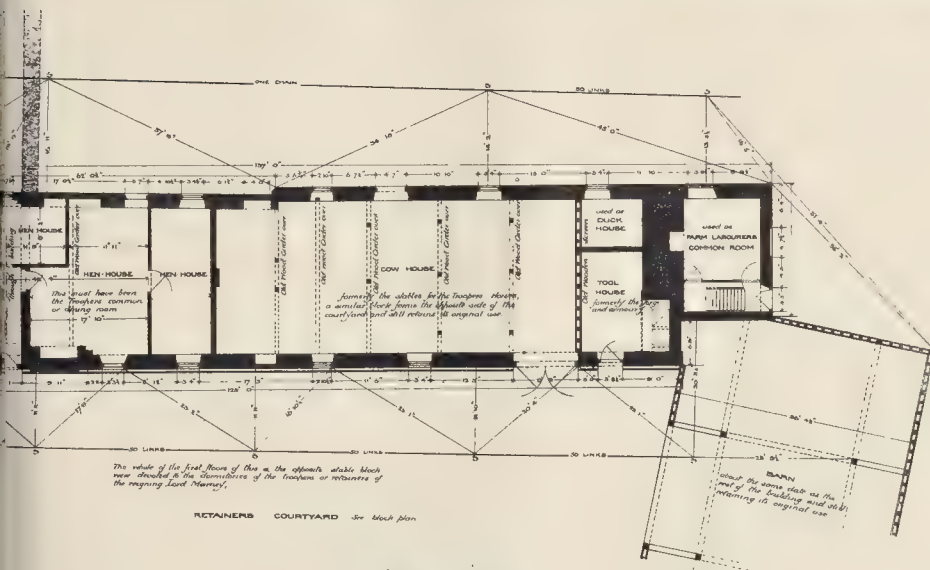


FIRST FLOOR PLAN

SCALE OF FEET

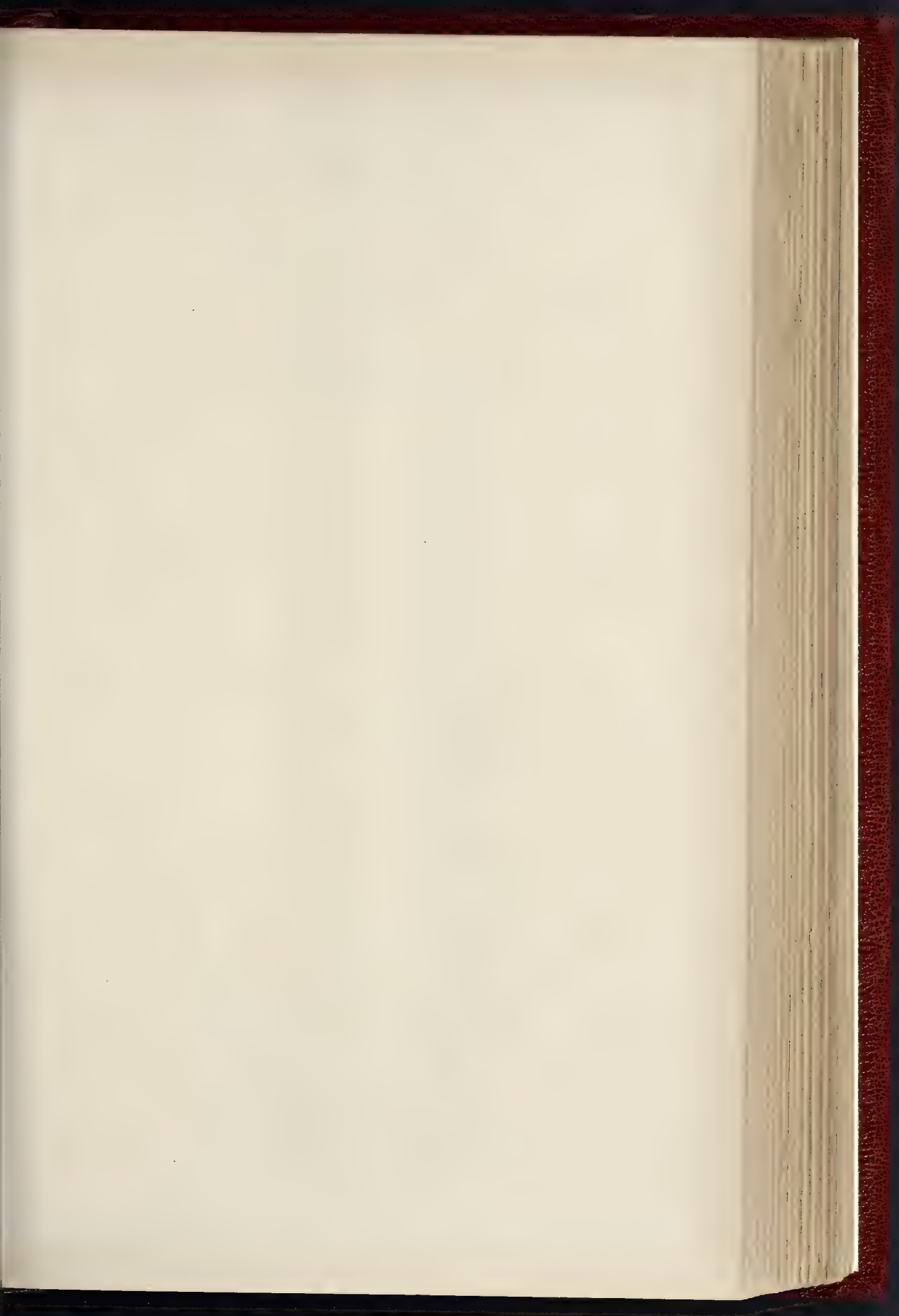
WYMER · MARNEY · TOWERS · · ESSEX · (1506 · AD ·

· EARLIEST EXAMPLE OF THE ENGLISH BRICK AND TERRA COTTA RENAISSANCE

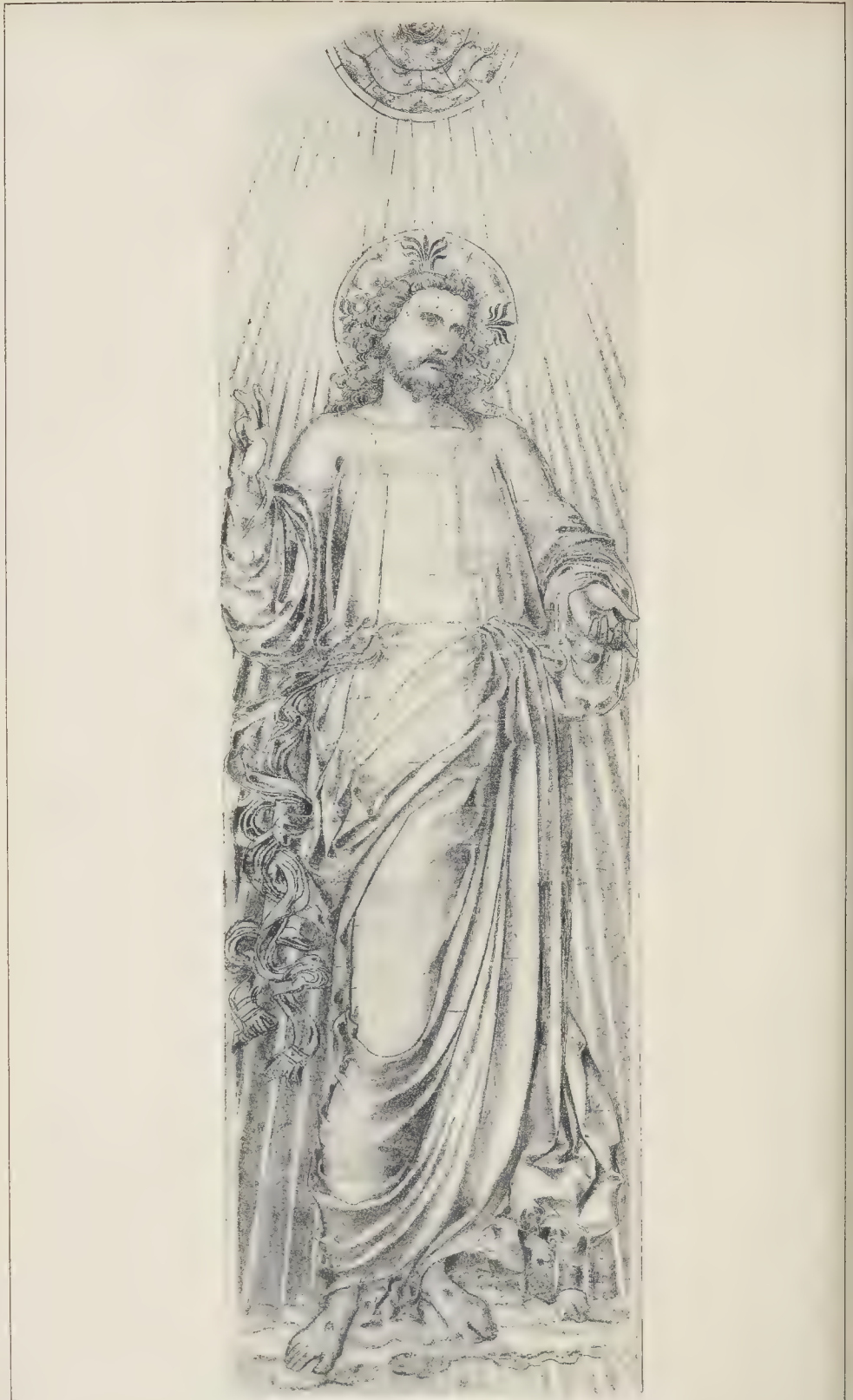








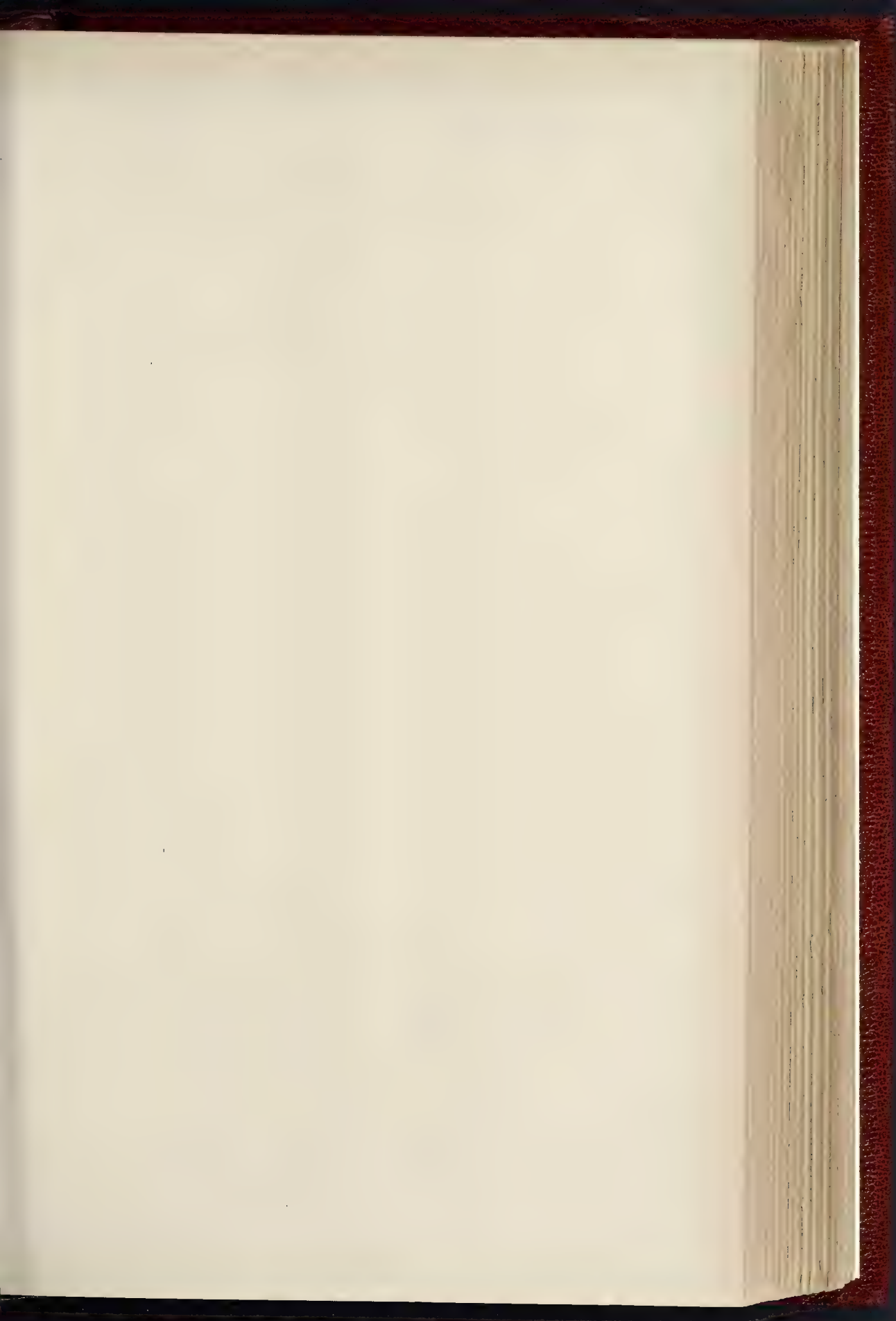




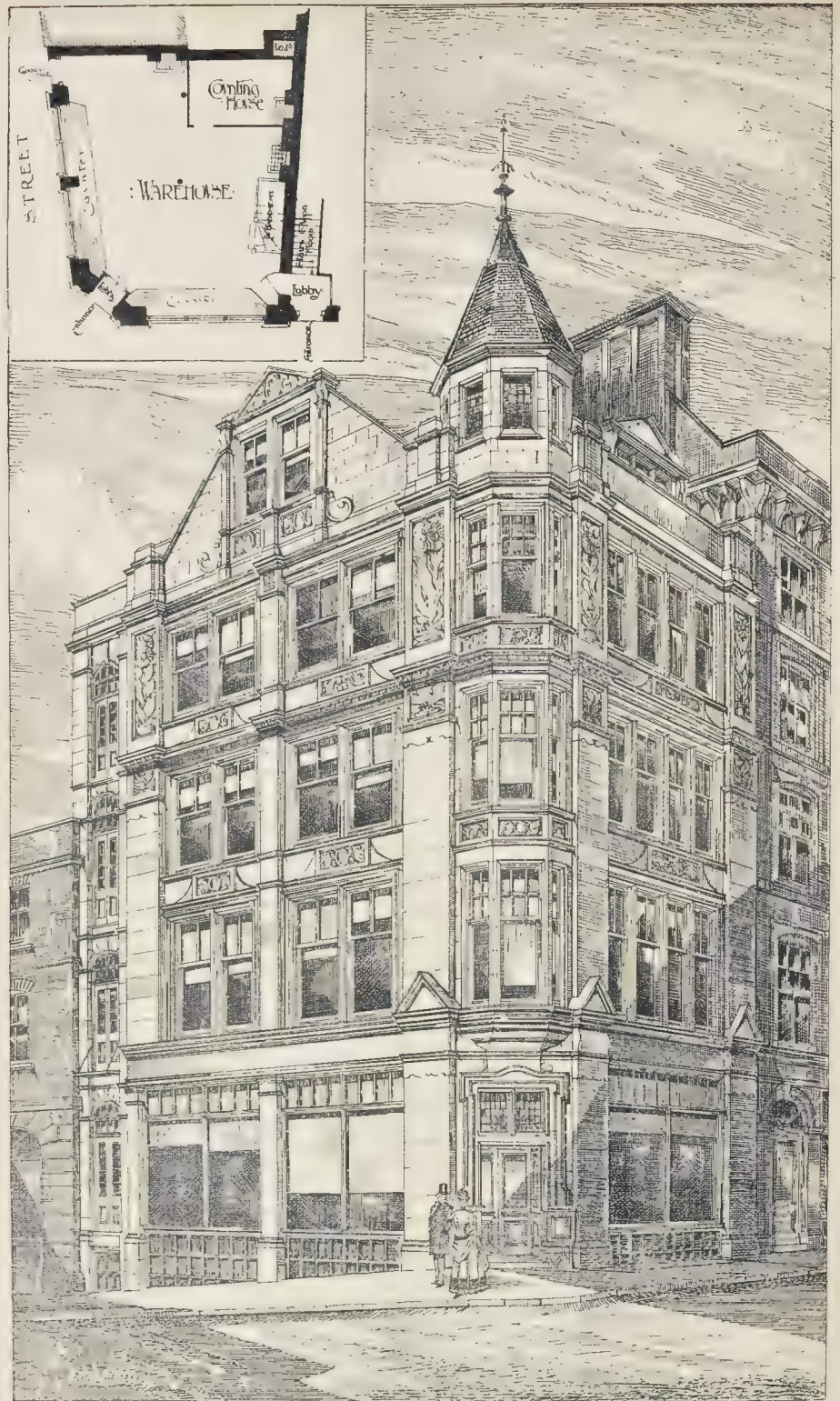
164 PHOTO SPRAGUE & CO LONDON

DESIGN FOR SOUTH TRANSEPT WINDOW FOR DENVER CATHEDRAL, COLORADO, U.S.A.  
PRINCIPAL FIGURE FROM CENTRAL LIGHT.

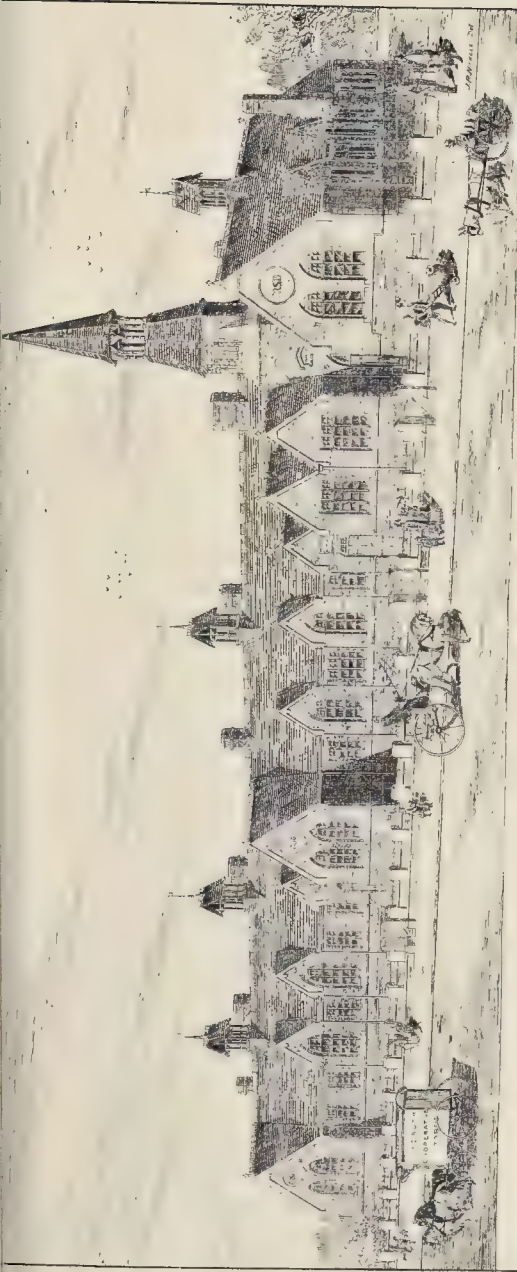
By MR. ED. FRAMPTON.







DESIGN FOR A CITY WAREHOUSE. —MR. ARTHUR ARDROS, ARCHITECT.



GROUND PLAN

Wm. & A. G. H. H. H. H.

TREWIRGIE BOARD SCHOOLS, REDRUTH.—MR. J. R. NICHOLS, ARCHITECT.

Chapman & London W.C.







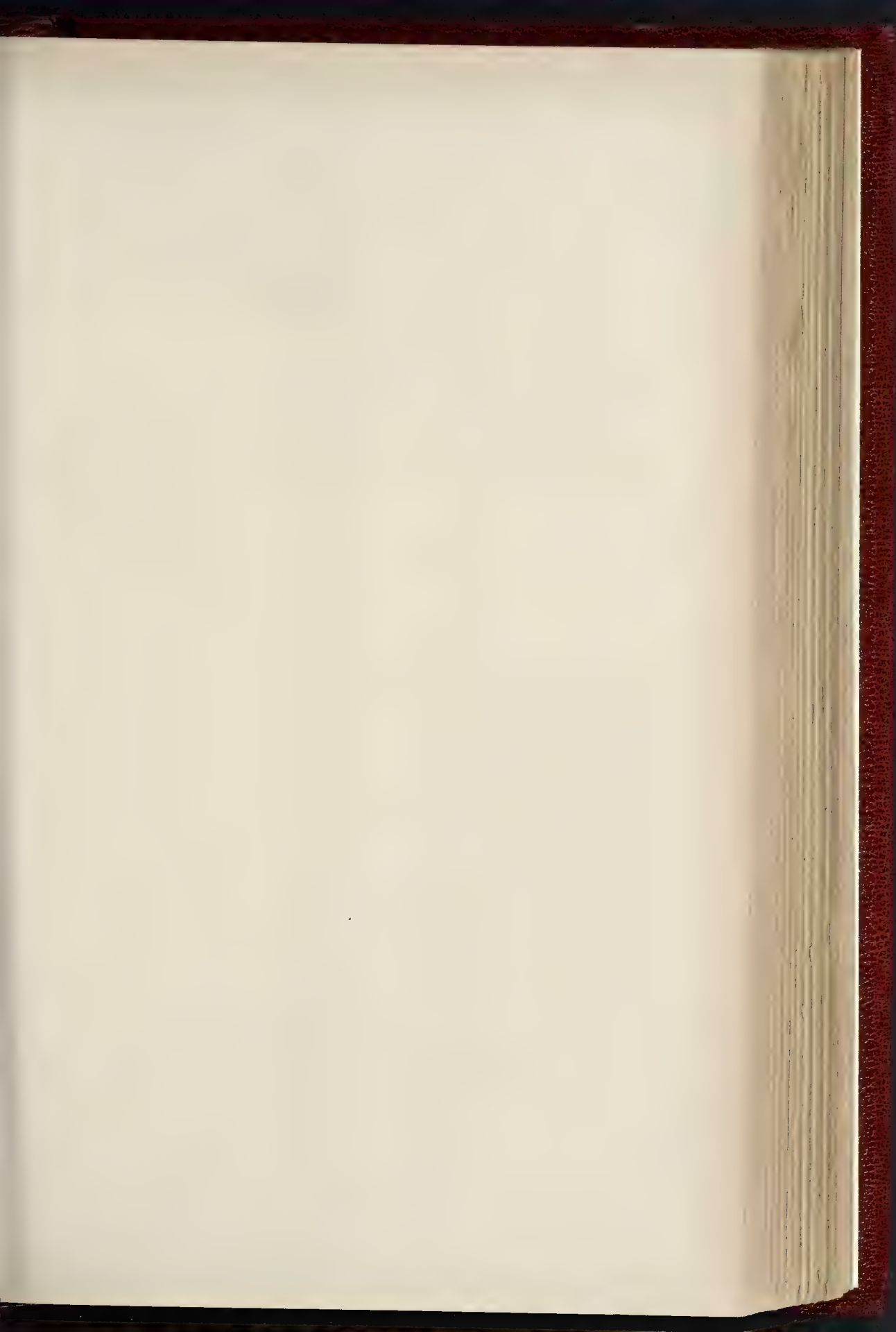
INK PHOTO SPRAGUE & CO LONDON

DESIGN FOR SOUTH TRANSEPT WINDOW FOR DENVER CATHEDRAL, COLORADO, U.S.A.

By MR. ED. FRAMPTON.









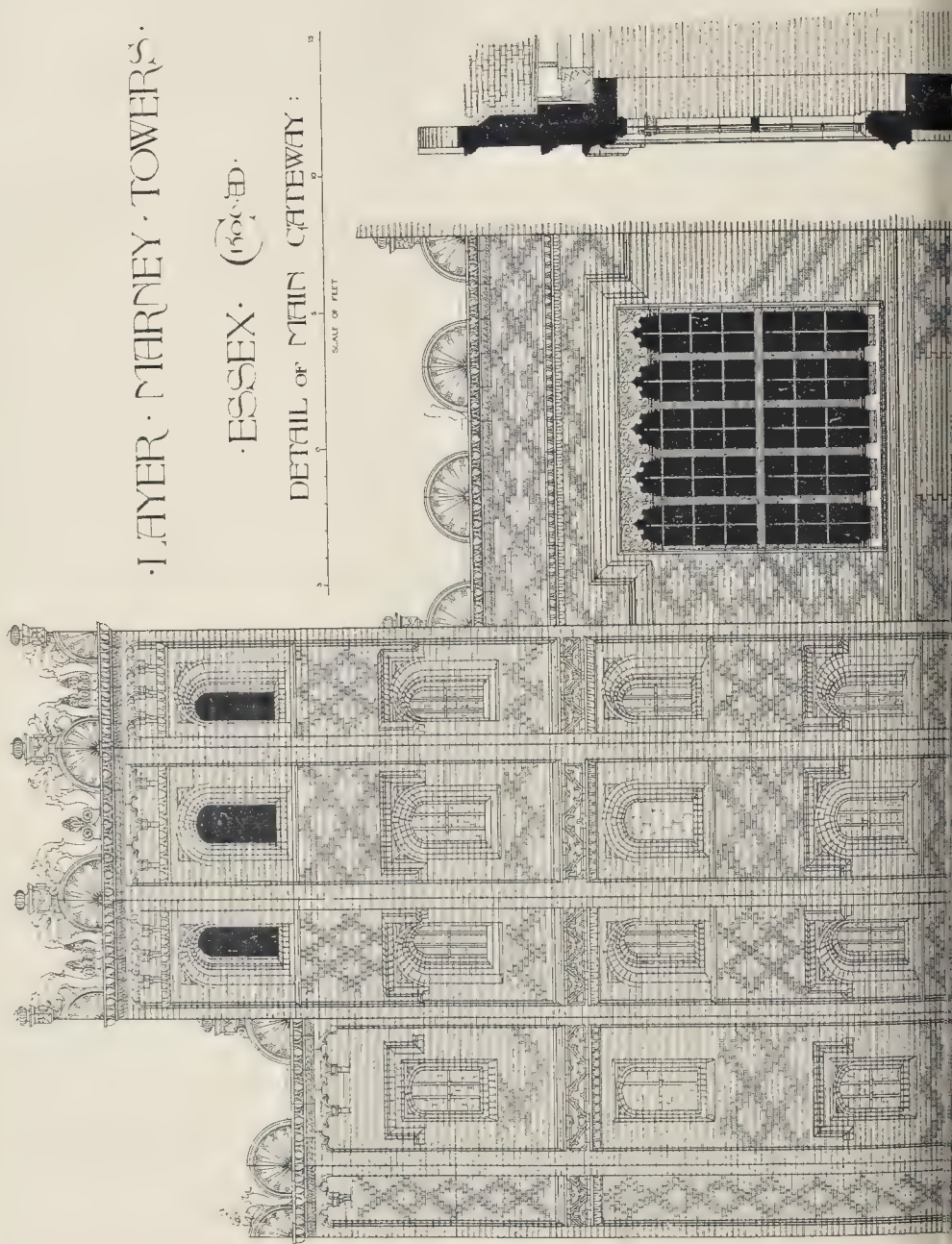
THE BUILDER, APRIL 3, 1886.

LAYER · MARNEY · TOWERS ·

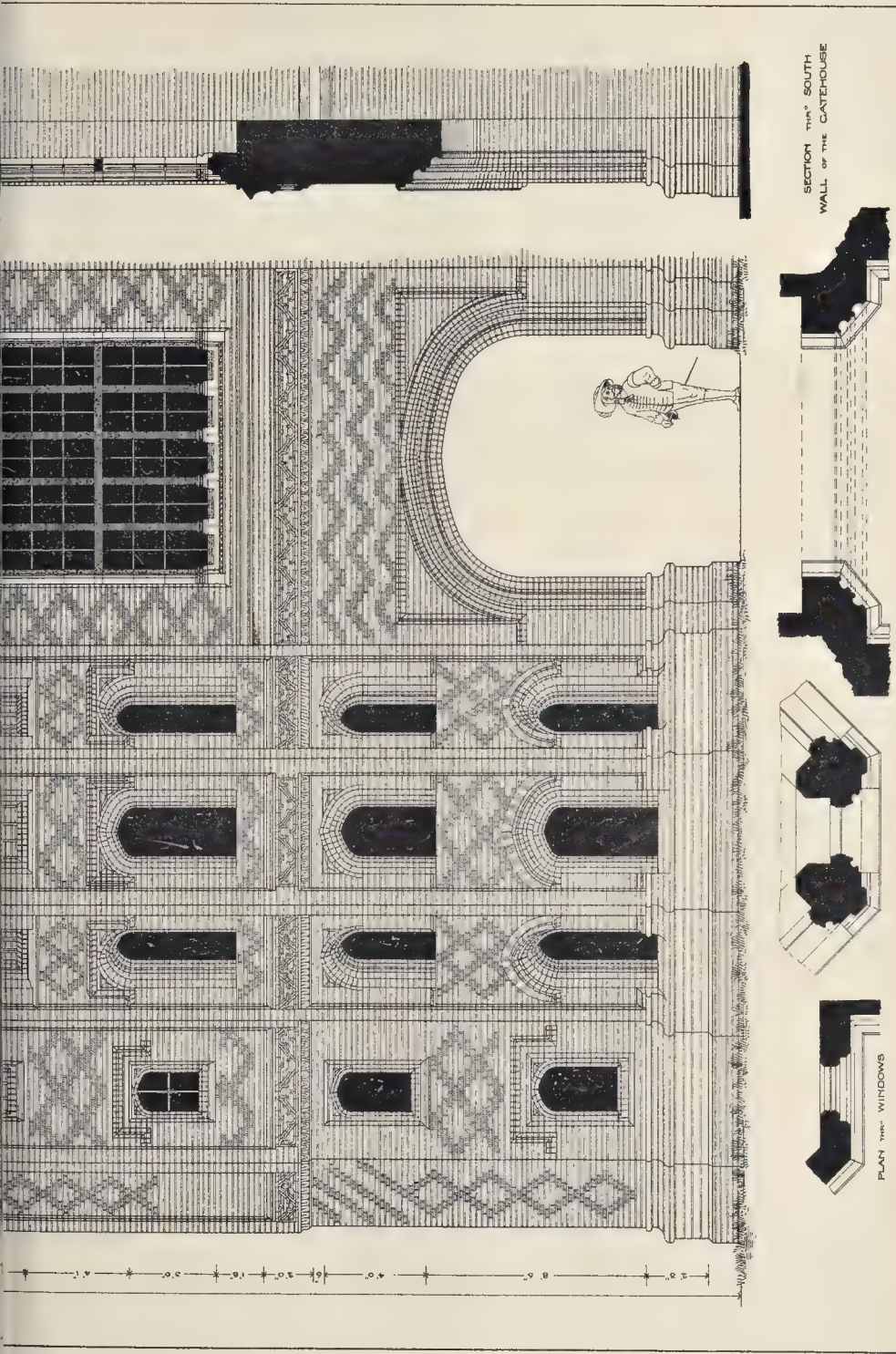
· ESSEX ·

DETAIL OF MAIN GATEWAY :

SCALE OF FEET











## THE ROCKY MOUNTAIN RAILWAY.

At the ordinary meeting of members at the institution of Civil Engineers, Great George-street, on Tuesday, the 16th ult., Mr. Edward Woods, vice-president, in the chair, the reading of a paper by Mr. Granville Caryle Cunningham, M.Inst.C.E., on "The Construction of the Rocky Mountain Division of the Canadian Pacific Railway during 1884," was postponed to the meeting held last week (23rd ult.). Mr. Cunningham stated that when the works were suspended for the winter of 1883 the rails had been laid to a point four miles short of the summit of the Rocky Mountains, 960 miles east of Winnipeg. Early in 1884 the summit of the Rocky Mountains, at the commencement of Kicking Horse Pass, and at an altitude above the sea of 5,296 ft., was reached, the gradients, except in one or two cases, not exceeding 1 in 12. Passing through the Columbia Valley, the mouth of the Beaver river was reached, then the railway ascended to the summit of the Selkirk, at a point 4,300 ft. above the sea, and then on to Kamloops. The district traversed between the Rocky Mountains and the river produced nothing capable of use in railway construction, except timber, chiefly spruce, fir, firs, sleepers, temporary bridges, cables and culverts, a fact which necessitated the transport of material for long distances from the East. When curves occurred in connection with the maximum gradient, the grade was adjusted so that the resistance to traction could not be greater on the curved than on the straight line. The width of the cuttings in the bottom was 22 ft., with a side slope varying from 4 to 1 and 1 1/2 to 1. Dynamite of 7 1/2 per cent. strength was used for blasting in the case of limestone, while better results were obtained from the use of black powder in the case of shale, which was very prevalent, all the drilling being done by hand labour. In the 73 1/2 miles of line constructed, there were seven tunnels, each 22 ft. in height, 16 ft. wide. The author pointed out that the increased height, as compared with European tunnels, was necessary to meet the requirements of the Canadian Railway Act, which provides that every permanent structure spanning a railway line shall give a clear space of 16 ft. above the top of a box freight-car, in order that the brakemen may not be endangered when on the roof of a car in the execution of their duty. The rails used were of steel, of the Sandberg pattern, with angle-plate joints, and secured by spikes to the sleepers. The average weight of rail used was 60 lb. to the yard; but where the gradient and curves were severe, a rail of 70 lb. to the yard was adopted. The angle-plate connexion, which had recently been introduced, and now used in Canada and the United States, in preference to the old fish-plate joint, made a very rigid perfect track. The ties used were chiefly of spruce and jack-pine, growing on the mountains, and were laid at the rate of 3,000 to the mile, and were 6 in. thick, and not less than 6 in. in face. The wages paid for common labour were at the uniform rate of 8s. per day, and the men were charged 20s. a week for board, which was provided in a train of cars specially fitted and always located in the neighbourhood of the place where active operations were being carried on.

## VISIT OF THE ARCHITECTURAL SOCIETY TO THE NEW LAW COURTS.

The fifth Saturday afternoon visit of the Architectural Association was made to the new Law Courts of Justice on Saturday, the 27th March. The members assembled in the Great Hall, and were conducted through the various courts and corridors, and were shown round of the rooms used by the judges, and the dining-room for the bar, which is the only room decorated by Mr. Street. The members were then taken into the basement under the Great Hall, and the various engines and machinery for heating, lighting, and ventilating building. These consist of two 120-h.p. engines and a 25-h.p. engine, and eight dynamos, small engine being for working the lamps during the daytime for lighting the corridors, &c. The fresh air is drawn in by means of fans, and is delivered into the courts at temperatures varying from 64° to 68°. In summer air is cooled by means of ether. The foul air is extracted by means of shafts with steam at the top. The machinery and boilers occupy almost all the space under the Great Hall.

## SURREY ARCHÆOLOGICAL SOCIETY.

The annual meeting of this Society was held at the Whitgift Grammar School, Croydon, on Wednesday, March 24th. Dr. Alfred Carpenter presided, and was supported by the Mayor of Croydon and a very numerous audience.

Dr. Carpenter moved the adoption of the report of the Council and balance-sheet for the past year, which was unanimously agreed to. The retiring members of the Council were re-elected, Mr. Watney being elected to supply a vacancy. The auditors (Messrs. J. T. Lacey and W. F. Potter), and the hon. secretary, Mr. Thos. Milbourn, were also re-elected, after which several papers were read descriptive of the old Whitgift Hospital, which had been previously visited by the company. We may here mention that this hospital has not been visited by the Society since June 12th, 1856, when a very able paper was read thereon by the late Mr. W. Pettit Griffith, and which will be found printed in *extenso* in the *Builder* of June 21st of that year.

After the routine business, Dr. Carpenter commenced by referring to the attempt at one time made to remove the Whitgift Hospital to make room for a new Town Hall, which raised such a storm of opposition that it was abandoned. Archbishop Whitgift, he said, was the greatest benefactor the parish of Croydon ever had. To him they owed that grand foundation, — the home which sheltered forty old men and women. He then sketched out the life of Whitgift, who was the son of a merchant at Great Grimsby, down to 1577, when he became Bishop of Worcester. From that time his history became part of the history of Great Britain. He succeeded Grindal as Archbishop of Canterbury in July, 1553, and died February 29th, 1604, and was interred in Croydon Parish Church, March 27th following. The hospital was finished in 1559. The town ought to show its appreciation of Whitgift's memory. At this moment in the Parish Church of Croydon, and for the last sixteen years, there had been the embers of portions of that which was once Whitgift's monument, which had never yet been restored. It seemed to him to be a disgrace to them as a borough that that monument should remain in its present condition. It would take 500*l.* or 600*l.* to restore it. He hoped it would not be long before the inhabitants would find funds for that purpose. Having referred to the schools, Dr. Carpenter concluded by calling on Mr. J. R. Frewer to read a paper on the "History and Nature of the foundation of the Hospital."

Mr. Frewer commenced by remarking that the institution, formerly known as the Hospital of the Holy Trinity, was founded in the reign of Queen Elizabeth, in 1546. The number of the brethren and sisters fixed by the Archbishop was to be not more than forty, nor less than thirty, with a limitation of the number of sisters. These were the objects the founder had in view, and these were to a great extent embodied in the scheme approved by Her Majesty's Council, July 15th, 1581, and under which the foundation is now managed. The educational benefits originally provided by Whitgift were greatly enlarged in 1871 by the erection of the Grammar School, where now 300 boys were educated. The Middle School had also been greatly enlarged, and now accommodated 200 pupils. The letters written at the time by Samuel Finch, vicar of Croydon, gave a graphic account of the progress of the buildings, and the difficulties which arose from time to time. Some very interesting legal and other documents belonging to the hospital, which were discovered about two years ago, were shown to the meeting; these had for many years found an undisturbed resting-place in some old chests in one of the rooms of the hospital. These chests being searched, about 200 valuable parchments and papers came to light, some bearing the seals and signatures of the founder, and some going back to the reign of Edward III. Many of them were in a remarkable state of preservation, and gave instructive insight into the social and political life of the times in which they were written. The oldest deeds they had yet discovered bore date the 30th of Edward III., about 1357, and of Henry V., about 1415, and referred to properties still in possession of the foundation. Mr. Frewer said he had only briefly glanced at some of the antiquarian treasures the hospital possessed, and which had afforded him some months' pleasant occupation.

Mr. S. W. Kershaw, F.S.A., next read a paper entitled "Notes and Annals of the Whitgift's

Hospital." He said it was remarkable that Surrey possessed two such interesting buildings as the one founded by Archbishop Whitgift in Croydon, and the other by Archbishop Abbott at Guildford. Both established for the benefit of the poor belonging to, or once in the service of, the Archbishop, these charities still retain their useful objects. Their origin was to be traced to those earlier buildings which once abounded in the land, and were the asylums and refuges for the travellers, pilgrims, and the infirm in the fourteenth and fifteenth centuries. In Henry VIII's reign a commission was granted by which the hospitals and lands were to be seized for the king's use, but fortunately some escaped, and thus in various parts of the country were still found several most interesting examples of the architecture and history of the past. Whitgift Hospital was begun in 1596, and took three years in building; during that time the accounts were carefully kept and supervised by the Rev. S. Finch, and are still preserved in the Archiepiscopal Library at Lambeth Palace. The old park which belonged to the manor and see of Canterbury, was of vast extent, now locally known as Park Hill, and formed a large appendage to Croydon Palace, concerning which he hoped that modern vandalism would never be allowed to sweep away such a relic of antiquity. The interest which centred round the hospital became greater when it was known that many of the materials were obtained from the immediate neighbourhood. Its total cost was 2,716*l.* 11*s.* 11*d.* On Monday, July 9th, 1599, Whitgift's Hospital was dedicated to the use of the poor by Richard Bancroft, Bishop of London, and Antony Watson, Bishop of Chichester, and among those present was one George Whitgift. There was a visitation of the hospital, by Archbishop Laud, in August, 1634. As to the documents recently discovered, they were about 400 in number, and consisted of court rolls, deeds, and indentures dating from the early fifteenth to the end of seventeenth-century. Mr. Kershaw concluded by describing some of the most important deeds, some of which bear the signature and seals of Whitgift and members of his family and are of great interest.

Mr. H. Berney, A.R.I.B.A., then gave a short account of the pictures and paintings in the chapel of the hospital. Mr. Berney described each picture in detail, and concluded by thanking the Warden, Mr. G. Lipscombe, for cleaning and thus rendering them intelligible.

Mr. G. Lipscombe, the Warden, was then called upon by the chairman, and said from the title-deeds discovered it appeared that on the site of the Hospital formerly stood an old inn, "The Chequers," for which the founder paid 200*l.*; for the tenement 30*l.* was paid, and for some land adjoining, 80*l.* In building the chapel he said the most stringent economy seemed to have been observed, as the seats were made of the roughest knotted timber, which could not be used for anything else. Among the relics found were some drinking-bowls for those "above the salt" and those "below the salt," and there was also a fine old bible, known as the "treacle bible," from the fact that in the verse "Is there balm in Gilead," the word "treacle" was substituted.

Several new members were then elected, and votes of thanks to the readers of the papers and to the chairman and Court of Governors of the Hospital, being accorded, to which Dr. Carpenter, as chairman of the Court of Governors, responded, the meeting terminated.

## THE NEW HOUSE OF COMMONS.

SIR,—I have naturally taken a large interest in the question originally mooted some months ago by Mr. Mitchell Henry, M.P., as to the necessary enlargement or rebuilding of the House of Commons in order that sufficient accommodation therein may be provided for the 670 members of the House, and after careful consideration of all the suggestions that have been made to the Committee of the House in 1867, 1868, and since, and after attentive study of the present building, I have come to the conclusion that it is not desirable to build over and block up the Commons Court, as was proposed by my late brother in 1867, or to do the like to the Star Chamber Court, as has also been lately suggested.

I should, on the contrary, be most anxious not to interfere with the main arrangements of the building as designed by my father by any



alteration in the position of the House, and I think that the least possible derangement in this respect affecting also the several approaches to the House will be most agreeable to the members.

I see no difficulty in effecting all that is desired by adding laterally to the House on each side to such extent as is required, and so as to provide seats for all 670 members without galleries. To do this new side division lobbies would be built in the Commons Court and Star Chamber Court respectively, diminishing their area, but still retaining a large part of the space in them, which is valuable for light and ventilation to the other parts of the building adjacent to them.

The position of the Speaker's chair and the table of the house would remain unaltered, and the bench fittings would also remain as at present, except that they should be re-spaced so as to provide additional gangway and to give more room from back to back of the seats. The arrangements at the Bar end of the House, and the Peers', Speaker's, and Strangers' galleries over the Bar would not be interfered with.

The Reporters' Gallery would remain placed as at present, but its accommodation would be considerably increased.

The present roof of the House would remain as it is, and the ceiling would be in the same form, but extended over the lateral spaces thrown into the House, thus preserving its acoustical advantages.

The warming and ventilating arrangements would need no radical change, and only extension to the larger cubical area of the New House.

It will, I think, be evident that the scheme I propose, and which I have carefully worked out in plan and section, would be the least costly that can be suggested to meet all the known requirements. By sufficient time being given for the preparation of the work elsewhere, ready to go into its place with great expedition, I feel sure that an energetic contractor could carry out the work I propose during a single recess of Parliament, so that no temporary House would be necessary.

Another very desirable alteration could be made at the same time. The present tea-room and adjoining reading-room are very small and insufficient for their purposes. I think a better arrangement would be to place these in the river front on the principal floor where the present dining-rooms are, and to place a new suite of dining-rooms on the floor below level with the terrace and members' smoking-room. There would be no structural difficulty in doing this. A new staircase only would be needed from the library corridor to the lower floor.

If this were done the space occupied by the present tea-room and reading-room could be divided into six or seven private rooms for Ministers in close and convenient proximity to the new House in place of those now appropriated to this purpose, which are dispersed in the most inconvenient positions in different parts of the building.

It is understood that a committee is soon to be appointed to consider this important question, before whom I shall hope to be permitted to explain my views more in detail.

CHARLES BARRY.

No. 1, Westminster-chambers,  
March 27th, 1886.

#### R.I.B.A. CHARTER.

SIR,—Although the danger of the Institute's being placed at the mercy of its own Council or being subjected to the ordinary jurisdiction of the Privy Council has probably passed away, there still remains a great chance of its suffering in future from that which has caused great inconvenience in the past, namely, finding its action limited by chance expressions in its Charter.

All the Institute requires from the Crown is an enabling charter, but it seems good to the Council to insist on the matter being considered only on the lines of a document originally drawn with the view of defining and so limiting all future action.

Having regard to the weight of the solid Council vote on divisions, I venture, with your permission, through the medium of your paper, to ask all Fellows of the Institute to be in their places on Monday and to exercise their independent judgment on the important points which will be submitted to their consideration.

LACY W. RIDGE.

#### CONCRETE FLOORS.

SIR,—Referring to the admirable lecture on "Concrete" reported in your this week's issue, I offer the following facts and formulae for the guidance of fellow architects and others seeking definite information on this important subject.

The "Phoenix Warehouse" (Messrs. Pearman & Corder's), of this town, erected from my designs about six years ago, is a fireproof structure, with concrete floors throughout. There are 1,800 tons of cement concrete in the floors of this building. It was only after long and patient study and research I satisfied myself that my clients' interests would not be jeopardised, but that, on the contrary, a very considerable saving of cost would be effected by the daring expedient of trusting concrete slabs (the largest of which are no less than 21 ft. by 12 ft. 6 in.) of average 13 in. thickness, to sustain the great loads and rudely impactive forces of the wholesale provision trade.

Of course, I was very careful as to the quality of cement (all of which was manufactured by Messrs. Grimsshaw at North Hylton, near Sunderland), and which ranged in tensile strength from 700 lb. up to 1,000 lb. per square inch. I also endeavoured to secure that all the cement should be not less than one month old, because the cement which is hot from the heap cannot be relied on to retain its first strength.

I had the cement mixed one to four with good hard broken brick aggregate.

The result is that after six years' practical test these floors stand quite unshaken, and even those few of the slabs which before they were used cracked right across from contraction in drying, stand the heavy work, and show no indication of weakness.

There is a 12-h.p. Otto gas-engine working on the top floor, about 35 ft. above the ground, and the vibration is barely perceptible.

Two or three serious fires have occurred in this warehouse since it was opened, but beyond damage to stock and fixtures, no harm was, or very well could be, done.

Those iron girders which are used to sustain the outer edges of the large slabs above referred to are thoroughly embedded on all sides, except the soffit of the bottom flange, which is flush with the concrete ceiling.

It is important to observe that by embedding the girders thus, not only are they protected from fire, but also the concrete slabs have their edges encased, which condition adds enormously to their stiffness and strength.

The greatest stress on an encased slab of any material may be found as follows:—

L = Length of slab, in inches.

B = Breadth " "

D = Depth " "

w = lb. weight per inch of slab surface-area, uniformly distributed.

$\int$  = The greatest tension per inch of sectional area of slab.

$$\int = 0.5 \times \frac{L^4}{L^4 + B^4} \times \frac{B^2}{D^2} \times w$$

What is required for cement concrete slabs is not a formula to represent the maximum stress, but a constant to render such formula applicable to practice.

In the case of the "Phoenix Warehouse" the maximum load per square foot of floor is about 2 cwt. imposed and 1 cwt. of concrete itself = 3 cwt. per foot, or 2.3 lb. per inch of surface area. And all the items of the formula stand as follows:—

L = 252 inches.

B = 150 " "

D = 13 " "

w = 2.3 lb.

Therefore,

$$\int = 0.5 \times \frac{252^4}{252^4 + 150^4} \times \frac{150^2}{13^2} \times 2.3$$

$$\int = 136 \text{ lb.}$$

Hence, it is proved that 136 lb. per inch is a safe maximum stress for cement concrete mixed 4 to 1 as before described.

I may say that some of the slabs were loaded when they were about one month old.

I believe that much larger maximum stress would be safe than that of the Phoenix Warehouse, but I would not venture on much larger slabs of that thickness and quality without wider experience to justify me.

I would, therefore, myself use the before-named formula in further practice, and take

136 lb. per inch as the safe stress for all slabs formed 4 to 1 of cement of not less than 700 lb. strength.

If one could be sure that cement concrete slabs would not be greatly loaded for the first three months after setting an allowance could be made for the enormous gain of strength which occurs during that period.

During the first twelve months after setting cement concrete is known to gain five or six times the strength it possessed at the end of the first month after setting, and the bulk of this gain occurs in the first few months of the twelve.

But, as the urgency of trade can seldom allow a clear three months for setting of concrete floors, it is safe only to calculate on tensile strength which has proved itself safe under such practical conditions as the "Phoenix Buildings" present.

As regards the great density of concrete floors tending to overload the foundations of buildings, I do not think that it is to be feared where the concrete is not stupidly thick, as where the foundations are reasonably good. For the equal distribution of load can be fairly maintained; and that is practically of no consequence than the mean intensity of the load. But where parts of the flooring are sustained by metal columns or detached piers special care should be exercised to give a great spread to the footings of such detached supports.

In cases, however, where, either from insecurity of foundation, or instability of wall, or from other and special reasons, an exceptionally light, and yet strong, fireproof floor is needed. Hollow terra-cotta blocks, filled with "lime riddings" or other light suitable material, and fitted together as shown in Messrs. Doulton at the Inventions Exhibition last summer, are worthy of consideration.

But for ordinary cases, cement concrete applied to the "Phoenix Warehouse" is, I am satisfied, the cheapest and best form of fireproof flooring.

FRANK CAWSE.

Sunderland, 27th March, 1886.

#### ROYAL ACADEMY.

SIR,—I hope this year's architectural exhibition will be better than last, and that that may be less cause of complaint. I am sending anything myself, so am not pleading my own cause, but last year there were 2 architectural drawings hung, twenty-one of which were of inferior merit, forty-eight were designs which probably may never be executed (being a design for a Christmas card), and from seven men thirty-five drawings were accepted, and many meritorious works rejected.

T. E. KNIGHTLEY

#### STAINED GLASS.

Exeter.—A large and important window of seven-lights has just been filled with stained glass in the north transept of Exeter Cathedral, and called the "Women's Window," from the fact of its cost having been defrayed by Devonshire women of all classes. The idea of such a window was originated by the Archdeacon of Exeter, but the selection of the subjects has been the work of Miss E. Marriot, of the Church of Exeter; the design has been made by Hardman & Co., of Birmingham, and the execution of work has been carried out conjointly by the artists and Mr. F. Drake, of Exeter. The light is somewhat larger than the others, and contains the figure of the Blessed Virgin in white, with three lamps, emblematic of Faith, Hope, and Charity, in the upper part; above this, in a small trefoil opening, forming part of the same light, is the half-length figure of Eve. The other six lights are filled with full-length figures:—First, Miriam, with her timbrel in her hand, representative of Poetry, Art, and Accomplishments; second, the Queen of Sheba, typical of high rank and intellect; third, the Little Girl of Israel, expressive of domestic service; fourth, Lydia, the seller of purple, representative of trade and commerce; fifth, Eunice, representative of Timothy, setting forth the special work of women, the training of the young; and sixth, Dorcas expressing personal service to Christ. His poor. The openings in the tracery, chiefly of grisaille work, but in the eight feet of the large circle are half-length figures



arah and Ruth, intended to set forth Christ as the light of the Gentiles and the glory of Israel; Martha and Mary to show His consecration of human friendship; of Rahab and the woman with the alabaster box, to represent Him as the saviour of Sinners; and of the widow of Nain, to point to Christ as the Resurrection and the Life. The work is described as being of great beauty both in colour and design. The figures are by Messrs. Hardman. The window was opened with a short dedicatory service on the appropriate festival of Lady Day. It may be mentioned that this window, irrespective of the glass, is one of almost unequalled beauty in design, and it is said that the late Sir Gilbert Scott loved to dwell upon its charm whenever he visited the cathedral during the work of restoration.

**London.**—A large single-light stained glass window has just been erected in Stationers' Hall, London. The subject represented is a yure of St. Cecilia holding in her hands the emblematical organ, with a background of sky relieved by trees and foliage, while the foreground is also of foliage interspersed with bright flowers. The figure, which is nearly 8 ft. high, is surmounted by a Classic canopy, in the centre of which are the arms of the present Master of the Stationers' Company, through whose generosity the window has been placed, while at the sides of the canopy are Cherubs holding cords, which is suspended a tablet bearing the name St. Cecilia, the whole being supported on elaborate pillars and surrounded by a border. The work has been designed and executed by Messrs. Mayor & Co.

**Nettlecombe.**—A Munich stained glass window, consisting of two lights with tracery, has just been erected at the south end of the Raleigh of Nettlecombe Church, near Taunton. The subjects represented are, in the one light, "Giving Bread," and, in the other, "Teaching an Ignorant." The work has been designed and carried out by Messrs. Mayor & Co., of Taunton and London.

## The Student's Column.

### OUR BUILDING STONES.—IV.

#### VARIATION IN TEMPERATURE.

ANOTHER cause of the disintegration of rocks is by considerable variations in temperature. Its effects on building stones used in Great Britain are no doubt very slight, but in countries where there is a great annual range of temperature, much difficulty is experienced in selecting building materials from this cause. Even in this country it is as well to know something about it, for stones are frequently required to stand fierce heat; whilst if the services of a student are required in other lands, where general effects are more appreciable, it will be useful to him.

Rocks are expanded by heat and contracted by cooling. Variation in temperature thus sees some building stones to alternately expand and contract, and this prevents the joints of masonry from remaining close and tight. In the United States, with an annual thermometric range of more than 90° Fahr., a difficulty led to some experiments on the amount of expansion and contraction in different kinds of building stones. It was found that in *granite* the rate of expansion was 0.004825 for every degree Fahr. of increment of heat; in *white crystalline marble* it was 0.005668; and in *red sandstone* 0.00095532, about twice as much as in *granite*.<sup>\*</sup> In Western America, where the climate is markedly dry and clear, the thermometer gives a range of more than 80° in twenty-four hours. This great difference of temperature produces a strain so great that it causes the stone to crack or peel off in skins or irregular pieces, or, in some cases, it disintegrates them to sand.

Dr. Livingstone found in Africa (12° S. lat., E. long.) that surfaces of rock which during day were heated up to 137° Fahr. cooled so rapidly by radiation at night that, unable to retain the strain of contraction, they split and flew off sharp angular fragments from a few cent. to 100 lb. or 200 lb. in weight.<sup>†</sup> according to data obtained from Adie

"Trans. Roy. Soc. Edin.," xiii., p. 366, and Totten (before quoted) we are able to estimate that the expansion of ordinary rocks ranges from about 2.47 to 9.63 millionths for 1° Fahr.\* Any stone exposed to very different degrees of heat on its different faces is liable to crack from unequal expansion and contraction" (Wray, "On Stone").

The effect of a conflagration on some exceedingly durable building stones is very disastrous, and especially on those which were formed by heat.

#### THE EFFECTS OF WIND ON STONE.

Wind is both a destroying and a preserving agent. Its action as a destroyer of building stone consists in blowing sand and dust against the building, which wears away the stone by chipping particles of it off.

Wind also blows dust and dirt into cuttings, holes, and lines in exposed mouldings, and fills them up, adding much to the disfiguration of ornamental buildings.

A strong wind accompanied by rain, by blowing the rain hard against a building, causes it to penetrate into the stone farther than it would otherwise do, and thus the chemical action of rain and the effects of frost on the stone are increased.

The principal preservative action of wind is in its drying out moisture from stone, and the acids, &c., contained in the moisture have, therefore, less time to act on it.

This, together with the action of the sun in preserving stone, will be further referred to when treating of the best modes of placing stones in building, in order to make them last as long as possible.

#### BORING MOLLUSCS, AND HOW THEY DESTROY STONE.

The action of molluscs, which are capable of boring into stones used in the construction of piers, breakwaters, and embankments, is so very important that engineers have devised various methods of trying to get rid of the evil. Myriads of these marine animals congregate on the stone, and make their holes so close together that they eventually weaken it by removing its substance, thus leaving open cavities for rain and sea water to fill and promote decay. Portland Breakwater, amongst other large works, has been seriously damaged by these molluscs.

The principal actors are known by the names of *pholæ*, *lithodomus*, *gastropoda*, and *saxicava*. The first of these (*pholæ*) bores into a variety of substances,—limestone amongst them. The *pholæ*-shell is rough, like a file, and sufficiently hard to abrade limestone, and the animal is able to turn from side to side, or even quite round, in the hole it has made. The action is probably a "mechanical" one, aided by the foot of the animal.

With respect to the other three genera of molluscs mentioned, it is difficult to understand how they can possibly wear away the stone by a mechanical means. They bore only into calcareous rocks and attack the hardest marble. The valves of the animals cannot assist them in making their holes, for, unlike *pholæ* they are smooth, and, in addition, are covered with epidermis,—a thin membrane,—neither does the foot help. Their power of moving is also extremely limited, the cells not being cylindrical, whilst *saxicava* is fixed in its crypt by a thread called a *byssus*. They have been supposed to dissolve rock by chemical means, although all attempts to detect the presence of an acid secretion have hitherto failed, as might be expected; but by the hypothesis of an acid solvent supposes only a very feeble but continuous action, such as in nature always works out the greatest results in the end.<sup>†</sup>

The best way, no doubt, of overcoming the destructive action of these creatures is to build the breakwater or pier of such stone, as is too hard for them to bore into. Methods have been adopted by casing the stone with copper or other similar metal.

We might remark that the molluscs mentioned live only in the sea, or between high and low water mark, so that in selecting stone for riverside wharfs, embankments, or piers of bridges over rivers, these destroying agents need not be taken into account.

\* See also experiments by Pfaff, "Z. Deutsch. Geol. Ges.," xiv., p. 493, &c.  
† Woodward's "Manual of the Mollusca" (1890), p. 385; also Hancock, "Ann. Nat. Hist.," October, 1849.

#### ON SELECTING PIECES OF STONE FOR EXAMINATION.

The precautions it is necessary to take before beginning to experiment on thrusting stress, specific gravity, and microscopic examination of stone, are as numerous as they are important.

One of the first things to do is to select pieces of stone for examination. When convenient, they should be obtained *in situ*, or at least in the quarry.

Very often one quarry produces three or four kinds of stone for sale. There are generally differences in the grain, compactness, or chemical composition, of each of these kinds, which render them useful for specific purposes. One may be a better freestone than the others, and so is used for exterior mouldings and carved work; a second, perhaps, through being softer and not of a very durable nature, is fit for interior work only; a third, though it is durable under ordinary circumstances, may not be capable of being raised in blocks large enough for building purposes, and is therefore used as road metal, &c.

It sometimes happens, even after great care has been exercised in selecting a stone for a public building, that when the stratum has been singled out to serve the purpose, the selection has proved a failure for want of uniformity in grain and quality as the bed is worked into,—an unforeseen accident.

The chemical composition and physical features of stones found on the same horizon, and in the same quarry, are frequently found to vary within certain limits; whilst occasionally, although these characters are persistent for some distance, the natural joints of the rock eventually become so close together, that the stone is only fit for rubble-work. Thus, we see the great importance of not only specifying that the stone shall come from a particular stratum, but that the quarrying of the stone should be watched, and blocks examined as the work progresses.

Now and then the particular stratum, when worked into, contrary to all expectation, thins out, and the remainder of a large building must then be finished with other stones. With respect to the quantity of stone thus becoming reduced,—there can be no doubt that, in a great majority of cases, a careful geological examination of the district wherein the quarry is situated, would soon put that matter at rest. Assuming that this point is settled, let us now see how to collect pieces of stone for indoor examination.

Students are strongly advised to go as often as convenient to some of the large quarries, and select their own specimens. They will see there how the stones weather, better than in any other place, and get an idea of the different methods by which the stones are quarried, seasoned, and shaped. If it is intended to use the stone for building in a city, the additional destructive effects of the smoky atmosphere in rotting stone must be taken into account, as previously explained.

Having arrived at the quarry, it is easy to find the best bed used for building purposes, and (1) going into the heart of the working, a piece of stone should be knocked off. This piece should be retained to show the presence and amount of "quarry water." (2) Then proceed to the place where the stone is being seasoned, and obtain a specimen of the seasoned stone, but be careful to make quite sure that it originally came from the same bed as the previous specimen. (3) If the quarry-working is in the open air, go to the face of the rock, and follow the same bed away from the present workings, and (if the quarry has been opened long enough) get a piece of old weathered stone. (4) If the quarry-working is underground, and the particular bed does not come to the surface of the ground, it is of very little use to obtain a piece of stone from the workings. A block which has been brought into the open air for some years should be sought for. This will be weathered, and will answer our purpose quite well. When chipping a piece from it, inquire how long it has been quarried.

In securing these pieces, average-looking samples should always be obtained. The tendency is to bring away pieces which present some peculiarity, and which, of course, would not be fair specimens. Odd pieces lying about the quarry should never be taken away, but, in all cases, the stone should be obtained from the workings, or from a large block, the horizon of which when *in situ* is certain.

\* Totten, "Amer. Jour. Sci.," xiii., p. 136.  
Livingstone's "Zambesi," pp. 492-516.



It cannot be too strongly urged that each specimen intended to be carried away should have a label affixed to it, on the spot where it was obtained, giving the name of the quarry, bed, and stating whether it is weathered, unweathered, or seasoned.

The numerous grave errors arising from inattention to little points like these are sufficient to warrant their strict observance. If the information obtained respecting the stones is not put down at the time, it is remarkable how soon things become mixed up or forgotten. A very good plan is to give each stone a number, and especially if a tour of different quarries is being undertaken. This number should be entered in the note-book, and everything relating to the stone it refers to should follow after. Besides general information, the note-book should also contain:

1. A rough vertical section of the quarry, giving the thicknesses of the various beds.
  2. The size of the average, and the largest blocks which can be raised for building purposes.
  3. The quantity of stone estimated as capable of being raised from the best beds.
  4. The methods of quarrying.
  5. The appearance of the stone in the quarry, weathered and unweathered.
  6. The period which is usually allowed to elapse between the time when the stone is quarried and before it is thoroughly seasoned and ready for use.
  7. The method of seasoning.
- It is advisable to have samples of stone for examination sent direct from the quarry, when not convenient to go thither to obtain them personally.

### Books.

*Interior Decoration: A Practical Treatise on Surface Decoration, with Notes on Colour, Stencilling, and Panel Painting.* By FRED. MILLER. London: Wyman & Sons.

THIS is a very useful treatise by a practical artist who may be trusted as a teacher of whatever is teachable in the art of the decorator. With patience every one may become a draughtsman, and much judicious drawing from nature and from the best examples of decorative work will give some facility in design. But colour is a gift and the fact is admitted by the author, who avows explicitly that no rules can be given for harmonious colouring. The student may be told, indeed, that such and such colours so mixed and broken produce such and such results. But the proportions to be used cannot be expressed by formulae, but depend on feeling; and this quality, though it may be cultivated and improved, cannot be imparted to those who are destitute of it. "Where a room is decorated in tones of one colour it is not a very difficult matter to produce a pleasing effect." But the decorator should be something more than a worker in monochrome, though how he shall work and by what means he is to produce his effects must be left to his own instinctive feeling of the beautiful. The writer discards the employment of positive colour, holding that the nearer a tint approaches to a primary colour the less suitable it is to decorative requirements. He would work almost entirely in secondary and tertiary tones, although the latter of which, in the oft-expressed opinion of such colourists as the late William Burges, are not colours at all, but "mud." The author is, perhaps, a little too severe in this regard, and scarcely gives enough weight to the use of positive colour in Oriental schemes of decoration. It is to the careful adjustment of the quantities of pure colour employed that the decorator should address himself. That the colour schemes of the Medieval artists would be found too crude for modern practice may be at once conceded, but colour as positive and bright was successfully used by the Moors, and may be used again by those who have the Moorish feeling. "Pure vermilion" and "black" ceilings (pp. 93 and 129) are daring experiments, and are not likely to be attempted by the tyro.

The book is copiously illustrated, and the suggestions for stencilled ornament are all good, and every page supplies matter for profitable thought.

*Dictionnaire des Marques et Monogrammes des Graveurs.* Par GEORGES DUPLESSIS et HENRI BOUTCHOT. Paris: Jules Rouam, 1886.

THIS beautifully-printed little book gives fac-similes of the customary monograms

and other methods of signing their names on their works, adopted by the principal engravers whose works have obtained name and fame in the history of the art. It does not profess to exhaust the subject, by going after rare or out-of-the-way initials or monograms; it is intended as a guide to the amateur in recognising the work of the known masters of the art. Each monogram is accompanied by a record of the date of birth and death of the engraver concerned, and the localities where both are known. The book is arranged as a dictionary, alphabetically. Of the authors, M. Duplessis is curator of the Engraving Department in the National Library of France, and M. Bouchot the "archivist" and sub-librarian in the same department.

### RECENT PATENTS. ABSTRACTS OF SPECIFICATIONS.

10,940, Door-knobs. R. R. Parker.

The knob is secured to the spindle by a pin passing through it. A fine adjustment is obtained by making two series of holes at right angles through the spindle, and two holes at right angles in the neck of the knob, one slightly in advance of the other. The pin is secured by a collar screwing on the neck of the knob or fitting loosely thereon.

13,918, Street Gas Lamp. T. Pickett.

This invention consists in making the lantern triangular, and in fixing the sheets of glass by sliding them in grooves. Strips of glass are placed on each side to receive the names of streets or other announcements.

16,480, Window-sash Fastener. W. Reynolds.

The stem of the fastener, which is fixed on the stile of the bottom sash, has ratchet teeth, which enter a box on the opposite sash. This contains a lever, which engages with a rack securing the window in a closed position, or preventing any further opening if the window be partially open for ventilation. The back plate of the box presses on the curved portion of the stem, and draws the sashes together when closed. A projection which is cast on the fastener near the box prevents the insertion of a knife or other instrument so as to tamper with the fastening.

16,574, Indicating Door-bolt. A. A. King.

The bolt moves an arm carrying a disc. A spring prevents the bolt from being partially shot, the knob is mounted on a collar turning freely on the bolt to allow the knob to be turned down in the slot in the bolt case. The word "engaged," or other indicating word, is marked on the disc, and is exposed when the bolt is shot, or the disc is plain and covers or uncovers a word on the door according as the bolt is unfastened or fastened.

16,817, Fanlights and Skylights. R. Adams.

Relates to a method of opening fanlights by means of a notched link or lever at the side of the window or fanlight frame. Several alternative methods are incorporated in the specification, and to prevent slamming a door, check may be used in combination with any form of the apparatus.

16,893, Furnace Bricks and Linings, and Concrete Walls. J. Gillespie.

These bricks, or their outer faces only, are of fire-clay, and for the purposes of affording a hold for a gannister or other silicious lining, they are formed with projecting pins or ridges, which may be either in the solid with the brick, or made separately, and afterwards inserted, or holes may be employed with a similar object. They are specially applicable to the building of concrete walls.

16,894, Garden Training Walls. J. Gillespie.

Special bricks are employed for building these walls. The body of the bricks is made of common red or dark clay. To the exposed side or end of the brick is dovetailed or cemented a block or tile of a superior clay. This block may be so glazed and coloured as to reflect the light most beneficial to vegetation. Recesses are moulded (with or without projecting pieces) in the brick to facilitate the training of trees, flowers, and wall plants by tying up.

16,630, Stone-working Machines. F. Trier.

This machine for dressing stone acts in a manner analogous to that of a planer, by dressing the stone with cutters which travel backwards and forwards, over the surface. The cutters are disc-shaped, and act alternately on the stone.

### NEW APPLICATIONS FOR PATENTS.

March 19.—3,874, T. Ford, Hydraulic differential power lift.—3,881, W. Hill, Alarms for Windows, Doors, and Shutters.—3,903, G. Knight, Step Ladders.—3,909, H. Peters, Portland Cement.

March 20.—3,923, A. Huxley and Others, Syphon Flushing Cisterns.—3,941, W. Macville, Attaching Door Knobs and Handles to Spindles.—3,944, T. Humpage and E. Shaw, Improved Screw.—3,948, H. Abrecker and N. Grew, Water-meters.—3,949, F. Humperson, Forming Sockets on Lead Pipes.—3,953, C. Jones and F. Hasseldine, Portable Book-

case.—3,961, S. Frankenberg, Cement for Laying Mosaic Work, &c.

March 22.—4,000, Joints and Connections Pipes.—4,001, R. Hall, Urinals.—4,005, C. Mufford, Guards for Circular Saws.

March 23.—4,031, T. Shipman, Heating Buildings, &c., by Hot Water.—4,035, E. Wharling, Sanitary Pan.—4,039, T. Pessel and H. M. Chimney-cowl.—4,059, A. Henderson, Automatic Flushing Closet-pans.—4,065, S. Gerish, Sash Hinges.

March 24.—4,091, C. Greenfield, Trap for Drains.—4,101, S. Bamford, Chimney-tops.—4,110, Abbott, Opening and Closing Main Valves in Water-closets.—4,123, W. Sissons, Fastenings for Fall-pipe Rain-water Pipes, &c.—4,128, T. Gardener, Fastenings for Window-sashes, &c.—4,153, T. and J. H. Flushing Apparatus for Water-closets, Urinals, &c.—4,160, J. Osmond, Holding Doors or Casements Windows partly open.

March 25.—4,164, D. Brecknell and T. Mallon, Soldering Iron.—4,192, R. Hope, Folding Portable Table.—4,218, H. Minns, Ornamental Boards, &c.—4,224, A. Ryles, Ornamenting Panels, Tiles, &c.—4,229, M. Ismay, Double Swing Doors.

### PROVISIONAL SPECIFICATIONS ACCEPTED.

15,436, R. Oates and J. Green, Gullies and Traps.—2,240, F. Winsor, Water-waste Preventer.—2,310, C. Groombridge and J. Rickman, Door Chain.—2,419, J. Hicken, Fixing Door Handles to Spindles.—2,427, W. Sanderson, Door Lock and Latch Furniture.—2,437, S. Fisher, Wall or Ceiling Covering.—2,558, G. Priestley, Window Fasteners.—2,587, S. Pardee and J. Biggs, Sash Fastener.—2,687, Sanderson, Cupboard and Door Catches.—2,710, T. Panario, Overflow Pipe for Syphonic Cisterns.—2,841, A. Pilling, Self-closing Doors.—2,846, W. Sanderson, Window Sashes.—2,851, T. Panario, Water-waste Preventer.—2,872, R. Thorpe and P. Castle-Smith, Window Fastenings.—2,875, W. Ross, Water-waste Preventer.—2,235, Farley, Flushing Cisterns.—2,326, R. Rao, Water-closets.—2,531, W. Egglestone, Water-closet.—2,730, S. Kershaw, Coupling for Pipe Joints.—2,742, H. Colclough, Frost-resisting Tap.—2,743, W. Maish, Window-sash Fastener, &c.—2,949, Sowden and W. Cowan, Hinges.—2,967, Hicks and C. Tight, Levels.—3,003, J. Field, Ventilating Covers for Sewers.—3,112, W. F. Balancing Window Sashes.—3,139, F. Hamm, Hinge.

### COMPLETE SPECIFICATIONS ACCEPTED.

Open to opposition for two months.

6,441, C. Foster, Paving of Streets, &c.—7,191, J. and A. Clarke, Box Flues and False Bricks for Fire Grates.—7,239, H. Allan, Sealing and other Pipes.—7,311, G. Garrard, Pressing Taps.—7,330, R. Hunter and J. Turnbull, Kirt Ranges.—1,737, W. Lake, Screw-threaded Nuts.—2,257, L. Nash, Water Motors.—2,459, Openshaw, Fastening Rain-water and other Pipes.—2,491, J. Simpson, Gullies.—2,559, C. Spackman, Manufacture of Portland Cement.—2,755, J. A. Duckett, Cisterns for Flushing Water-closets Urinals.

### RECENT SALES OF PROPERTY.

#### ESTATE EXCHANGE REPORT.

MARCH 18.

By THURGOOD & MARTIN.

Croydon, Arundel-road.—A Plot of Freehold Land, 10,000 sq. ft., "Hope Cottage," freehold, 20 ft. deep, South Wimbledon.—2 to 8 even, South-road, freehold.

MARCH 22.

By J. BROWN.

Old Ford.—149, Grove-road, 88 years, ground-rent 21, 10s.—2 to 8 even, Peacock-place, freehold.

Chelsea.—46, Upper Manor-street, 16 years, ground-rent 10s.—

By HARMAN BROS.

Canonbury.—5 and 6, Alwyne-square, 40 years, ground-rent 20s.—

Shoreditch.—29 and 31, Mead-street, freehold.—Haggerston.—29, Dove-row, freehold.

Kingsland.—72, Kingsbury-road, freehold.

By C. & H. WARR.

Pimlico.—An Improved Rental of 47l. a year, term 39 years.

Katon-square.—12, Caroline-street, 35 years, ground-rent 6l.—

Pimlico-road.—"The Duke of Cambridge" beer-house, term 8 years.

Camberwell.—8, Cleveland-street, and 1 and 2, Cleveland-street, freehold.

9 and 10, Cleveland-street, freehold.

66 and 67, Wyndham-road, freehold.

By WOOD & SPINK.

Hackney, Orchard-place.—The Lease, Goodwill, and Plant of the "Albert Works," term 17 years.

By A. J. BROMLEY.

Stepney.—Ground-rent of 12l. a year, reversion in 45 years.

129, Carr-street, freehold.

By DOWSETT & WOOD.

Whitechapel.—21 to 37 odd, Chickland-street, 23 to 33 odd, Cannon-street, 24 to 58 even, Henage-street, 22 to 34 even, Spelman-street, and 1 to 13, John-court, freehold, area 15,630 ft.

Peecham, Cambridge-place.—Ground-rent of 18l. a year, term 67 years.

Ground-rent of 6l. reversion in 63 years.

Ground-rent of 11l. reversion in 63 years.



By FAIRBANKS, ROBERTS, & Co.	
oke Newington—3, Gordon-road, 74 years, ground-rent 44. 6s.	£800
By DEBENTHAM, TAYSON, & Co.	
ampstead—7, 8, and 11, Ball-street, freehold.	1,840
ing a Cross-road—No. 11, freehold.	747
olloway—119, Seven Sisters-road, freehold.	1,750
uth Kensington—129, Gloucester-road, 33 years, ground-rent 42. 12s.	1,700
elsea—97, King's-road, "The Old Black Dog," 21 years, ground-rent 62. 8s.	436
rough—30, 31, and 32, Trinity-square, 9 years, ground-rent 112.	420
ly—45, Cow Cross-street, and 19, Benjamin-street, freehold.	1,700
Wood-street—A profit rental of 230l., term 13 years.	1,900
John's Wood—20, Marlborough-road, 61 years, ground-rent 10l.	350
Finchley-place, 32 years, ground-rent 6l.	

By OWTEN & CO.	
ntenham Court-road—14, Stephen-street, 11 years, ground-rent 10l.	213
mpstead—By ROUSSEY & PEARCE.	
ground-rent 42. 8s.	1,550
18, Edward-street, 38 years, ground-rent 6l.	690
28, Harrington-street, 38 years, ground-rent	650
146, Hampstead-road, 56 years, ground-rent 6l.	1,400

By HOOKER & WEBB.	
uth Croydon, Barham-road—"Ingoldsby Villa," freehold.	520
ular—6, Rigdon-street, freehold.	235
ledonian-road—31A, Stock Orchard-crescent, 56 years, ground-rent 17s.	480
olloway—48 and 50, Tollymore-road, 62 years, ground-rent 12l. 12s.	850
13, Grove-road, 77 years, ground-rent 7s.	340
to 4, Bryett-road, 62 years, ground-rent 24l.	1,175

By BAKER & SONS.	
George's East—8, William-street, 30 years, ground-rent 12s.	80
ground-rent—15 and 48, Jane-street, 15 years, ground-rent 4l. 15s.	200
0 and 42, Jane-street, 15 years, ground-rent 4l. 15s.	185
atford—to 6, Great Eastern-road, freehold.	1,800

By J. L. DAVEY.	
nal Green—55, Tollymore-road, 46 years, ground-rent 3l.	260
By J. BAKER & WILKINSON.	
aldstone, near Harrow—Two Plots of Freehold Land.	99

By GLASER & SONS.	
hledon—Enclosures of Freehold Land, 56s. 1r. 16p.	19,600
Enclosures of Freehold Land, 16s. 9p.	9,000

By T. R. RAWSON.	
ington—66, Gibson-square, 42 years, ground-rent 6l.	545

By HARRIS & JENKINSON.	
on, Essex—Two Plots of Freehold Land.	185

By PROCTOR & MORRIS.	
atford—to 5, Chatsworth-cottages, 870 years, ground-rent 15l. 3s.	820
7, 13, and 15, Chatsworth-cottages, ground-rent 12l. 6s.	605

By E. STANSON.	
ton—5, Loughborough Park, 38 years, ground-rent 6l.	250
thorne Park News—Nos. 1 and 2, the Lease of, term 15 years.	250
berwell—28, Westmoreland-road, 63 years, ground-rent 12l. 6s.	600
to 6, Red Lion-row, 61 years, ground-rent 12l. 6s.	740
10, and 15, Red Lion-row, 61 years, ground-rent 8l.	465
oyce-road—21, Tollymore-road, 51 years, ground-rent 16l.	635
ton—16, Talford-road, 75 years, ground-rent 6l.	470
Kent-road—93, 96, and 97, Ormside-street, 67 years, ground-rent 10l.	375

By WHITE & SONS.	
ing—24 and 25, Howard-road, freehold.	500

By R. REND.	
on-square—155, Gower-street, 21 years, ground-rent 12l. 16s.	530

By HENDERSON, BOY, & FRANK.	
bourne, Herts—The Freehold Residence, "Wormley Lodge," and a Plot of Land.	2,750

By J. BAKER & WILKINSON.	
way—33 and 34, St. John's-villas, 58 years, ground-rent 6l. 10s.	1,045

By COOPER & GOULDING.	
labone—12, Clay-street, 4 years, ground-rent 2. 4s.	85
John's Wood—33, Capland-street, 38 years, ground-rent 4l.	330

## MEETINGS.

SATURDAY, APRIL 3.	
ociation of Public Sanitary Inspectors.—Dr. Alfred Water on "Sanitary Legislation." 8 p.m.	
ety of Arts (Spontaneous).—Professor George on "Electricity." 3 p.m.	
burgh Architectural Association.—Visit to the Edinburgh Museum of Science and Art. 2.30 p.m.	

MONDAY, APRIL 5.	
al Institute of British Architects.—Special General up of Minutes to consider the Draft of Pro-Charter. 7 (noon) p.m.	
ety of Arts (Cantor Lectures).—Mr. Alan S. Cole on Arts of Tapestry-making and Embroidery." I.	

ety of Engineers.—Mr. Arthur Rigg on "Obseur- of Recirculation in High Speed Steam Engines." 7 p.m.	
ety of Works' Association.—Third Annual Dinner, at Restaurant. 7 p.m.	

*Society of Chemical Industry.*—Professor Unwin on "The Principles and Methods of Testing Cementing Materials." 5 p.m. (Special meeting, in Technical Institute, Exhibition-road, Kensington.)  
*Victoria Institute.*—8 p.m.  
*Inventors' Institute.*—8 p.m.

*Leeds and Yorkshire Architectural Society.*—Presentation of Annual Report, and Election of Officers.

## TUESDAY, APRIL 6.

*Institution of Civil Engineers.*—Dr. Percy F. Frankland on "Water Purification: its Biological and Chemical Basis." 8 p.m.

*Society of Biblical Archaeology.*—Papers by Mr. Le Page Renouf and Dr. Louis Amant. 8 p.m.

## WEDNESDAY, APRIL 7.

*Carpenters' Hall, London Wall.*—Mr. Banister Fletcher, M.P., on "The Influence of Architecture upon Carpentry." 8 p.m.

*Society of Arts.*—Mr. J. S. Hudson on "The Preparation of Drawings for Photographic Reproduction." 8 p.m.

*British Archaeological Association.*—(1) The Rev. J. J. Daniell on "A Prehistoric Enclosure on Langley Burrell Common." (2) Mr. Thomas Morgan on "The Roman Monument at Fier's Bridge, Durham." 8 p.m.

*Civil and Mechanical Engineers' Society.*—Mr. A. Ivor Smith on "The Working and Interlocking of Railway Signals, &c., by Electricity." 7 p.m.

*Builders' Foremen and Clerks of Works' Institution.*—Ordinary Meeting. 8.30 p.m.

## THURSDAY, APRIL 8.

*Society of Telegraph-Engineers and Electricians.*—Continued discussion on Mr. Alexander Berenstein's paper on "Electric Lighting by means of Low Resistance Glow Lamps." 8 p.m.

*Society of Arts.*—Mr. James Boyd on "Asbestos and its Applications." 8 p.m.

*Society of Antiquaries.*—8.30 p.m.  
*St. Paul's Ecclesiastical Society.*—7.30 p.m.

## FRIDAY, APRIL 9.

*Architectural Association.*—Mr. G. R. Redgrave on "Ind. or Architecture." 7.30 p.m.

*Institution of Civil Engineers.*—Mr. Gilbert M. Hunter on "Locomotive Engine and Carriage Sheds as used on the Caledonian Railway." 7.30 p.m.

## SATURDAY, APRIL 10.

*Architectural Association.*—Visit to the Constitutional Club, Northumberland-avenue. Members to assemble at 3 p.m.

*Royal Institution.*—Professor Oliver Lodge on "Fuel and Smoke." I. 3 p.m.

*Edinburgh Architectural Association.*—Visit to Hatton House.

*Society of Arts.*—Professor George Forbes, M.A., on "Electricity." II. 8 p.m.

## Miscellaneous.

**The Parkes Museum.**—The following lectures and demonstrations for the instruction of sanitary inspectors, have been arranged for, on Wednesdays and Saturdays at eight p.m.:—April 3rd (1), introductory lecture,—"General History, Principles, and Methods of Hygiene," by Mr. George Wilson, M.A., M.D., F.R.S.E.; April 7th (2), "Ventilation, Measurement of Cubic Space, &c.," by Prof. F. de Chaumont, M.D., F.R.S.; April 10th (3), "Water Supply, Drinking Water, Pollution of Water," by Prof. W. H. Corfield, M.A., M.D.; April 14th (4), "Drainage, Construction," by Prof. H. Robinson, M.Inst.C.E.; April 17th (5), "Sanitary Appliances," by Mr. W. Haasle, C.E., F.L.S.; F.G.S.; May 1st (6), "Scavenging and Disposal of Refuse," by Mr. H. Percy Bouniole, M.Inst.C.E.; May 5th (7), "Food (good and bad), Milk, Sale of Food and Drugs Act," by Mr. C. E. Cassal, F.C.S., F.I.C.; May 8th (8), "Infectious Diseases and Methods of Disinfection," by Mr. Shirley F. Murphy, M.R.C.S.; May 12th (9), "General Powers and Duties of Inspectors of Nuisances,—Method of Inspection," by Mr. J. F. J. Sykes, B.Sc., M.R.C.S.; May 15th (10), "Nature of Nuisances, including Nuisances the Abatement of which is difficult," Mr. J. F. J. Sykes, B.Sc., M.R.C.S.; May 19th (11), Sanitary Law,—General Enactments, Public Health Act, 1875, Model By-laws," by Mr. A. Wynter Blyth, M.R.C.S., L.S.A.; May 22nd (12), "Metropolitan Acts, By-laws of Metropolitan Board of Works," by Mr. A. Wynter Blyth, M.R.C.S., L.S.A. A nominal fee only of 6s. for the course will be charged to cover expenses.

**The Banner Sanitation Company.**—Messrs. Banner, Bros., & Co., sanitary engineers, have removed from Billiter-street to Wessex House, Northumberland-avenue, opposite the entrance to the Hotel Métropole, where they will carry on business in future under the title of the "Banner Sanitation Company," and where they have arranged a permanent exhibition of models, illustrative of their system and of domestic appliances, more especially applicable to drainage, ventilation, heating, lighting, water-supply, and electric fittings.

**Building Trades' Exhibition.**—The annual Building Trades' Exhibition in the Agricultural Hall, Islington, will open on Monday next, April 5, and will close on the 17th inst.

## Provident Institution of Builders' Foremen and Clerks of Works.—On Saturday last the members of this Institution paid a visit, on the kind invitation of Mr. Rashleigh, clerk of works, to the new museum and classroom now in course of building from the drawings of Mr. Basil Champneys at Harrow Schools. The members assembled at Baker-street Station, and took the train to Harrow, and on the road to the schools paid a visit to Harrow Church. At the new museum, Mr. Rashleigh, and Mr. Winn, foreman for the contractor (Mr. Foster, builder, of Bedford), acted as guides, explaining the details of construction. The members, who were greatly gratified by seeing such good work, next paid a visit to the Speech-room, and afterwards to the chapel, erected by Sir Gilbert Scott. They then returned to the new museum, where Mr. Rashleigh had kindly provided a cold collation. Subsequently Mr. Duffy, the patentee of the solid deal flooring which is being used at the new buildings, explained his system of flooring, which has already been described in the Builder, claiming for it great advantages resulting from the dwelling of the blocks, thereby making a most rigid floor. Several of the members spoke of the practical value of such visits as this, and expressed the hope that other of their members who might be in charge of important works would copy the example set by Mr. Rashleigh, and that the Institution would have many excursions of a similar nature.

**The Proposed Simplon Tunnel.**—The principal project for a railway tunnel through the Simplon by which it is intended to provide a shorter and quicker route for the Eastern and Northern parts of France, and Western Switzerland, to Italy, has been for some time past under consideration of the Swiss Federal Council. Its leading feature is a tunnel through the base of Mount Simplon. The cutting would be of the length of 19,900 metres, or about twelve and a half English miles, thus making it the longest tunnel in the world. The expense of such an undertaking would, of course, be prodigious, and this fact has suggested a rival scheme, which was recently submitted to the Swiss Council. According to the latter project a tunnel is to be carried through the mountain at a height of more than 5,000 ft. above the sea level, and its length would only be 4,800 metres, or about three English miles. The approaches both on the northern and southern side of the tunnel would be by a line having a gradient of one in ten, which it is proposed to work by a toothed wheel locomotive, capable of performing a traffic of 1,200 tons a day, whereas, according to the best estimates, the average would not be more than 740 tons. The rate of speed upon the approaches and through the tunnel is calculated at fourteen kilometres an hour for passenger trains, and ten kilometres for goods trains, so that the length of the journey for this part of the line would be one and a quarter and two hours respectively. The number of trains passing daily in both directions would be sixteen, and the total cost of carrying out the latter and less ambitious scheme is estimated at not more than 14,000,000 francs, or 1,600,000l. sterling.

**The Preservation of Iron Structures.**—Mr. B. Baker, writing to *Engineering*, says:—"Any facts connected with the preservation of iron structures are of the highest interest to engineers. I may mention, therefore, that in recently testing the old links of the Hammersmith Bridge, which will be utilised in erecting the Forth Bridge, I was much struck with the perfect state of the iron. Under direct tensile or cold bending stresses the paint peeled off in large elastic flakes, and the surfaces of the bars were as clean and as blue as in fresh rolled iron. In none of the links tested by me was there any trace of oxidation under the paint, although the chains of a suspension-bridge, with the deep narrow spaces between the links, are by no means the easiest to cover. I was the more impressed with this result as in several of the more recent bridges across the Thames it is no exaggeration to say nearly an inch of rust has accumulated between the links. To what is this difference due? The Hammersmith Bridge was built sixty years ago. Can any specialist say what was the probable mode of preparing the paint then used? According to my experience, the revival of its manufacture is much to be desired."



**The Value of Building Land at Wimbledon.**—Last week a large portion of the Wimbledon Park Estate, through which the Wimbledon and West Metropolitan Railway, which is about to be constructed, will pass, was brought into the auction market at the instance of the mortgagees, on behalf of whom Messrs. Glaisher & Sons offered for sale 73 acres. The particulars stated that the property already possessed upwards of 7,000 ft. of frontages, in addition to which new roads could be formed to the extent of 9,000 ft., giving building frontages of about 16,000 ft. The property was submitted in two lots, the first lot offered consisting of 58 acres, which was sold for 19,000*l.*, being at the rate of about 340*l.* per acre. It transpired that the purchase had been effected by a syndicate, with the view of immediately developing the estate for building purposes simultaneously with the construction of the railway now about to be commenced, and which includes the erection of a bridge across the Thames from the Fulham Station of the Metropolitan District Railway to Putney. The second lot submitted, immediately to the west, and containing 15 acres, was put up at 9,000*l.*, and no advance having been made upon that since it was withdrawn, the auctioneer observing that its peculiar situation rendered it still more valuable for building purposes than the lot just sold. Subsequently, however, the vendors agreed to sell it for 9,000*l.*, and it was disposed of for that sum by private contract, the purchasers of the first lot being also the buyers, at the rate of 600*l.* an acre.

**Good Flat Roofs.**—For town buildings, flat roofs have many advantages, but when used they should be thoroughly well constructed. Two of the best roofs of this kind which we have seen for some time are the one at the new City Police station in Clock-lane, Cannon-street, and that of the new stores of the Army and Navy Auxiliary Supply Association in Francis-street, Westminster. The roof of the former building will afford a pleasant promenade for the many men who will be quartered in the building. It has a superficial area of about 2,600 feet, and consists of a layer, one inch in thickness, of the finest Pyramont Syssel asphalt, laid on concrete carried by iron joists, there being kirrings of the same material all round the parapets, chimneys, &c. The work has been excellently done, and to impart a pleasing appearance to the surface as well as to afford a good foothold, a thin layer of very fine and clean pebbles from the seashore is applied while the asphalt is hot. The roof at Westminster is of the same character, and has a superficies of about 12,000 square feet. The roofs at both these buildings have been laid by Claridge's Patent Asphalt Company, who have long been favourably known for the excellence of their work and material.

**Lloyds' Rooms.**—Messrs. A. Smith & Stevens have recently connected their hydraulic lift at Lloyd's Rooms, Royal Exchange, with the Hydraulic Power Company's mains. This lift is now making about forty journeys per hour, and is probably carrying more passengers than any other lift in London, the estimated number being over 1,000 per day.

**A Correction.**—The Campbell Tile Co., of Stoke-upon-Trent, write to say that the floor tiles in Caudon Church, mentioned on page 490, under the head of "Church Building News," were supplied by them and not by Messrs. Minton.

**Technical Education in New South Wales.**—For the benefit of artisans engaged in the building trades, classes have been established in decoration, plumbing, bricklaying, wood-carving, carpentry, and joinery; and in many of those classes the syllabus of instruction is identical with that in use at the Finsbury Technical College. Recently, the Council of the City Guilds Institute have received an application to extend their technological examinations to the Colony, and to award certificates and prizes on the results. This application is at present under the consideration of a Committee of the Institute.—*Nature.*

**The late Mr. Alfred Burges.**—In the obituary notice of this gentleman in our last, for "A. Deane" read T. Drane.

**Obituary.**—Mr. J. H. Read, managing partner in the firm of Messrs. John & Henry Cocks, builders, decorators, &c., of Grove-road, Mile-end, died a few days ago, aged 84. During the recent severe weather he was attacked with acute bronchitis, about a week prior to his death.

**The Department of Public Works in Japan** having recently been abolished as a separate office of State, much interest is felt, especially by scientific Europeans in the Japanese service, as to the future fate of the Imperial College of Engineering, which, since its establishment, has been under the control of the Minister of Public Works. It has been attached now to the Education Department, but it is uncertain whether it will remain a separate college, or will be incorporated with the University of Tokio. In the latter case a considerable re-adjustment of the staff would take place, as the University has already professors of most of the subjects taught at the Engineering College, and a number of holders of Chairs of scientific subjects would be redundant. Commenting on this subject, the *Japan Mail* says that graduates of the College are found doing useful work in every part of the empire, and so high is the esteem in which they are held that to have been educated there is a certain passport to employment. It possesses the handiest buildings and the most perfectly equipped laboratories and museums of any educational institution in Japan, the University not excepted,—and hence it would be a pity to destroy the individuality of an institution which has been so markedly successful. Accordingly it is suggested that the wisest plan would be to affiliate it to the University, and to transfer the engineering classes of the latter to its care. If any Japanese institution may be said to be British, the Engineering College may be said to be so from its foundation until the present moment. Its chairs have all been held by English men of science, and are still held by them.—*Nature.*

**The Hiramant Tunnel.**—At the students' meeting of the Institution of Civil Engineers, held on Friday, the 26th ult., Mr. James Mansergh, M.I.C.E., in the chair, Mr. W. A. Legg submitted a paper on "The Construction of the Hiramant Tunnel on the line of Aqueduct of the Vyrnwy Waterworks for the supply of Liverpool." The author explained that this tunnel formed the first portion of the aqueduct of the Vyrnwy Waterworks, now being constructed for the supply of water to Liverpool. Its section is a circle of 7 ft. in diameter, and its length 3,901 yards, having a gradient of 1 in 2,540. The Corporation had undertaken to drive to the rock at each end. The first 128 yards of tunnelling at the inlet end and 287 yards at the outlet end, both passing through clay, were formed 12 ft. square, and lined with brickwork consisting of four rings, set in cement and backed with concrete. This brickwork extended to 1,061 cubic yards at a cost of 3*l.* 10s. 4d. per yard. For mortar, pulverised quartz obtained from a disused lead mine in the neighbourhood, was used, as no sand could be got near. The proportions for the mortar were 2 to 1, and for the concrete 8 to 1, the latter costing 1*l.* 3s. 10d. per cubic yard. Blasting and machine drilling by compressed air, were the means adopted for driving through the rock portion of the tunnel. Two drills, working at about 500 strokes per minute, were employed simultaneously at each heading; the air-compressor, when working at 120 revolutions per minute, being capable of delivering 33 cubic feet of air at 60 lb. pressure along 3 in. cast-iron flanged pipes. For each round of blasting about twenty-three holes were drilled, dynamite being almost exclusively used. While the tunnel was ventilated by exhaust air from the drills during the operation of drilling, air for ventilation was supplied from a Blake's blower during the removal of the spoil, the compressed air pipes serving both the purpose of feeding the drills and ventilation, being regulated by a system of valves. The two headings met on the 30th of September, 1885, when it was discovered that a difference of only 2½ in. existed in the centre lines, and only 0.22 ft. in the levels, over a distance of 3,566 yards, being the length of the tunnel. The average progress during the last fourteen months of the work had been 4.44 yards per day.

#### PRICES CURRENT OF MATERIALS.

TIMBER.			
	<i>£</i>	<i>s.</i>	<i>d.</i>
Greenheart, B.G. ....	ton	8	0
Teak, E.I. ....	load	12	10
Sequoia, U.S. ....	foot cube	0	2
Ash, Canada ....	load	3	0
Birch " ....	load	3	0
Elm " ....	load	3	10
Fr. Dautsio, &c. ....	load	1	10
Oak " ....	load	2	10
Canada " ....	load	5	10

TIMBER (continued).			
	<i>£</i>	<i>s.</i>	<i>d.</i>
Pine, Canada red .....	load	3	0
" " yellow .....	load	3	0
Lath, Danish .....	load	3	10
St. Petersburg .....	load	4	0
Waincoat, Rugs .....	load	2	15
Osaka, grove .....	load	3	12
Denia, Finland, 2nd and 1st ..	load	7	10
" 4th and 3rd .....	load	6	0
Riga .....	load	6	0
St. Petersburg, 1st yellow ..	load	7	0
" 2nd .....	load	7	0
" white .....	load	7	0
Sweden .....	load	6	0
White Sea .....	load	6	0
Canada, Pine 1st .....	load	17	0
" 2nd .....	load	12	0
" 3rd, &c. ....	load	6	0
" Spruce 1st .....	load	8	0
" 3rd and 2nd .....	load	5	0
New Brunswick, &c. ....	load	5	0
Patterns, all kinds .....	load	4	0
Flooring Boards, sq. 1 in. —	load	0	9
pared, first .....	load	0	8
Second .....	load	0	7
Other qualities .....	load	0	5
Cedar, Cuba .....	load	0	3
Honduras, &c. ....	load	0	3
Australian .....	load	0	2
Malaya, Cuba .....	load	0	5
St. Domingo, cargo average ..	load	0	5
Mexican .....	load	0	3
Tolasco .....	load	0	4
Honduras .....	load	0	5
Maple, Bird's-eye .....	load	0	6
Rose, Rio .....	load	7	0
Balsa .....	load	8	0
Box, Turkey .....	load	5	0
Satin, St. Domingo .....	load	0	7
Porto Rico .....	load	0	8
Walnut, Italian .....	load	0	4

#### METALS.

	<i>£</i>	<i>s.</i>	<i>d.</i>
Iron—Pig in Scotland .....	ton	0	0
Bar, Welsh, in London .....	load	10	4
" " in Wales .....	load	4	5
" Staffordshire, London .....	load	5	15
Sheets, single, in London .....	load	6	10
Hopps .....	load	6	0
Nail-roads .....	load	5	10
Copper—			
British, she and ingot .....	ton	45	0
Best selected .....	ton	47	0
Sheets, strong .....	ton	63	0
" India .....	ton	48	0
Australian .....	ton	47	0
Chili, bars .....	ton	7	6
YELLOW METAL .....	lb.	0	4
LEAD—Pig, Spanish .....	ton	13	5
English, common brands .....	ton	13	5
Sheet, English .....	ton	14	0
STEELS—			
Swedish, special .....	ton	14	6
Ordinary .....	ton	14	6
TRY—			
Banca .....	ton	0	0
British .....	ton	0	0
Strata .....	ton	63	10
Australian .....	ton	63	12
English ingots .....	ton	67	0
ZINC—			
English sheet .....	ton	0	0
OILS.			
Linseed .....	ton	20	10
Cocount, Cochiti .....	ton	29	0
Ceylon .....	ton	25	10
Cap .....	ton	0	0
Palm, Lagos .....	ton	0	0
Palm-out Kernel .....	ton	0	0
Rapeseed, English pale .....	ton	22	15
" brown .....	ton	21	5
Cottonseed, refined .....	ton	16	15
Tallow and Oleine .....	ton	25	0
Lubricating, U.S. ....	ton	6	10
" Refined .....	ton	8	13
TURPETINE			
American, in casks .....	cwt.	1	6
Tak—Stockholm .....	barrel	0	18
Archangel .....	barrel	0	10

#### TENDERS.

BLACKHEATH. — For conservatory adjoining B health Station, for Mr. Shaw:—	
Couchman & Co., Blackheath .....	2161 0 0
J. A. Taylor, Haggerston .....	165 9 0
King & Son, Vauxhall .....	98 0 0
BODMIN. — For the erection of a new dwelling-h for the Town Mills at Lanivet, for Messrs. Thomas G & John Treval, joint proprietors. Materials and car supplied. Mr. William Treval, architect:—	
For all the Work.	
J. Lobb & Son, Bugle, St. Austell .....	2200 0 0
For Mason's, Slater's, and Plasterer's Work.	
N. Pearce, St. Blazey, Pax .....	273 12 0
For the Carpenter's, Joiner's, Smith's, Plumber's, Paint and Glazier's Works.	
D. Trethewey, Roche, St. Austell .....	288 0 0
Accepted.	
BRIGHTLINGSEA. — For the erection of the H Hotel, Brightlingsea, for Mr. F. Miller, the propri feeding brick, sand, and lime. Mr. Edgar Farman, m teet, Great James-street, Bedford-row:—	
Everett & Son .....	21,375 0 0
O. H. Oldridge (accepted) .....	1,370 0 0
BRONDESBURY. — For additions to No. 10, Avenue, Brondebury, for Mr. J. R. Macdonald, Mr Giltie Scott, architect:—	
Fritchard & Son .....	21,173 0 0
J. Anley .....	1,154 0 0
Benjamin & Co. ....	1,023 0 0
Gould & Brand .....	1,023 0 0
J. H. Johnson .....	868 0 0
Harris & Wardrop .....	868 0 0



*Epitome of Advertisements in this Number.*

.....

## PUBLIC APPOINTMENTS

**TUNBRIDGE WELLS.**—For the erection of "Salva-  
tion Army Barracks" in Varney-street, Tunbridge Wells,  
"General" Botha. Mr. E. J. Sherwood, architect  
and surveyor, Queen Victoria-street, E.C. Quantities by  
a architect:—

G. & F. Penn, Tunbridge Wells .....	£1,821	0	0
W. T. Judd, Tunbridge Wells .....	1,679	15	0
Gallard & Sons, Tunbridge Wells ...	1,868	0	0
Oakley & Drake, Tunbridge Wells...	1,680	0	0
M. C. Tully, Addick Wood .....	1,867	0	0
N. Young, Tunbridge Wells .....	1,338	14	6
J. Jarvis, Tunbridge Wells (estd) ..	1,338	14	6
F. J. Coxhead, Leytonstone .....	1,320	0	0



*Particulars on Application.* Chief Offices:—352 to 364, EUSTON ROAD, LONDON, N.W. 1



# The Builder.

Vol. L. No. 2253.

SATURDAY, APRIL 10, 1896.

## ILLUSTRATIONS.

Ridgemoor, Englefield Green.—Mr. Henry Cowell Boyes, Architect.....	542-543
"Fontaine d'Amour."—Design for Stained Glass, by M. Champigneulle.....	548
Bainbridge Memorial Chapel, Newcastle.—Messrs. S. Oswald & Son, Architects.....	547
Laver Marney Towers, Essex.—From a Drawing by Mr. A. B. Mitchell.....	551
Details and Elevations of Laver Marney Towers, Essex.—Measured and Drawn by Mr. A. B. Mitchell.....	550, 554-555

## CONTENTS.

The Excavations at Winchester Cathedral.....	531	"Bainbridge Memorial" Chapel, Euston-road, Newcastle-on-Tyne.....	538	Sunderland Municipal Buildings Competition.....	569
The Institute and its Charter.....	533	Competitions.....	538	Stone-Sawing and Mosaic Manufacture.....	570
Notes.....	535	Clerk of Works Association of Great Britain.....	538	The Marney Monument.....	569
The Building Trades' Exhibition.....	536	State of the Materials of Lord Carrington's House.....	538	The Student's Column: Our Building Stones.—V.....	569
The Examination in Architecture.....	537	Roberts's Rain-Water Separator.....	539	Recent Patents.....	569
Free Lectures to Artisans at Carpenters' Hall: Terra-Cotta.....	537	A New Clatern-Valve.....	539	Recent Sales of Property.....	561
Ridgemoor, Englefield Green (with Plan).....	543	Wood-Block Flooring.....	539	Meetings.....	561
Fontaine d'Amour: Design for Stained Glass.....	548	The Proposed Railway up Mont Fildun.....	539	Miscellaneous.....	562
Laver Marney Towers.....	549	Associates of the Royal Institute of British Architects.....	560	Monument to Liebig.....	562
Lighthouse, Sanibel Island (Illustrated).....	558			Prices Current of Building Materials.....	562

### The Excavations at Winchester Cathedral.

**I**N our issue of the 13th of February, page 259, reference was made to the excavation of the foundations of a portion of what was supposed to be the New Minster, founded by King Edward the Elder close to the cathedral, or old Minster, of Winchester. The workmen have laid bare the foundations of what appears to be a nave measuring about 85 ft. from east to west, and about 49 ft. wide internal measurement, with a chancel continuous with the nave or nearly so, 63 ft. long, with apparently the same width, the proportion thus being almost exactly three squares, one for the width to three for the length. The walls have been traced entirely round the south side, the west end, and portions only of the north wall of the nave and the east end of the chancel, the work of excavating being discontinued only from very slender evidences of the existence of the walls being met with, traces of rough foundations alone remaining at a depth of about 8 ft. from the present level of the ground. The south wall is, for the most part, solid from its foundations up to about a foot of the present surface. The excavations show that the whole of the site consists of made ground, which rendered it necessary for the foundations to be carried down to a firmer basis, the earth being full of fragments of Roman brick, rough pottery, tiles, and such like. The walls are roughly constructed of small-sized rubble and flints, laid herringbonewise in some places, with broken Roman brick at intervals, put together with brown gravelly mortar. The ground level is about 1 ft. 10 in. below the present surface, and here there is a set-off of about 2 in. on each side, on which the fair wall, which is 3 ft. 6 in. thick, commences, but it remains only 1 ft. high, the whole of the upper portion having been removed. It is formed of small-sized stones and flints, laid more closely than the foundation, and solidly bedded in a very good mortar of whiter colour than the lower.

At the south-west angle the foundations remain of a very small square enclosure, 5 ft. 5 in. by 5 ft. 6 in. Its walls measure 1 ft. 2 in. in thickness on the east side, and 1 ft. 3 in. on the north side. There is no sign of entrance-door at the level remaining, but the form of the chamber suggests the base of a small tower or turret. No trace remains of floor, and there is nothing to guide conjecture

as to how this building, whatever was its nature, was floored, nor are there any indications of the walls having been plastered. There are traces, and no more than traces, of what appear to have been two internal buttresses or piers, within the nave, on the south side, and of a larger one at the junction with what we have called the chancel; but there is no projection either of pilaster, pier, or buttress along the whole 157 ft. of the outer face of this south wall, a circumstance not a little remarkable. There is no special evidence of style or age, but the appearance of the masonry is sufficient to show that it is very early work, very different from the earliest Norman work in the adjacent cathedral.

Such, in fact, are the feeble traces which very painstaking search has revealed. No more have been met with. The result is not so satisfactory as might have been expected, and it must be a matter of regret that the building had been so completely demolished as to leave such slender signs of its former existence to reward the explorers.

While there is so little in the remains thus found to show anything of the stateliness we should expect from a royal foundation of such an important class as New Minster appears to have been, there is a doubt in some minds as to whether or not the remains met with are not those of one or another of the Saxon cathedrals of Winchester rather than those of New Minster.

In our issue of February 20th (p. 295), the Dean, under whose direction all the works of clearance are being carried out, "thinks it unlikely that the New Minster would have been built on the southernmost line of their territory," and favours the opinion that the remains are those of some former cathedral.

The consideration of local matters of detail merely from references to monastic chroniclers is, doubtless, a work of difficulty and uncertainty, likely to be set aside by some fortunate discovery or by some more direct evidence. Still, the subject of the relative positions of New Minster and the cathedral is sufficiently curious as to warrant a short space being devoted to its consideration. We have already, p. 259, referred to the statement that the New Minster was close to the old one at its foundation, it being partly in the cemetery of the latter, on a contracted and costly site. The excavations show that the burials come close up to the south wall, while the wall itself, without projection or transept, seems to show that it was so designed to form a boundary line. At any rate, had this been the intention the building, whatever it was, could not have been planned better to suit the ground, supposing that the intention was to come close up to the boundary. Then there is the reference

to the removal of New Minster on account of the troubles consequent upon the ringing of the bells, &c., owing to its proximity to the cathedral. The actual nearest distance from the Norman transept of the latter is but 27 ft., a sufficiently small distance to occasion trouble; but if the foundations are not those of New Minster it must follow that the latter was on some other site which would have been further away, which would have lessened the trouble referred to, if not have prevented it altogether. The small distance, therefore, supports the statement of the old chroniclers, and is in favour of the site being that of New Minster. A good deal of weight must be attached to the references of the Norman rebuilding of Winchester Cathedral by Bishop Walkelin, for if it can be shown that a new site was then chosen for the building, then it follows that some little uncertainty may attach to the identification of New Minster. While we know that the Saxon cathedral was close to New Minster, it is the Norman cathedral which is referred to as experiencing the evils from the proximity, thus supporting the belief that the Normans rebuilt upon the old site, as was the almost universal custom. We may conclude that they commenced the rebuilding at the east, and probably extended the building westward.

The records of that event show that Walkelin left standing the domestic buildings while he was erecting the new ones, and that for some time after the cathedral had been rebuilt and the new domestic buildings occupied, a portion (one altar) of the old Saxon church was left standing. Now this is more consistent with the supposition that Walkelin rebuilt his church on the same axis, but more to the west, than that he went to a new site altogether; for if the foundations now laid open are those of the old cathedral, then the old domestic buildings, if in their usual place on the south side, would have been in the way of his work. But we find there is an ancient cemetery in this place, which prevents the supposition that there were buildings there. Is not this more likely to have been the cemetery of the cathedral, in its proper position on the north side, in relation to the present church, rather than the cemetery of a cathedral more to the north, on its south, or unusual, side?

But Rudbourne tells us that Walkelin took down the western portion of the old domestic buildings to enable him to rebuild them, which also points to the fact that he was working on the same lines, but more to the west, of the old Saxon work. A curious little structural point has been brought more prominently forward by the removal of earth from the crypt of the cathedral, which appears to



support the same line of reasoning. The whole of Walkelyn's work is faced with squared stone with wide joints, alike on the inner and outer faces of the crypt. At the junction of the charming Norman crypt of Walkelyn's Lady-chapel, where its eastern apse ends at the western commencement of Bishop Lucy's extension, there is to be seen on the north side and also on the south side alike,

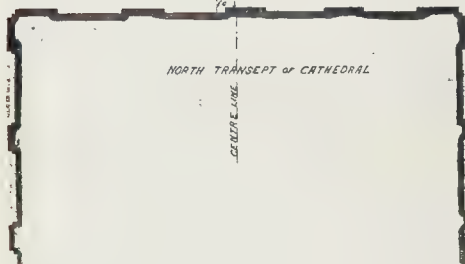
known to us of such a building of such dimensions. The largest churches of Saxon date in existence are cruciform; that in Dover Castle and some others having its tower over the crossing; that at Worth, cruciform and having no original tower at all. The plan of the old cathedral of Sidnacester (Stow) appears also to have been cruciform from the portion of the north transept remaining. The plan of a nave

from the earth only a little below them, the shafts being about one half buried, their bases being completely out of sight, and the walls appearing very low. The enormous mass of accumulated earth is being gradually carried away in baskets, and as it thus appears a finely altered appearance is the result.

The piers are being opened out to view to their entire height, and their bases revealed;



Plan of Remains Discovered.



a mass of rubble walling formed of small stones, remarkably like the early work of the foundations we have been describing. While the contrast of these fragments is at once apparent as being unlike the Norman work, it is still different to the thirteenth-century work of Lucy's. That it existed before the work of the latter bishop is at once apparent, for the first, the most westernmost, of his wall shafts, north and south, is made of less height than the others in consequence of the existence of these masses of masonry. His work is accommodated to them. It is within the bounds of fair reasoning to say that these fragments of walling mark the east end of the Saxon cathedral. If so, they are conclusive that the latter stood on the same site as the present one, and we may suppose that Walkelyn, while completing his choir, left the Saxon choir standing for a time, so as not to interfere with the services, and on its site he afterwards erected his curious long Lady-chapel, bringing its east end up to the extreme end of the old Saxon work. No settlement has occurred on any of this portion of the work, but it may be noticed that Lucy's eastern extension has sunk materially to the east. This is not evidence of very much value, but we may assume, on the hypothesis stated, that a site occupied by buildings for a long series of years would be firmer than the extended portion on new ground.

Be these foundations what they may, and slender as they are, they are worthy of all the attention we can bestow upon them, since they illustrate a subject of which we know so little, namely, what was the plan of a large Saxon church?

These remains appear to indicate to us that there was a church consisting of a long nave without aisles (unless the great width between the walls was divided by wooden columns, which is not unlikely) joined to a similar aisleless chancel, a plan unlike anything at present

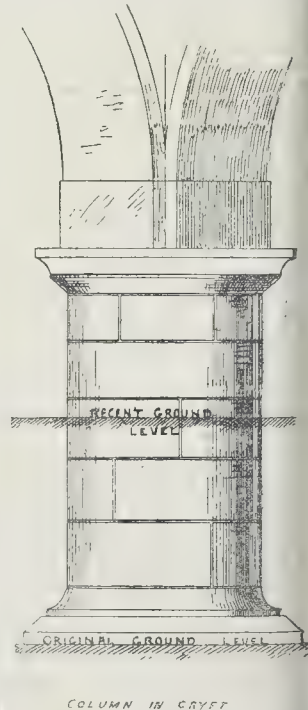
and chancel only is familiar enough to us, since it occurs in a great number of Saxon churches, but only in buildings of small or moderate size, nothing at all equalling the length of the foundations now laid open, and which we must consider as being unique in respect to their size. In the cases referred to the chancels are of less width than their naves, a distinction not observed here.

A comparison with some of the largest of our pre-Norman churches may not be without interest. These are mostly of small dimensions, and the following buildings, fairly moderate as are their sizes, have to be referred to as the largest. The cathedral of Sidnacester, as it may fairly claim to be, is, perhaps, the first as regards dimensions, the Saxon transepts having a length of about 90 ft., the present nave and chancel being about 150 ft., and the original was probably longer. Brixworth nave is about 136 ft. long; church in Dover Castle, 117 ft.; Worth, 98 ft.; Stanton Lacy, another transeptal church, 64 ft., without its later chancel. The chancel of Jarrow Church is 42 ft. long, which shows that it was part of a building of some size.

So far as regards width, there is little in anything actually existing to compare with the width of 49 ft.; Brixworth nave is about 32 ft. wide; Reculvers nave, 23 ft. 6 in., nave and aisles, 45 ft. 6 in.; Worth, 28 ft.; Dover Castle, 27 ft.; Stanton Lacy, 20 ft.; Jarrow chancel, 16 ft. 6 in. These figures are given approximately only from various published plans.

Let us turn to the works in progress in the crypt of the cathedral. Any one who is familiar with this fine old work will be most agreeably pleased with the altered appearance which is taking place day by day. The old proportions were so seriously destroyed by the level of the earth being several feet above the original floor line, that the work could only be studied under great disadvantage, the curious caps of the heavy central columns emerging

the excavations being carried down to the original level. Strange to say, except in the eastern extension, no traces of paving have been met with. The columns and walls appear more than double their recent height, and the fine effect of the work can be considered. Several masses of modern masonry have been removed to lay open the old work, and some tamperings with the vaulting have been set right, but the blocks of stonework which



support the Waynflete and Beaufort chantries in the choir above are bound to remain mute as they obstruct the view. Their constructive shows that the filling up of the crypt is a recent work.

As is well known, the crypt of Walkelyn Lady-chapel remains in all but perfect condition, notwithstanding that the chapel itself soon gave place to Bishop Lucy's extended work. It indicates precisely the size and



place of what Walkelyn erected. It has a range of central shafts, consisting of single columns, but their effect has been marred for centuries by a mass of walling built between them. This is being removed in order to detach the columns, and when completed a charming effect will result when seen from their junction with the crypt of the cathedral, the pointed-arch work of Lucy's square east-ended extension being in full view beyond it.

The walls of Walkelyn's work were pointed with a broad square band of excellent mortar, fully 1 in. wide, the joints being neatly squared.

Some of this pointing has always been visible in various parts of the cathedral, but the recent works have demonstrated that it is original, and not done at some later period, for it is found in perfect condition on some of the portions of walling which have now been opened to view after having been buried for many centuries.

The internal walls have never been plastered, only the vaulting; and there is no evidence that colour has been used to any portion.

#### THE INSTITUTE AND ITS CHARTER.

**A**FTER two meetings, one continued to a late hour on Monday evening, and the second occupying the greater part of Tuesday, the general meeting of the Institute of Architects has adopted, in the main, the form of charter as recommended by the Charter Committee, only one or two of the numerous alterations made in the wording affecting it in any important principle.

It is not our intention to report in any detailed manner the proceedings of what was essentially a private meeting; the official report is already in the hands of those whom it specially concerns. Some portion of the proceedings on Monday, indeed, are much better left unrecorded; and the member who made the principal attack on the proposals of the Committee, in one of the most discourteous and unseemly speeches that we ever had the misfortune to listen to, ought to feel that he owes some gratitude to the persons whom he attacked in this manner for their expressions of willingness, at the close of the second meeting, to condone and forgive an exhibition of superlative oratory which, however, is not likely to be altogether forgotten. Apart from this, the proceedings at the two meetings may be regarded as satisfactory in their results. A great many points were considered in a very full and mostly business-like spirit, and (what more) a conclusion was arrived at; and by a process of taking the meetings consecutively till the matter was gone through, a country members who had attended for the purpose of taking part in the debate were enabled to see it through without the inconvenience of a long stay or a second visit to town for the purpose; an inconvenience of which they have complained, with good reason, on former occasions, when important debates have been cut short and adjourned to a distant date.

Two of the provincial members, it may be observed, Mr. Connon (Leeds), and Mr. Aldridge (Liverpool), the meeting owed a great many excellent and useful suggestions; among the London members who have an interest in the subject, the Institute ought to feel much indebted to one of its younger members, Mr. E. T. Hall, who has been the originator of a great number of modifications in the form and wording of the Charter, a large portion of which have been adopted, and which it is to establish their author in a reputation outside-street for practical business qualities. The new Charter as now proposed perhaps on the side of being over full in its provisions, though on going through them *seriatim* it does not appear that there was much in them which could very well be omitted. The most important modifications made were, indeed, in the form of addition rather than subtraction. As regards the clause providing that Associates should have future voting powers, subject to definition or restriction by by-laws, the Committee rather rashly went into definitions on the point, partly from a wish to have done with a troublesome subject, partly on the ground

suggested by one or two speakers, that matters of privilege were much better incorporated in the Charter for good and all, and that there was less chance then of their being overturned or meddled with at any future time. The result was the modification of clause 19, to the effect that in future Associates should be entitled to vote on all questions except the making of by-laws: a result which seemed to give satisfaction to the Associate members present, as indeed it ought. We question the wisdom of conceding as much as that at present; but if it puts to rest a cause of contention it may be as well that a definite conclusion was arrived at without further loss of time. There are a great many members among the Associate class, no doubt, who would be perfectly competent and desirable voters on every subject that comes before the general meetings; of the feeling of some of these there is excellent evidence in the letter from Mr. Richards Julian which we print in another column. But there are unfortunately others who are not. The reasonableness of the views of some of these gentlemen may be gauged by the fact that some of those present openly intimated that they considered they ought to have the same votes and privileges as the Fellows in every way, while paying only an Associate's subscription; and the fitness of some other gentlemen for the additional influence they seek to obtain may be estimated by the fact that three or four of them were reported to have voted clandestinely in the debate of Monday evening: nor is this all that might be said. The best of the Associates would probably prefer to forego for the present some privileges for which they are perfectly qualified, rather than share them with such coadjutors. We very much doubt whether some of the members of the Council are fully alive to the possible consequence to the status of the Institute of the provision which they lightly and good-humouredly passed. They have bestowed the power of voting the election of Fellows on a body more numerous than the Fellows, and containing a certain proportion of men who have not, and perhaps never will have, any very high status, either socially or professionally. Considering the possible combinations in voting for Fellows elected from the class of Associates under these circumstances, the Council will do well to exercise their right of decision as to the putting up of candidates with extra care and discrimination, if they wish to preserve to the Institute the high character and tone which, amid whatever other shortcomings, has always hitherto belonged to it. Ultimately, no doubt, the effect of the compulsory examination on entrance will be to put a bar on the election of undesirable members, and to assist in maintaining a universally high standard both of character and capability.

The other main addition made to the form of the Charter was, on the motion of Mr. Hall, to retain in the preamble the words relating to the spirit and intention in which it was originally conferred, mentioning the importance and dignity of the art of architecture and the desire of the Sovereign who conferred the Charter to assist the architects in their aim of further developing and improving so noble an art, &c. This, as we have before observed, may be considered less necessary now that the importance of architecture is more generally recognised and admitted; but we are glad the meeting decided to retain the words, because they are, in the first place, exceedingly dignified and admirable in expression, and set up a very high view of the subject, and because also they are of interest historically as evidence of the feeling and spirit in which the original Charter was conferred.

We hope the Charter, as now approved by the general meeting, will before long be confirmed and conferred. With this freer scope for its action, the Institute, having got through the formal business necessary to give it the foot-hold for a new start, ought to take up with fresh vigour the higher task of promoting and raising the art of architecture in the spirit embodied in those words of the preamble of the original Charter, which it has wisely determined to keep on record.

#### NOTES.

**T**HE action of the Railway directors with regard to Mr. Mundella's Bill has had precisely the effect we anticipated. The alarm created amongst shareholders has forced stock upon the market, and a feeling of great uneasiness prevails. The directors have received the support of the shareholders generally, as the latter are very much in the dark as to the real merits of the case, but the press unite in condemning the exaggerated statements which have been made, and the same may be said of the Stock Exchange. The *Economist*, while naturally sympathising with the directors to a certain extent, is of opinion that much that has been said is nonsense,—and mischievous nonsense,—and that the directors must alter their tactics if they wish to achieve any success. It is very improbable that the Bill will be rejected, as the opposition is narrowing down to three or four clauses, and the resolutions passed at the more moderate of the shareholders' meetings were in favour of amendment rather than rejection. The attitude of the traders may be judged by the remarks of the Railway Rates Committee and the Railway and Canal Traders' Association. The former body, in their report presented to the Chambers of Agriculture on the 6th inst., recommend that support be given to the second reading of the measure, though considering it necessary to propose amendments if the Bill is to be accepted as a satisfactory solution of the existing controversy, while the Traders' Association, after condemning the Bill as it at present stands, remarks:—"Nevertheless, we have so much confidence in the public spirit of the present House of Commons that we believe it would be safe to allow the Bill to pass the second reading, and that its vices may be cured in Committee." Both parties look for benefit from the measure, and both find clauses that go against the grain, and the Bill will, doubtless, undergo considerable alterations before becoming law.

**W**E may note that on Friday, the 2nd inst., on the motion of Mr. W. H. Smith, it was resolved that a Select Committee be appointed "to reconsider the plans and proposals for an Admiralty and a War Office," which in itself we are glad of, as there is, we hope, some chance that the site may be rearranged on the lines suggested by the Institute of Architects. The only information added in regard to the points for the consideration of the Committee, however, is, rather ominous, as it is "that it be an instruction to the Committee to report whether some or all of the existing buildings of the Admiralty may with advantage be retained." This looks like a further development of the wretched spirit of parsimony which is practised in regard to Governmental architecture in this country, in place of any preconceived wish to carry out the scheme in a manner more worthy of the nation. We earnestly hope that some Members of Parliament who have a real knowledge of and interest in architecture for its own sake will find a place on the Committee.

**T**HE case of Saunders v. Pawley, which was recently discussed before a Divisional Court, involves points which are of some importance to the public at large as well as to our readers. The trial of this action took place in June last before Mr. Justice Day and a special jury, the claim being for damages against an architect, by reason of injuries sustained through the alleged fraudulent representations of the defendant as regards the sanitary condition of a house at Norwood. It was also alleged by the plaintiff that there was a breach of contract, inasmuch as the defendant had stated that the system of drainage was good and had been approved by the Local Sanitary Authority. The case, as presented on behalf of the plaintiff, was that sewer gas escaped into the house at the time of the letting and afterwards, resulting in the serious illness of some of the servants and in the death of the plaintiff's wife from blood-poisoning. This lady had enjoyed an income of 800*l.* a year, and, by reason of the loss



occasioned through her death, and of various expenses necessarily incurred, the plaintiff claimed the sum of £2,400. The jury returned a verdict for the full amount, but execution was stayed upon the defendant paying into Court the sum of 1,000*l.*, pending an application for a new trial, or, in the alternative, that judgment should be entered for the defendant. The arguments in support of this application, and *contra*, have now been heard, and in the result the verdict is set aside, and the defendant obtains judgment, execution being stayed, however, for ten days, in the event of the plaintiff deciding to go to the Court of Appeal. Upon the question whether a civil action could be maintained for the loss sustained by a man in consequence of the death of his wife, Mr. Justice Grove pronounced an unhesitating negative. Upon the other point, as to the alleged representations of the sanitary state of the premises, the Court decided that there was nothing in the evidence to justify the verdict, inasmuch as it had not been shown that the defendant had made any representations which he did not at the time believe to be true; in other words, there was nothing fraudulent or dishonest in his conduct. The case should, however, serve to make people cautious as regards making representations in answer to the inquiries of incoming tenants.

It is to be regretted that the London daily papers do not follow the fashion of many provincial papers and publish the evidence taken before Select Committees of the House of Commons. Thus the *Freeman's Journal* has recently printed pretty nearly *in extenso* the evidence given by Mr. Robinson, a civil engineer and a member of the Kingstown Town Commissioners, before the Select Committee on the Tenure of Houses in Towns. From his evidence it would appear that leases are renewed in Kingstown on unreasonably high terms; thus a lease at a rent of 6*l.* 10*s.* a year is renewed for 26*l.* a year, and then another example of an enormous increase. But we fail to find in Mr. Robinson's evidence at what date the old leases began,—a very important factor in estimating the justice or injustice of the new rents. It does not follow that because a man has been paying too low a rent for ten years he is to be allowed to go on doing so. It is clear the whole question largely hinges on this. We are sorry also to find that the bad system of leases for lives still continues in Kingstown. Mr. Robinson also mentioned many instances of overcrowding and of houses falling into decay, all of which evils he put down to the leasehold system. It has, doubtless, many evils to answer for, but we can scarcely put all of these matters to its door. If a woman, as Mr. Robinson stated, lives in a room 6 ft. by 9 ft. and 5 ft. high, with an open dustpit and a privy by its side, we should certainly say that this is the fault of the sanitary authorities, not of a system of leasehold tenure.

At the ordinary meeting of the Institution of Civil Engineers, held on Tuesday, the 6th inst., Sir Frederick Bramwell, F.R.S., President, in the chair, Dr. Percy Frankland read a paper on "Water Purification: its Biological and Chemical Basis." In considering the various attempts to purify water by the removal of suspended particles, he said that the passage of micro-organisms through filtering material had long been considered, and, until recently, there seemed to be little reason to doubt that the majority of filtering substances offered no barrier; but a series of carefully-conducted experiments had recently proved that certain materials are less favourable than others to their passage; and this degree of efficiency was more or less maintained by a frequent renewal of the filtering material. He had found invariably, that very porous substances, like coke, animal and vegetable charcoal, were highly efficient in removing organic matter from water when the latter came in contact with them by a process of agitation. Dr. Clark's precipitation process for softening water with lime had a most marked effect in removing micro-organisms

from water. The process consists merely in the addition of a small quantity of slaked lime. The chemical improvement resulting from this softening process is not often considerable; but it is found to reduce the presence of micro-organisms 98 per cent. He was satisfied that the only explanation of the freedom from micro-organisms of water taken direct from deep wells was to be found in the fact of its having been subjected to a long and exhaustive process of natural filtration. He thought the effect of this natural filtration upon the biological condition of water could not be better understood than by comparing water obtained from the Thames and the Lea with deep-well water taken from the chalk near London. While, in the last case, as few as eight organisms per cubic centimetre will not unfrequently be found, the number in the case of the two former may, and often does, reach as many thousands.

A REPORT on the sanitary arrangements in various parts of Italy is of considerable interest in these international days, when so many English elect, for climatic and other reasons, to make their home in foreign countries. There are 8,259 communes in Italy, and of these there are only 318 which have thought it worth while to keep up any inspection of the water-supply. Of these, 198 have good drinking-water, 85 tolerable, and 35 bad; of the remainder (a very large majority) 1,454 allow that the water is either indifferent or very bad, while 509 have returned the supply as being very scanty. There are 4,877 communes totally unprovided with sewers, and 1,503 from which no information was received, the inference therefore being that nothing good could be reported. As to dwellings, 37,206 were subterranean, giving shelter to 101,457 persons, while 2,836 deplored the dearth of salubrious habitations. In the Abruzzi, the Basilicata, Apulia, and the Roman Campagna, many families live in hollows scooped out of the rock or tufa. In 1,876 communes there are no latrines, and the sewage remains in open ditches, close to the houses. In 3,976 there are closets, but only in the houses of the well-to-do. In 155 communes the excrements are emptied out of the windows into the street, where they remain until dispersed by the combined action of wind, rain, and scavenger dogs. In 1,483 communes the houses are unprovided with chimneys to the fireplaces, so that the only exit for the smoke is the door or the window. In 259 *circondari*, 194 are more or less troubled with malaria, which spreads over at least 90,000 square kilometres, and affects about 6,000,000 people. In 1879 there were in Italy 97,855 persons suffering from pellagra (the result of malaria), and this number had increased by 1881 to 104,067. Between 1835 and 1885 Italy has been visited seventeen times by cholera. To wind up this rather unsatisfactory condition of things, 326 communes have no burial-ground.

THE building trades of Rome, where a very large number of new houses are in course of construction, are greatly exercised at the sudden collapse of many of these schemes, sometimes even before the buildings are finished. The rage for speculative undertakings of this kind is becoming as great a nuisance in some parts of Italy as it is in England; but although scamped work is no novelty with us, it has never gone to the same length as at Rome. About a fortnight ago a large building gave way at Prato di Castello while a number of masons were at work upon it, and several were killed; while, more recently, another house has fallen, though it had been in existence longer than the other. The evil has become so serious that the municipality has at last issued an order that the owner of every building in course of erection must make a return of the name of the architect employed, accompanied by a declaration of the latter that he accepts the responsibility of any accident that may occur. Until this is done, the works will not be allowed to proceed. The architects have one and all concurred in this, and have

come forward most creditably to assume the supervision of all future operations. There is clearly a great need of some such system, seeing that the number of skilled masons in Rome is comparatively small, and that the great majority of the workers are men who have never been on a roof-top in their life, but whom lack of agricultural employment has driven into the towns to gain a livelihood as best they can.

THE recently decided case of Kiddle & Son v. Lovett ought to afford a lesson to those who, having entered into a lawsuit, hurry hastily into a compromise. It was an action by a firm of builders who had taken a contract to paint the outside of a house. They engaged a separate contractor to put up post-staging for the purposes of the work. During the progress of the work some of the staging gave way, so that one of the painters was thrown into the street and injured. He brought an action against Messrs. Kiddle & Son under the Employers' Liability Act. They, just before the case came on for trial, settled the action for a sum of 125*l.* Then they brought the present action to recover this sum as damages from the contractors who had put up the staging. Mr. Justice Denman held that they were entitled to recover against the contractors, because they had erected a defective staging, but he also held that Messrs. Kiddle & Son could not recover the damages paid to their workman because he had no right of action against them since no act of negligence had been committed by them or their servants, and consequently they were under no liability to pay the 125*l.* Therefore, they obtained judgment for nominal damages only, without costs. The unfortunate position of Messrs. Kiddle, who compromised the action in which they were right and fought out that in which they were practically wrong, certainly provokes a smile.

SOME little time since we commented on the fact that in the Birmingham Workhouse Infirmary Competition, the architect who prepared the particulars on which the instructions were based was not, as he should have been, debarred from competing, and we drew attention to the feeling expressed in correspondence in the Birmingham papers, that the state of things was calculated to give such competitor an unfair advantage over others. The result seems unfortunately to have done too well justified these anticipations. In a letter to the *Birmingham Daily Post*, Mr. Victor Scruton calls attention to the fact that only six architects responded to the invitation to compete (the profession seem to have been wiser than usual in this case, that among the six was the architect who prepared the particulars, and that 14 plans have been accepted. Mr. Scruton pointedly contrasts this with the course pursued in the case of the Birmingham Assi-  
COURTS Competition, where Mr. Waterhouse who had occupied an analogous position as architectural adviser of the Corporation before competition was determined on, withdrew from any claim to compete, and acted only as assessor, being, by his previous knowledge, the wishes of the Corporation, specially qualified to do so. In this latter case 134 architects competed; in the former only six. The competition was manifestly intended as a fiction from the outset; the other was suspicious. We hope promoters of competitions will reflect the lesson conveyed.

IN answer to a question asked by Mr. Sturt Wortley in the House of Commons a few days ago, in regard to the antique sculptural concealed in the basement of the British Museum, Mr. H. Fowler, after describing the conditions of light under which these works were placed, and stating that in favourable weather they can be viewed and sketched by students though they cannot be visited by the general public, added that "the room formerly occupied by the department of prints and drawings can be made to accommodate the principal part of the sepulchral monuments



an estimated cost of 1,600*l*. If so, we hope this small sum will be voted for the purpose on the first opportunity, and the soul of Mr. Newton set at rest in regard to this portion of the works of which he has so long been the careful and learned custodian.

SO Lord Carrington's house is not to be removed *en bloc*, after all! The necessary plans and calculations had all, it is said, been made, and the *modus operandi* determined, when the exigencies of the Lands Department of the Crown necessitated an abandonment of the scheme. It is very much to be regretted on some grounds that so interesting an experiment should have been nipped in the bud. But the want of a permanent Minister of Public Works, and the rapid revolutions of the political wheel, render changes of this kind inevitable, we suppose, in building matters.

#### THE BUILDING TRADES' EXHIBITION.

THE seventh annual Building Trades' Exhibition was opened in the Agricultural Hall, Islington, on Monday; but, as usual, was far from ready then. So dilatory, indeed, were some exhibitors that their "Stands" were not completed even so late as Wednesday evening. The present exhibition is perhaps a trifle better than last year's display, but several well-known and prominent exhibitors hitherto (Messrs. W. H. Lascelles & Co., to name only one) refrain from exhibiting this year, while some others who have in former years occupied considerable space are this year content with very small displays. There are, it is true, one or two new names of repute in the list of exhibitors (such as Messrs. Standell, Saunders, & Co., and Messrs. Heaton, Butler, & Bayne); but, on the other hand, the pace in the hall is not fully occupied, though falls for the sale of bead necklaces, pincushions, and other miscellaneous trifles whose connexion with the building trades it would be hard to discover, have been allowed standing-room. On the whole, the present show only confirms us in our oft-repeated opinion that these exhibitions recur at too frequent intervals to be of such real value as an index of progress in the building trades. We know that they are regarded by many of the exhibitors as something akin to nuisances, and one of the largest exhibitors in the present exhibition has, within the last two or three days, given forcible expression to this sentiment, coupled with a wish that something could be done to put down these oft-recurring displays, the iteration of which is, even in this exhibition-ridden age, a great bore. Possibly some of the exhibitors were led to take pause because this year the exhibition is styled "Architectural and Building Trades' Exhibition," the only apparent ground for this additional nomenclature being that, by some arrangement into which it does not concern us to inquire, the show is announced as being held "under the auspices" of a society whose retentions, as indicated in the preface to the catalogue, are about on a par with those of the monks of Three Tailors of Tooley-street.

Messrs. Shanks & Co. (Bay 1) exhibit a varied assortment of baths, lavatories, water-closets, sinks, and other sanitary appliances and fittings. An enamelled stoneware pedestal sink-bath, shown by these exhibitors, has the merit of compactness.

One half of Bay 3 is occupied by Messrs. E. Jones & Sons, who exhibit their hot and foul air extractor for ventilating houses and ships. This appliance has been described by us on a previous occasion of former exhibitions. The same exhibitors' "Inlet and Exhaust Double-Action Ventilator" is claimed to be "automatic and perfect in action," and, no doubt, is claim is a good one if, in all states of wind and weather, the respective channels for warm and cold air are found to keep to their allotted work. One merit which this ventilator possesses consists in the absence of moving parts. A double-trapped earthenware closet for fixing over the floor-line, and somewhat cumbersome in form, is shown at this Stand; also a ventilating stove for heating purposes.

Bays 4 and 5 are occupied by Messrs. H. & Edwards with a good display of school-benches, furniture, fittings, and teaching appliances.

The Patent Victoria Stone Company (Bay 6) exhibit the practical applications of their excellent material in the shape of steps, paving-

flags, sinks, &c. A specimen of this stone, after five years' wear under the heavy and almost continuous pedestrian traffic at the corner of Commercial-street, Whitechapel, presents a good and even surface, such as would hardly be possible, we should say, with the best York flagging shown at a trial. The same material is shown in its "ornamental" applications, but these constitute the least satisfactory part of the display.

In Bay No. 7 are shown Kaye's Patent Automatic Locks and Door Openers, two exceedingly good and simple applications of which are adapted to railway-carriage doors. One of these forms of lock, we are informed, has been adopted for use by the Great Northern Railway Company, after careful trial. Excellent locks and handles for shop and office doors, calculated to work for years without the many vexations incident to older forms of door furniture where the wear is heavy and incessant, are shown by the same exhibitors.

Bay No. 8 is apparently in the joint tenure of the Pulsometer Engineering Co., the Remedy Ventilator Co., and other exhibitors. Of the well-known pumps of the first-named Company we need say nothing. Of the "Remedy" ventilator, also adaptable for use as a chimney-cowl, we will only call attention to it without expressing an opinion as to its efficiency.

The Broomhall Brick and Tile Company have at this Stand a good selection of their well-known moulded and perforated bricks, which, for truthness of shape and excellence of quality, are not surpassed by any others. They also exhibit their patent roofing tiles. The 34-in. lap-tiles are especially worthy of notice. They are light and cheap. Hard by, Messrs. T. J. Mayfield & Co. have a small display of electric-bell apparatus, burglar-alarms, &c.

The Thames Bank Iron Company (Bays 9 and 10) have a large display of tubular, saddle, and other boilers for heating purposes. They have also a good show of hot-water fittings, such as pipes, coils, valves, &c. The back-water saddle-boilers are now made by this Company up to 5 ft. 6 in. long. At this Stand are also exhibited some cast-iron traps, soil-pipes, bends, and junctions. The patent "Expander" for facilitating the jointing of hot-water pipes is also shown.

Bay 11 is occupied by Mr. E. Howard, with a horticultural building and gearing, calling for no special remark except that the levers and cranks of the gearing seem to be likely to be somewhat in the way of the plants which the building is to contain.

Messrs. Ewart & Son (Bay 17) exhibit their "Dido" gas bath, enamelled with Price's "cheer-lui," a hard drying enamel. The "Dido" bath seems to be very compact, and is fitted with the "shower" geyser or water-heater, which is rapid in action, and possesses other merits. The "Empress" Ventilator, in various forms, is shown by the same exhibitors.

Messrs. J. Pickles & Son, of Hobdon Bridge, Yorkshire (Bay 18), exhibit a small collection of very well made woodworking machinery, including a saw-bench and an improved moulding machine, as well as spiral-cutting planing-machines.

Bays 19, 20, and 21 are occupied by Messrs. Winch & Sons, of Ipswich, with two horticultural buildings and a summer-house, which call for no special remark.

Bay 22 is occupied by Mr. W. Harris with an improved cast-iron horizontal pug-mill, for shafting, and a vertical standard pug-mill with chain wheel.

Bay 23 is sparsely occupied by a few brick-making appliances, including Whitehead's brick press.

Mr. J. Matthews, of Weston-super-Mare (Bay 24), exhibits Poole's patent bonding-roll square-cornered roofing tiles and a variety of rustic and other vases, hanging flower-pots, &c., for horticultural use.

In Bay 25 Messrs. J. E. H. Andrew & Co., Limited (Stockport), exhibit the "Stockport Silent Gas Engine," which works very smoothly and is fairly well entitled to its name. This and two "Bischoff" gas engines at the same stand serve to drive two or three of Messrs. F. W. Reynolds & Co.'s excellent wood-working machines.

Messrs. Carter & Co., of Poole, Dorset (Bay 26), exhibit some very good encaustic and glazed majolica tiles. These are excellent in quality and colour. There are a variety of hand-painted tiles and panels, of which some of the figure-subjects are good. Other panels, on the con-

trary, all stated to be hand-painted, are too realistic and naturalistic in style, some of them being more suggestive of varnished oleographs than of anything else. In the rear of their Stand this firm have an exhibit more worthy to come to the front than some of the pictorial panels just mentioned, viz., a new kind of wall decoration which is called "tile fresco in outline." It consists of a number of buff tiles, 6 in. by 6 in., put together so as to form a panel about 6 ft. by 5 ft., on which is drawn a seated figure symbolical of "Education" teaching a group of young children. These figures are all in outline merely, and the dark lines, burnt in on the lighter ground of the tiles, are very effective. The surface is unglazed. This method of wall-decoration, which is stated to be comparatively cheap, seems likely to have a future.

Stand 1 (Avenue A) is tenanted by Mr. R. Adams, who exhibits his "Anti-accident Window," patent door-springs, &c.

At Stand 3 Messrs. Burney & Co., of Millwall, exhibit galvanised iron tanks and cisterns.

Messrs. C. Kite & Co. (Stand 5) exhibit their excellent exhaust and other ventilators, of the merits of which we have often spoken. Besides these they exhibit a quite newly-patented invention, the "Counterpoise" silent automatic valve for smoke-flues and extraction shafts, which appears to embody a valuable improvement. Their mirror-ventilators are ornamental as well as useful, and likely to disarm the preternatural susceptibilities of people who always fancy they "feel a draught" when they know they are in the proximity of a ventilator.

At Stand 8 Mr. J. Robson exhibits his patent drip-tiles for weathering cornices, chimney-stacks, parapets, &c. We spoke of their merits in one of our notices of the Inventions Exhibition last year.

Mr. P. Maignen (Stand 10) exhibits his "Filtre Rapide" and his patent process for softening water.

At Stand 13 Messrs. Muldon Bros. show their system of wood-block flooring and asphalted wood pavements for roadways. They also have a good display of enamelled slate chimney-pieces, tile-hearths, stoves, &c.

The Adamantine Clinker Pavement, so well adapted for stables and yards, is exhibited at Stand 14 by Messrs. Towers & Williamson in conjunction with Musgrave's patent stable gulley.

At Stand 17 Messrs. T. J. Marshall & Co. exhibit some good stained-glass work suitable for domestic purposes.

Tighe's patent door-knobs and handles are shown in a case at Stand 20. The door-handles have no tap screws.

At Stand 24 is shown a new form of protected sash-fastener (Garrood's patent), which at first sight appears to be somewhat cumbersome and complicated, but its patentee claims that it is absolutely thief-proof, and incapable of yielding to the persuasions of the "drop-key" and other tools of the expert burglar.

The Luton Brick and Lime Company (Stand 24) exhibit an archway showing the use of their grey and red Luton bricks, which are most effective in appearance when not used with that sham known as "tuck-pointing."

Messrs. A. Attwood & Co., late Salmon, Barnes, & Co. (Stand 27), show some good self-sustaining lifts and hoists, and a model of their patent revolving shutters.

At Stand 29 Messrs. Smith & Turner show their admirable adjustable silent door spring, which is likely to meet with increased favour as it becomes better known. They also show Ben Turner's regulating door springs, and other excellent door and window furniture.

A simple form of sash-fastener is shown by Messrs. A. Lewis & Co. (Stand 33). This fastener will be found proof against being forced back by the insertion of a knife or other instrument between the meeting-rails of the sashes, provided that the slit in the arm be exactly adjusted in fixing.

At Stand 59 Messrs. Poulton & Son, of Reading, exhibit a doorway built up to show the use of their red and grey moulded and enriched bricks.

Messrs. A. Cappello & Co. (Stand 61) have a small but good display of mosaic work for floors and for wall-decoration.

Mr. W. F. Stanley (Stand 63) has a small display of surveying and drawing instruments. There is also exhibited at this Stand one of



Mann's cement-testers, for testing cement by adhesion.

Messrs. Wenham & Waters (Stand 65) exhibit plumbers' work and sanitary fittings, including a regulating-supply lavatory.

Stand 69 is occupied by the Coalbrookdale Company, who have a very good show of cast-iron mantels and overmantels, besides stoves, grates, fenders, and railings.

Messrs. Ewart & Son (Stand 71) are exhibitors of baths and other sanitary appliances.

Messrs. T. Lawrence & Son, Bracknell, have a small structure (Stand 72) exhibiting the use of their red rubber and facing bricks. The red facing work is executed with the exhibitors' improved hand-made and hand-pressed facing bricks, which are free from sand-flaws, and leave nothing to be desired in colour and texture. The adaptability to plain and fancy wall tiling of the "T. L. B." tiles is shown at the rear of the Stand.

At Stand 73 Messrs. Robert Boyle & Son (Limited) have a very good display of their well-known specialties, including their most recent developments. The reputation of this firm for such appliances is of long standing.

Messrs. E. & J. M. Verity (Stand 74) exhibit some of their well-known and convenient appliances for opening, closing, and fastening fanlights and sashes.

Messrs. Johnson, Clapham, & Morris exhibit specimens of their patent wire lathing, which affords an admirable key for the plaster.

Mr. J. J. Carpenter (Stand 79) exhibits what he calls "the patent combined fast and slow combustion stove," which embodies an idea which we do not remember to have seen worked out before. This stove has really two bottom gratings, one sliding over the other on the "hit-and-miss" principle, thereby affording means for regulating the rate of combustion.

At Stand 80 Mr. M. F. C. Turpin has a very good display of parquetry and dado work, excellent in execution and material.

The Willesden Paper and Canvas Company demonstrate, at Stand 81, the waterproof qualities and other advantages of their excellent light roofing material.

The House Sanitation Company (Stand 87) exhibit some of the sanitary appliances patented by Mr. Thomas Durrans, A.R.I.B.A., including cast-iron drain-pipes with screw joints to facilitate inspection or removal. The "Astril" filter, which consists essentially of a porous porcelain tube, is also shown at this Stand. A new form of trap for sinks, called the "scour" trap, is ingenious, though simple, the water passing through it receiving a spiral motion so as to prevent the unsealing of the trap by the too sudden passage of the water. The central portion of the trap is removable for the purpose of cleaning out the sink-pipe when necessary.

Messrs. H. and C. Davis & Co. (Stand 88) exhibit their "Metropolitan" and other gas-kitcheners and stoves, to the great merits of which we have referred on previous occasions.

Mr. Joseph Westwood, jun. (Stand 96), exhibits Hawkeley's patent treads for stairs, which are coming largely into use, not only for railway stations, but for warehouses and other buildings where there is much wear and tear on the staircase. An adaptation of the invention to the purpose of hydrant-covers has been largely used in the City.

Messrs. Brazier & Son (Stand 97) exhibit their "aromatic" and deodorising water-closets and other sanitary fittings, which have been noticed by us on former occasions.

At Stand 104, Messrs. Jeffrey & Co. have a good representative collection of their non-poisonous wall-papers, which are all admirable in design and colour.

Mr. J. M. Bookbinder (Stand 106 and 112) exhibits some of his carton-pierre and fibrous plasterwork, for interior decoration, as well as a number of specimens of painted tapestry.

At Stand 110, Messrs. Hayward Bros. & Eckstein have a good show of their specialties, foremost amongst which we must place their well-known "semi-prim pavement lights" and their self-locking coal-plates.

Mr. Julius Sax (Stand 111) exhibits electric bells and apparatus.

Roberts's rain-water separator, described at length in another column, is shown at Stand 115. An illustration and description of this will be found on another page.

The "Lincernata" and General Decorating Company (Stand 118) exhibit, in conjunction

with their decorative specialties, a mantel-piece and overmantel provided with a folding screen for use when the fire is not required.

Messrs. George Wright & Co. (Stand 123) have a good display of slow combustion and other stoves, with marble and wood chimney-pieces, tiled hearths, &c. A specialty to be noticed is their patent bivalve grate. Some very good close and open fire kitcheners are shown by this firm.

Messrs. F. W. Reynolds & Co. (Stand 124) exhibit their double-handed locks and one of their mortising machines.

Messrs. A. Moore & Co. (Stand 128) have a display of stained-glass work, including a good window for the New Pump Room at Bath.

Mr. John Smeaton (Stand 129) exhibits a collection of very good sanitary appliances and fittings, including one or two novelties. Among these we may mention a swing-urinal for affixing to doors and in other positions where space is restricted. A dust-shoot, shown at this Stand, for use in artisans' dwellings, is so arranged as to prevent the passage of foul odours into the dwellings should the hopper be left open. Smeaton's new patent water-waste preventing valve for water-closets (manufactured by John Warner & Sons) is also shown at this Stand.

Messrs. Heaton, Butler, & Bayne (Stand 131) exhibit some good stained and painted glass; a part of a painted reredos for Grosvenor Church, Kendal; and part of a reredos for Mr. C. Lucas, Warham Court,—the latter designed by Mr. A. W. Blomfield, and both painted and decorated after the style of the screens in the churches of Norfolk and Suffolk.

Mr. George Jennings (Stand 138) has a good display of sanitary appliances and fittings, including a new form of his pedestal vase closet. Baths, lavatories, urinals, housemaids' closets, water-waste preventers, stoneware and other traps, plumbers' and other brasswork, go to form what may be taken as a fair representative show of the work of this well-known exhibitor.

Messrs. Woollams & Co. (Stand 135) exhibit a good variety of their excellent non-poisonous wall-papers, including a number of new designs, which are well worth the attention of visitors.

The New Patents Development Association (Stand 136) exhibit specimens of "wood-carving" by machinery. We believe that the process consists in the main of burning or charring off the superfluous wood, so that the term wood-"carving" is rather a misnomer. The work produced is, no doubt, cheap, but it is flat and spiritless.

Mr. Henry Bassant (Stand 139) makes a very good display of parquetry work for floors. Teak seems to be coming into increased use for this purpose, and with very good effect.

In the centre of the hall the Eolus Water-spray and General Ventilating Company have a very good show of their well-known appliances for ventilating and warming, and at Stand 119 they exhibit a number of drawings showing the application of the appliances to churches and other buildings. Of the effectiveness of these inventions we have often spoken.

At Stand 141 Messrs. Diespeker & Co. have a good display of marble mosaic pavements and of glass and marble mosaic wall decorations.

Messrs. Frederick Jones & Co. (Stand 145) exhibit their silicate cotton or slag-wool, with especial reference to its use in protecting exposed iron-work in buildings from the action of fire.

Messrs. Starkie, Gardiner, & Co. (Stand 147) have an excellent show of wrought-iron work as applied to lamps, gaseliers, fenders, grilles, &c.

Mr. Jos. F. Ebner (Stand 150) exhibits some very good marble mosaic flooring and glass mosaic wall decorations, all good in colour and design. Mr. Ebner's parquetry work is not excelled by any that we have seen, and he exhibits a new method of attaching it firmly to basement floors without the necessity for any under-flooring. The same method is equally applicable for use in connexion with fireproof construction. Some good woodwork in the shape of doors, dados, and mantelpieces is shown by the same exhibitor.

Messrs. Nettlefold & Sons (Stand 152) exhibit locks and door furniture of all kinds, and in conjunction with them Messrs. Richardson, Ellison, & Co. have a small display of wrought-iron work.

Messrs. George Jackson & Sons (Stand 156) exhibit some new and good designs for ceilings and mantels in fibrous plaster. These will well

repay inspection. They represent sections of ceilings which have been put in at the Badminton and Constitutional Clubs, under the direction of Mr. R. W. Edis, and at the new addition to the Junior Carlton Club-house under the direction of Mr. J. Macvicar Anderson.

Mr. Thaddeus Hyatt (Stand 157) exhibits his well-known pavement-lights and other cognate appliances for transmitting daylight to basements of buildings. The tile-illuminated gratings have a decorative appearance, while they afford a better foothold than the glass lights alone.

Wilkes's Patent Metallic Flooring and Eurok Concrete Company (Stand 158) exhibit some of their specialties in paving work and fireproof construction. These, as well as the architectural enrichments shown, are well worth notice.

Messrs. Randall, Saunders, & Co. (Limited) exhibit the application of their well-known Bath stone for external purposes, as exemplified in the porch of the Church of St. Lawrence, Catford Bridge, Lewisham, the greater part of which is actually built upon the floor of the exhibition-hall. The architect of the church is Mr. Hugh Roumieu Gough. The plinths and bases are of Westwood Ground stone, the shafts and arch moulds of Corham Down stone, while the interior lining is of Farleigh Down. The stone has been admirably selected and worked, and goes very well with the red brickwork and diapers of the walls. The bricks have been supplied by Mr. James Brown, of Cannon-street, and are excellent in texture and colour.

Mr. J. E. Ellison (Stand 162), exhibits his "radiator" and other ventilators.

At Stand 164, Messrs. Lindsay & Co. exhibit their well-known systems of fireproof flooring, the "steel-decking," and their patent truss concrete flooring, which were referred to by Mr. John Slater in his lecture at Carpenter's Hall the other evening. The built-up steel columns, for use in combination with concrete, should also be seen by visitors to the exhibition.

Messrs. Jones & Willis (Stand 165) have a large show of their excellent and varied productions in the shape of church furniture, fittings, and decorations.

Messrs. Humpherson & Co. (Stand 166) have a good display of sanitary appliances and some good plumbing work. One piece of the latter, quite a *tour de force*, and in our hearing some of the visitors did not hesitate to express their scepticism as to its having been executed out of one piece of lead. The exhibitors, however, state that they are prepared to demonstrate this any time by performing another piece of work like it.

Webb's Worcester Tileries Company (Stand 167) have a good show of encaustic and other tiles.

Mr. Roger L. Lowe (Stand 172) exhibits a patent wood block flooring, which has many advantages, and is capable of being used with very good effect by variation in the colour at disposition of the blocks.

Messrs. Steven Bros. & Co. (Stand 187) have a very good show of marble, wood, and iron chimney-pieces, with grates, fenders, tile hearths, &c., *en suite*. There are also a number of kitcheners and ranges, slow-combustion stoves, bath covers, &c., to name only a few of the innumerable articles exhibited at this Stand in the way of builders' ironmongery and hardware.

The Madeley Wood Company (Stand 193) exhibit a number of pressed Broseley roofing tiles and wall tiling.

Mr. J. Stannah (Stand 194) exhibits lifts and models of lifts, besides pumps and other articles of builders' plant.

Messrs. Esdaile & Co. (Stand 195) exhibit mouldings, doors, and joinery of English, American, and Swedish manufacture, which may be usefully compared by visitors.

Messrs. M. C. Duffy & Son (Stand 196 & 201) exhibit a large show of builders' turnings. They also exhibit their "Acme" system of solid wood-block flooring, which was not long ago described and illustrated in our columns.

Messrs. Carter, Johnson & Co. (Stand 202) have a good space laid with their tiles for church purposes, which are very good appearance.

The Decorative Wood Company (Stand 203) exhibit what appear to be carved panels (doors, &c.), but we believe that they are carved, but consist of a thin veneer of wood, a layer of pulp, the whole being pressed into moulds. The effect is much sharper and better



than that obtained by the process previously referred to.

Mr. J. P. Lilly (Stand 233) exhibits specimens of the Chilmark & Wardour stones as selected and used for Westminster Abbey.

At Stand 234, Messrs. S. & G. Staple exhibit specimens of Douling and Ham Hill stone.

Stand 240 is in the occupation of Messrs. Musgrave & Co., who exhibit a large model showing their patent stable fittings. Messrs. Musgrave also exhibit their patent slow combustion ventilating stoves.

Messrs. Geary & Walker (Stand 243) exhibit their wood-block flooring, which is described in another page of this week's *Builder*.

The St. Pancras Ironwork Company (Stand 16) exhibit some stable fittings and a few good specimens of good decorative wrought iron.

Hitchins's Fireproof Plastering Company (Stand 319) have erected a cottage, in the interior of which they exhibit specimens of ornices executed in their material recently for R. Chatfield Clarke and other architects.

There is very little machinery in motion, but among the few exhibitors in this line we may mention Messrs. E. Jacobs & Co. (Stand 329), who exhibit woodworking machinery.

Messrs. Edgington & Stevenson (Stand 343) exhibit mortar-mills and other items of builders' plant.

Mr. E. S. Hindley (Stand 348) exhibits steam engines, &c., specially adapted to the requirements of builders and contractors.

There are very few exhibitors in the Arcade connecting the hall with the Islington-green entrance, but among them are Messrs. Chambers, Monney, & Co., who exhibit a varied assortment of builders' ironmongery, including their well-known iron wall-ties and some very good cottage kitcheners.

The exhibition will remain open until the evening of the 17th inst.

#### THE EXAMINATION IN ARCHITECTURE.

The following gentlemen passed the examination recently held in Leeds by the Royal Institute of British Architects, and are qualified to become candidates for the Associateship, namely:—

Cones, Lister, Halifax.  
Fairley, James McLeod, Edinburgh.  
Gelder, William Alfred, Hall.  
Hesketh, Peter, Manchester.  
Ridgway, Frederick William, Dowsbury.  
Smithson, William George, Derby.

The following gentlemen passed the examination recently held in London, and are qualified to become candidates for the Associateship, namely:—

Birkett, Isaiah Robert Edmondson, Manchester.  
Box, Stephen, Eastbourne.  
Collins, Henry Albert, Reading.  
Coxhead, Ernest Albert, Eastbourne.  
Cresswell, Herbert Osborn, Putney.  
Dunn, William, Crouch-hill.  
Ganger, Frank Stephen, Nottingham.  
Griers, Henry, South Shields.  
Gummow, Michael John, Pall Mall.  
Gwyther, William Banks, Calcutta.  
Hamilton-Gordon, George William, Finsbury-pavement.

Heyes, Austin, Clyde-street, S.W.  
Hirst, Henry Cecil Montague, Bristol.  
Hooker, Walter, Andover.  
La Trobe, James Henry, Bristol.  
Low, William Ralph, Basinghall-street.  
Milburn, Thomas Ridley, Sunderland.  
Mitchell, Arnold Bidlake, Clapton.  
Muller, John Joseph, Hampstead.  
Oakley, Frank Page, Manchester.  
Parkes, Thomas William, Bromley, Kent.  
Perks, Sydney, Wandsworth Common.  
Pethick, Benjamin Herbert, Paddington.  
Scruton, Victor, Birmingham.  
Tugwell, Frank Alfred, Scarborough.

#### Utilising the Coast Guard as a means of National Defence.

The Admiralty are at present erecting a battery and drill-hall at each of the principal Coast Guard stations, connected on a new plan designed by H.R.H. the Duke of Edinburgh. There will be one large battery at each station, which will be worked by a Coast Guard man on the station. The first of these batteries and drill-halls have just been completed at Sunderland, and are fitted with the latest improvements, the ventilation being specially attended to.—Boyle's latest proved self-acting air-pump ventilators being adopted.

#### FREE LECTURES TO ARTISANS AT CARPENTERS' HALL.

TERRA-COTTA.

The seventh of the present course of lectures at Carpenters' Hall was given on Wednesday, the 31st ult., by Mr. James Doulton.

Mr. Doulton said,—The term "terra-cotta" is of wide significance, and in its literal meaning embraces in its history and manufacture a period from prehistoric time, and a range of work from the roofing of the humblest cottage to ornaments suitable for the grandest palace.

The earliest mention of burned earth is in Genesis (ii. 3), where the people said, "Go to, let us make brick and burn them thoroughly. Go to, let us build us a city and a tower whose top may reach unto heaven, and let us make us a name lest we be scattered abroad upon the face of the whole earth"; the result being the confusion of tongues at Babel. Many allusions are made in sacred history to clay and the potters' work, the power of God himself being set forth in the similitude of the potter. If we turn to secular history we obtain the same testimony of its ancient character; there is not a country or a people in the world who have not in one form or another some knowledge of pottery, and from the imperishable nature of well-burned clay we have an unwritten history of many countries otherwise unknown. Pottery is constantly being found which gives us another link in the chain uniting us to the far-off ages. The history of pottery really is to a great extent the history of the world. There is a pretty little theory suggested as to the discovery of the properties of clay, which, like many such, is attributed to accident.—Man in his savage state, after forming a hollow in which to hold the embers of his fire, noticed that the earth had become capable of retaining water. This hardening process by the action of heat was turned to practical uses; vessels were made not only for holding, but for carrying water; bricks for the purposes of building, until little by little that perfection was attained which culminated in the works of Greece and Rome. Doubtless amongst the most popular forms of pottery were the drinking-horns of the Greeks; the term "ceramics" being taken from *keros*, a horn or drinking-vessel. We can but imagine the course that pottery took: first it was merely sun-burned; then artificial heat was applied, producing greater density, followed by yet another step, the introduction of the art of glazing. The kiln was evidently known at a very early period, as is shown by the sculptures of ancient Egypt. The same may be said of the wheel, and to whom we are indebted for this invention it is impossible to say; it appears to have been known at least 2,500 years B.C. One singular fact remains, that notwithstanding the wonderful discoveries and improvements in all else, the potter's wheel remains practically the same as at the commencement of our knowledge of it, the only difference being in the methods of turning it and the motive power used. The earliest type of wheel that we know is that still in vogue amongst many people of the East, in which a heavy wheel, attached to the table on which the clay is thrown, is rapidly turned by the potter, with such force that the momentum attained is sufficient to enable him to throw the form required, the great disadvantage being the necessity for the potter to stay his work and give to his wheel fresh impetus as often as needed. After this the same form of wheel was made, but in such a way as to enable the potter to propel it with his feet, and thus keep a steady, constant motion. There are still men living to whom this was the only method of gaining the necessary rotary motion, and I am given to understand, at the present time there is a Japanese at Knightsbridge showing his skill in throwing, having only this means of obtaining his motive power.

But as large vessels were required this method became totally inadequate and was superseded by a further advance in which the disc was attached to a large fly-wheel worked at right angles and turned by a crank handle. This gave the potter better control over his clay, enabling him to devote all his energy to the throwing, and giving him the power of regulating the speed by word of mouth to his assistant whose duty it was to turn this wheel. And lastly came the addition of steam and the invention of the conical drum, enabling the potter himself to regulate the speed of his wheel by the mere pressure of his own foot. Thus, while the modes

of turning the wheel have changed, the wheel itself remains the same as in the days of the prophet Jeremiah, whose description of the potter and his work is so graphically given in his denunciation of the children of Israel. I have mentioned the wheel thus fully as it is and always will be the means by which the potter does his principal work. The dexterity and skill with which a good potter can throw his work constitutes his art, and I trust the day will never arrive when the wheel is superseded by the mould in the formation of circular work. The mould reduces everything to the one dead mechanical level, while the wheel brings out the powers and the individuality of the workman.

Clay, of all substances, is that which lies most readily to hand, and could not but be found most available for an infinite number of objects of first necessity; its use, however, was progressive, and the bound from the rude vessel of the savage to the exquisite Etruscan vase,—from the bricks of Babel to the beautiful terra-cottas of Germany and Northern Italy,—is as great as is the period of time that divides them. The uses to which pottery is put have extended much of late years, and will no doubt continue to extend; at the present moment there is scarcely a trade which does not, more or less, call upon the potter for help. People always build with the material most readily to hand, and thus it came to pass that in the early history of man, with forests almost untouched, and a necessity to clear the same for the cultivation of the ground, wood was universally used, as in many parts of Russia, Norway, Sweden, &c.; but as these became exhausted, or more permanent dwellings were required, wood gave place to clay, to stone, and even to iron, affording in their preparation alone, employment to a vast multitude of workers, making the building trade the most important in all countries. As civilisation increased dwellings became more luxurious, until, at the present time, the providing of this necessity finds one of the chief occupations of man. It would be very interesting, did time permit, to trace the steady growth of the builder's art; how, from the mud hut or from the mere protection formed by boughs, we have come to the magnificent structures of the present day, replete with every comfort and demanding the utmost amount of care, thought, energy, and skill in erecting, the hall in which we now are being an example of this.

Of all trades that of the builder has, perhaps, benefited the most by the extended use of clay. It seems but a few years since the introduction of stoneware drain-pipes, and, though at first looked upon as a great innovation, meeting with much opposition, their use has become so general that our firm alone makes about 1,200 to 1,500 miles annually; and now, step by step, terra-cotta appears to be advancing into public favour, buildings in which it is used springing up in all parts of the country. While, in its literal meaning, terra-cotta, as I have already remarked, embraces every kind of pottery, it has now come to be applied exclusively to that class of ware used in the construction of buildings which is more or less ornamental and of a higher class than ordinary bricks, demanding more care in the choice and manipulation of the clay and much harder firing, and being, consequently, more durable and better fitted for moulded and modelled work.

It is always necessary that those desirous of using any particular material should be thoroughly acquainted with its characteristics. Were this always the case it would save a great amount of disappointment, and potters would never be expected to do impossibilities. An eminent architect has described terra-cotta as the highest development of bricks; its place certainly seems most appropriate in conjunction with brick, and in this form it has been most successfully applied. I have known buildings of stone in which terra-cotta has been introduced, but only in the ornamental parts, and principally on the score of economy. To understand a material thoroughly, its characteristics and nature should be studied and all its peculiarities known. I would, therefore, draw your attention to the mode of manufacturing terra-cotta.

All clays require careful preparation before use, and their after characteristics are often as much determined by this as by anything; the same clay being different under different treatment. The first necessity is that of kneading,



or, as it is termed, pugging. This consists of well mixing the clay and reducing it to a perfect consistency throughout; originally this was done by men treading it out with their feet (much in the same way as we read that the juice was pressed from the grapes in primitive times), but now pugging-millars are used, through which the clay is passed and thoroughly mixed. Most clays, like gold itself, require an alloy to make them more workable. In a pure state they are often what is termed too fat; their shrinkage is too great, and they are liable to twist and warp in drying and burning; rough stuff or burned clay ground fine is, therefore, added in proper quantities to prevent this, and to give the potter a more certain command over the clay: thus mixed, it is raised in a dry state into the mixers, and with the necessary addition of water it is passed in through the pug-mills ready for use. In some particular instances the clay is wedged or barred; that is, made more homogeneous by being continually struck with an iron bar, or by being cut with a wire, and the two separated pieces violently struck together: this tends the more thoroughly to assimilate the parts and to expel any imprisoned air. The clay being thus prepared, is pressed into a mould with considerable care, to prevent, as in the case of pugging and wedging, any accumulation of air in the clay; for should this occur, the heat of the kiln expanding the air will completely shatter the work. The moulds are of plaster, being taken from the models in the usual way; care is also necessary that in pressing into the mould an equal thickness should be kept throughout, as without this there would be uneven shrinkage, the result of which would be distortion. It is not safe to make any blocks of solid clay much more than 1 in. thick; to meet this difficulty, when work is required of a greater thickness the blocks are formed hollow with cross webs to strengthen them; when necessary these cavities are filled with concrete: this filling also prevents the accumulation of moisture to which the blocks would be liable were they left open. The use of moulds, of course, applies more especially to all repetitive work, such as string-courses, mullions, pilasters, cappings, cornices, balusters, &c., but it often happens that only one or two pieces of a particular kind are needed. These are then formed by hand, without the help of a mould, and at once passed through the kiln. This is particularly the case with sculpture, to which I shall allude presently. The last process is that of drying and burning, both of which form a very critical stage. Drying is the exhaustion of the water by evaporation, which must be done very gradually and very evenly; otherwise there would be a liability to crack and twist. The burning is the mysterious process and is of the utmost importance, as on it depends the lasting qualities of the material, for if the terra-cotta is well burned it will last for all time. An eminent American geologist, whom I knew personally, being asked what the burning was, replied simply expelling moisture from clay; but it is more than this, otherwise sun-burned pottery would be as good as any other. The fact is, chemical action goes on in the firing which changes the whole nature of the clay. It is no longer plastic, but rigid, and when once burned never admits of being worked up again, as in its original state. To accomplish the burning successfully requires much experience, much skill, and much patience. Kilns themselves often differ materially, and require to be known to avoid failure. In this as in everything, knowledge may be gained in three ways,—by reading, by hearsay, by experience, but the last-named is of the greatest importance. The burner, to be successful, must know his kilns thoroughly, but besides the kilns the clays have to be studied, and when we remember that the same bed of clay will sometimes change in character, and be differently affected by the application of heat, you will readily understand some of the difficulties with which the potter has to contend. A practical potter, speaking of this subject of burning, once said:—"I can only add, after twenty years' experience,—not that I know less than I did fifteen or twenty years ago, but rather how little I know compared with what still remains to be learned about burning." I am aware that some people have thought the potter's an easy trade to learn; but many have lived long enough to alter their opinion, having found by bitter experience that, even in the manufacture of pottery, there is no royal road to success. I once heard it said of a person who, without any

previous knowledge of pottery, had gone into the business, that he had affirmed that after a twelvemonth at the work he had mastered it in all its details: this is not the experience of those who have spent a lifetime at it, as my previous quotation from the speech of a practical potter testifies. Need I add that the place of this gentleman knows him now no more? He has accomplished a forced retirement. There is no doubt, however, that the potter's is a very seductive business, and one may be led on and on in the endeavour to attain an end at a very heavy cost; but, on the other hand, it is the only way of ultimate success. Amongst Wedgwood's papers were found trials numbering many thousands to obtain one result; and who has not heard of Bernard Palissy being so engrossed in attaining his end, that in default of anything better, he burned up his furniture, to his wife's dismay, that he might obtain fuel necessary for the firing of his kilns.

Having thus described some of the difficulties of the manufacture, I now turn to some of the advantages in the use of terra-cotta as a building material; and, first, I would mention its durability. It is, in fact, the only substance that may be said to be imperishable. Stone of every kind disintegrates by time, but well-burned clay resists all. There is terra-cotta at present in existence that has defied the work of time for thousands of years. From Egypt, Persia, Syria, Mesopotamia, Nineveh, Babylon, and the far East, have come to us pottery the age of which is past computing. Dr. Schliemann not long since brought to light some wonderful specimens; but a visit to the British Museum will surely convince the most sceptical: here may be seen slabs of burned clay which date not tens, nor hundreds, but thousands of years ago, covered with delicate writings, showing as clearly as the first day they left the operator's hands. To these slabs we are indebted for almost all we know of prehistoric time. In Greece and Italy pottery is continually being found of ancient date, and it was only since 1873 that those beautiful Tanagra figures were first brought to light, which have resisted the work of time for upwards of 2,000 years, having been made about 350 years before Christ; while some of the finest examples of Greek Terra-cottas date back 100 years previously to this.

Turning to more recent times, we have the terra-cottas of Northern Italy and Germany, the former of which have been so well described and beautifully illustrated by Louis Gruner in his work entitled "Terra-Cotta Architecture of North Italy." Most of these structures date back to the twelfth century, and in one instance, at all events, that of the Church of San Pietro in Ciel d'Oro as far as the seventh century; the study of this work, which shows also many examples of colour, would well repay any one desirous of knowing more of this beautiful material. Throughout the plains of Lombardy, and in many parts of Germany stone is rare, and there, buildings of considerable importance have been erected in which clay has been moulded into such exquisite forms as to raise it into a material of both value and dignity.

Many examples of brick buildings with terra-cotta mouldings and ornaments exist in England, having been erected mostly between the thirteenth and fourteenth centuries. Generally the use of terra-cotta died out in this country with the Tudors, and, except a slight revival of moulded brickwork about the seventeenth and the beginning of the eighteenth century, architectural terra-cotta was not practised until the time of George III. Wedgwood attempted a revival, but was not successful. Examples of this earlier period are found at Sutton-place, in Surrey, and at East Ham, and, later still, some medallions at the Hampton Court Palace, all of which are in excellent states of preservation. Among other specimens of terra-cotta building may be mentioned Eastbury Manor House, between Barking and Ilford, and Layer Marney Towers, near Colchester, Essex (the latter being illustrated in the last and present number of the Builder).

[At this stage of the lecture a pause was made for the purpose of exhibiting the mode of working the potter's wheel, which was illustrated by Mr. Butler showing the method of ornamenting the work.]

Towards the close of the last century there was a partial revival in the use of terra-cotta resulting in the establishment of a manufactory in Pedlar's Acre, Lambeth, under the management

of a lady named Coad. From this factory was turned out much good work, which found its way into all parts of the country as well as in London. The frieze at the Italian Opera House in the Haymarket, the caryatides and other ornamental work in St. Pancras Church, are from this factory. On the top of the Exchange, at Liverpool is a colossal figure of Britannia, also made by Coad nearly a century since, which, notwithstanding its exposed position, retains its original sharpness; some time ago it was proposed to paint it, but this was abandoned as being unnecessary. While staying myself with a friend in the Vale of Clwydd, I came across some excellent specimens of terra-cotta, which, by much research, I found had been exposed for nearly 100 years at the least; they had formed part of Llewellyn Hall, a mansion built by the Salisburys, a print of which I have seen showing the terra-cotta ornaments, many of which are about the grounds, and some bearing the name very distinctly of "Coad, Lambeth." In the early part of the present century the mansion was destroyed by fire and never restored; portions, however, which were left were converted into farm-houses, and it was in them that there were to be seen many relics of the terra-cotta, one of which—a medallion of one of the seasons,—was able, through the kindness of the agent, to bring away with me. It was as sharp as the day it was first made. I am sorry I could not take the piece itself to show you (I exhibit a facsimile of it). The print to which I have alluded was published by Boydell, of Cheap-side, and was dated 1792. In it was shown a fountain surmounted by the figure of Neptune; it was this figure that I found in the garden of one of the farms, and on which was the name "Coad, Lambeth." In Bishopsgate-street, in a niche outside Crosby Hall, is a terra-cotta figure of Sir Richard Crosby made by us more than fifty years ago, and which shows not the slightest signs of decay. It has been painted of late years,—not, however, for the purposes of preservation, but only for decoration. I think you will agree with me that fifty years in the atmosphere of London is far more trying than 100 years in the Welsh valley. The atmosphere of our large towns and populous districts is very destructive to stone and iron, from the smoke given out by the increasing consumption of coal, or from the fumes of chemical and other manufactories; but the close texture of well-burned terra-cotta makes it a very reliable material under these circumstances. I would mention one instance which came under my own notice some time since, and which, no doubt, may be seen at the present time. At Buckingham Palace, about thirty years ago, to that part adjoining the stable block were placed several large vases, made by late Mr. Blashfield. These are in perfect preservation, while the York stone coping on which they stand is in a state of decay. Bath stone is even less reliable; for, notwithstanding that care bestowed upon the choice of the stone, the Houses of Parliament in Westminster are constantly needing extensive restorations. It was called to see a balustrade on some terraces of a mansion, near Luton, where the balusters had worn down to a thread, by the more silent action of the atmosphere, and the far removed from any town; while at the church at the top of Langham-place, London, the balustrading and cornice became so decayed and shattered by the weather that a large portion fell, narrowly escaping some people below. But metal itself is not proof against the atmosphere of London; for the panels on lions at the Nelson Monument, Trafalgar-square have long since shown signs of decay. It is on fair, however, to mention that some terra-cotta has been made which, from defective burning, is of a very inferior character, disintegrating shortly after exposure. In such the heat applied has not been sufficient to effect the necessary chemical change which gives to terra-cotta its indestructible character.

Good terra-cotta is easily tested; who struck with steel it should emit sparks and merely show a black line, and ring like a bell. Sir Charles Lyell in his "Antiquity of Man" (chap. iii.) bears remarkable testimony to the wonderful durability of clay, which I cannot do better than quote in concluding this part of my subject. He says:—

"In the vast changes this planet has undergone, few things remain to mark the arts of its earliest inhabitants. Flint, spearheads, arrowheads, fragments of iron, bronze, of pottery, are almost all that remain. Of the latter burned bricks, jars, vases, the human figure



burned clay, are found in the remains of submerged towns, in the channels of the Nile and in Upper Egypt, in the Mexican buried ruins of America, and elsewhere, as the enduring types of civilisation of peoples and races whose names even are not known in the pages of history. Granite disintegrates and crumbles into particles of mica, quartz, and felspar, marble soon moulders into dust of carbonate of lime, but hard-burned clay endures for ever in the ancient landmarks of mankind."

My next point is that of strength, and, as in the matter of durability, I was able to give you actual examples of the power of terra-cotta, so I can also with regard to its strength. As already mentioned, terra-cotta for building purposes is generally made of hollow blocks formed with webs inside, so as give extra strength, and keep the work true while drying. This is necessitated because good well-burned terra-cotta cannot safely be made of more than about 1 in. in thickness, whereas, when required in bond with brickwork, it must be at least 1½ in. thick. When extra strength is needed these hollow spaces are filled with concrete, mixed rather weak, as otherwise the cement is liable to swell and burst the terra-cotta. Terra-cotta alone is able to bear a very heavy crushing weight, but thus strengthened its powers are much increased. Some years ago I had occasion to test a block of terra-cotta about 1 ft. cube, but without any cross webs or concrete filling to strengthen it. At 40 tons it plintered at the edges, and at 100 tons it became generally broken but not crushed, for I was able by tying it up with string, before releasing it from the jaws of the hydraulic press, to preserve it in its original shape. This very block I am able to show, though the experiment was made about ten years ago.

The late Mr. Blashfield, at the request of Mr. Charles Barry, and to illustrate a paper on the subject of terra-cotta, read before the Royal Institute of British Architects, prepared an exhaustive series of experiments giving the strength of terra-cotta, the result of which showed that as a building material it greatly exceeded all others in ordinary use, comparing most favourably with Portland, Bath, and ordinary stock bricks. Each specimen was placed between two pieces of ½-in. pine slabs, and the pressure then applied.

The result of these trials was published in tabulated form in the Proceedings of the Institute of British Architects at the time they were made, and a few comparative tests will be sufficient for the present occasion.

A block of Portland about 6 in. by 8 in. by 9 in. bore crushing weight equal per foot super. of 225 tons.	
A block of Bath of similar dimensions	104 "
A stock brick	82 "
A similar solid block of terra-cotta	523 "
A hollow block, slightly made, and unfilled	80 "
The same, but filled with concrete	163 "
A hollow block unfilled, but made with thicker walls	183 "

These figures are ample to show the correctness of my statement.

Terra-cotta possesses another element of strength, which is not shared either by stone or iron, but which is most important, that of resisting the action of fire. Heat, which would destroy stone, has merely the effect of burning off the dirt from the terra-cotta, giving it the appearance of having just left the kiln. This, as exemplified at our own building a short time since. After the late fire there, which, though of short duration was terrifically fierce, an examination the sills of windows and copings of walls which were of stone were destroyed, but the dressings to windows which were of terra-cotta were perfectly sound, the great heat merely brightening them up and making them look like new.

This power of resisting heat has been turned to advantage by the introduction of a patent re-proof flooring, called the "Doulton-Peto," samples of which I have near me. The principle consists of a series of hollow blocks of fire-proof material, which, placed between the rolled iron ribs, make a flat ceiling, and which may beastered or not. The blocks next to the iron ribs have flanges, which protect the joints from the fire and which form a perfect key for the plaster. We have subjected this flooring to very severe tests with great success. With a light equal to about 7 cwt. to the foot sup. on a floor of 50 ft. sup. we have lighted a fire underneath, making it red-hot in parts, and, while in this state, have turned on a hose with a considerable pressure of water, but without the least effect. It has also been tested with unevenly distributed weights and with vibration and concussion, all of which it has successfully withstood. This flooring is used throughout at the London Pavilion, where it was found very advantageous from its lightness, the speed with

which it was constructed, and its cleanliness. One of our own factories is also floored with it, where it may be seen by any one interested in the use of fireproof construction.\*

The third advantage I would bring under your notice is that of economy, and this is of the utmost importance in the present times, and, perhaps, more than anything else tends to popularise terra-cotta.

In comparison with good stone, while being much more durable and possessing more strength, it is also much cheaper, and I have known the use of terra-cotta to be most helpful to architects, enabling them to carry out their designs in their entirety. You can readily understand how this is in repetitive work; the model once made, the pressing into the mould is a labour which may be repeated as often as required, and at comparatively small cost.

The actual cost of terra-cotta as compared with stone varies according to the class of work and the quantity of repetition. The more elaborate the design the greater advantage will there be in the use of terra-cotta; in some instances as much as one-third less is saved. But even in cases where there is repetition, it may be by good management cheaper than stone. We once carried out a work in which were a number of capitals to columns, all of which were to be different. To accomplish this economically we cast the bell, dressing each one with a different ornament; you will readily understand the economy effected when you remember how much easier it would be to form all such ornaments in the soft plastic clay than to carve them in the hard stone.

This is especially so in the case of sculpture, and I cannot help thinking the day will soon arrive when terra-cotta will be much more used for monumental purposes than it is. Mr. John Bell, the eminent sculptor, has expressed himself very favourably on this score. I well remember his describing to me the immense labour attendant on his executing the colossal group of America at the Albert Memorial, and the method pursued was what is always done in all sculpture. The work is modelled first in clay, and, when finished, a waste mould is taken of it and the stone is carved from this, the finishing touch being done by the sculptor himself, and should it be necessary to carry the work out in bronze, or any repetition needed, a further piece mould would have to be taken, whereas should the work be done in terra-cotta, the first model made in the clay would be burned, and all after labour would be saved. I am aware that this process is attended with some risk, for should any accident happen to it in the burning the work would have to be remodelled, neither could such a method be carried out by the sculptor alone. It must be done in conjunction with the potter, who knowing the difficulties of burning, would carefully select the clay and see that the thicknesses throughout were as even as possible. Beautiful pieces of sculpture have often been ruined in the burning by neglecting this principle.

The largest piece of sculpture that has ever been executed in terra-cotta was Mr. John Bell's group of America at the Albert Memorial, which was manufactured in 1876; and some idea may be formed of the difficulty of the work when I tell you that it consists of five figures each about 10 ft. high, with a buffalo of like proportion in the centre, each figure being in a single piece. This group was sent to the Philadelphia Exhibition, where it was accorded the post of honour, and is now at the Smithsonian Institute, Washington.

Mr. Tinworth, whose studies from Scripture are so well known, rarely moulds his work; but by finishing up the subjects at once in clay, they are then burned, each never being repeated. His work is mostly in very high relief, his method being to make small sketches like those I have here, and from such to model to the size required. Some photographs here represent many of Mr. Tinworth's panels.

Another source of economy is its lightness in comparison with stone, by which means a saving is effected in carriage and handling; and as the filling of the blocks may be done with the broken bricks lying about, the expense of carting away this rubbish is avoided.

The absolute cost of terra-cotta in comparison with stone varies not only with the class of work but with the locality; if in a district where stone abounds it would not be so advantageous. In London it would be on an average, say 20 per

cent. less than Bath, and 40 per cent. less than Portland.

Another advantage it possesses is that of colour. In stone of all kinds except marbles, there is always one uniform tone, whereas in terra-cotta the colour varies, giving an appearance of depth to the work, and producing very pleasing effects.

This variety of colouring is generally produced by the flash of the fire; and its beauty of appearance can best be obtained in this way.

The natural colours of terra-cotta are the buff, the red, and the blue, these colours being more or less intensified by the amount of heat to which they are subjected. Other colours are obtained only by the admixture of foreign matter.

While thus speaking of the advantages of terra-cotta, I would not have you imagine there are no attendant disadvantages or difficulties; the difficulties I have already mentioned being occasioned chiefly by the nature of clay, in the varying effects produced by the action of fire, and the care under these circumstances required to keep the ware from cracks, warps, and twists. The disadvantages in the use of terra-cotta are neither numerous nor insuperable.

As I have already observed, there is the difficulty of getting the blocks true, but this is a matter mainly for the manufacturer; at the same time, much rests with the architect in designing his work so as to be suitable to the material. But the great difficulty is on the score of the extra time required to prepare the necessary drawings, one set for the builder, and another to the shrinkage scale for the manufacturer. But makers now are generally willing to undertake the latter work themselves, the full-sized drawings being all that are necessary.

There are also risks to be run. After all the labour has been spent upon the work, the fire, which is said to try all men's work, may find out some defect in the making and render it useless; to guard against this much care is necessary throughout all the various stages, and generally a few pieces more made than are absolutely required.

This brings me to that greatest of all troubles, the time needed in manufacture, and to combat this, I cannot do better than quote the words of Mr. Charles Barry, in the paper to which I have already alluded, and which would point to really an advantage rather than a disadvantage. He says:—

"Of these [that is, the disadvantages] perhaps the most embarrassing is the arrangement necessary to have the terra-cotta blocks made and ready on the ground, before the rest of the work is begun, in order to work in where the bricklayers progress. At times this is found impossible, and annoying delays in the general work take place, for which clients will be apt to blame the architect. The lesson, of course, to be learned from this is to carefully mature the design at the outset, instead of contenting ourselves, as we now often do, with a mere sketch of what is intended, with the hope and intention of working in parts as time goes on and the work proceeds. I am not sure that architects ought to object to this, since it must produce decision of thought and precision of detail, which may be an advantage in an educational point of view, and is a serious corrective to indolence of thought in design."

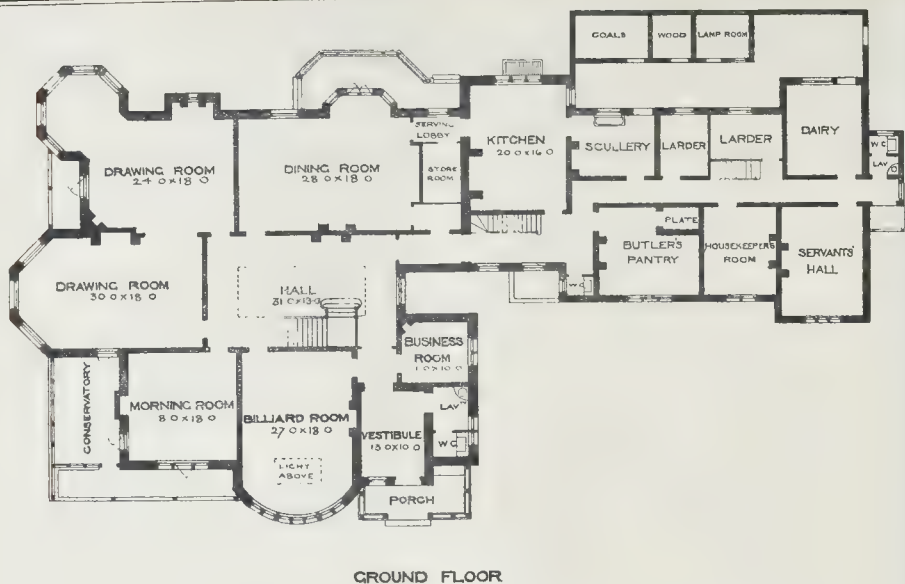
Terra-cotta has been objected to on account of its retaining its original colour, and not being toned down as much as other materials by age. Again let me quote from the words given by one of the profession:—"If a design requires age before its beauty becomes apparent, it surely needs re-consideration." But this objection no doubt arose from the fact that at one time it was considered that terra-cotta should be like stone, very even in its colour, whereas one of its greatest beauties, and certainly a distinctive feature, are those slight variations of colour which form its most charming characteristics.

To obviate the risk of warping, every block should be kept within reasonable limits, and large pieces only used where absolutely necessary. Large blocks may indeed be made, but it is very difficult, and the cost of manufacture is thereby considerably increased. In those beautiful examples which I have already mentioned which occur in Northern Italy, and which were erected from the seventh to the thirteenth centuries, brick dimensions are as much as possible adhered to. It is often absolutely necessary to make blocks of large dimensions, but when this is so, a corresponding time should be allowed in their manufacture, indeed, we have made cornices, &c., of great size, and at the present moment are engaged upon some columns about 10 ft. high, of which one portion of the shaft alone is 5 ft. long.

Some time ago the use of terra-cotta steps

\* For section of this system of flooring see *Builder* for December 19 last, p. 877.





Plan of "Ridgemean," Englefield Green.

was much advocated, especially in buildings erected by the London School Board. Knowing the unreliable nature of the material for such a purpose, we always refused to make them, but to meet the case have lately patented a tread of pottery, of great density, which may be used also as a nosing to stone or concrete steps. The Sicilian tread, as it is called, is absolutely indestructible, and does not become slippery by any amount of use. A flight of steps in one of the main galleries at the Exhibition at South Kensington, which has been in use for the last two years, is still as perfect as when first fixed.

A late development of terra-cotta has been in the form of glazed work. Glazed pottery has long been known, but only as applied to vessels, such as plates, vases, &c., or to tile work for the lining of walls, such as the works of Lucca Della Robbia, &c., and the Saracenic mural decorations; but in the present day there have been some few examples of structural glazed pottery. This glazing may be effected in two ways,—by the application of a glaze washed over the ware, or by the action of salt thrown into the fire. Of these by far the most durable is salt-glazed pottery. It is thought by some that the slight smear on many of the Etruscan vases is due to salt glaze. Certain it is that in excavations made in England several articles of Roman origin have been discovered in this ware. It was not known in England till comparatively late years; but, though Germany in her Grès de Flandres and Rhine ware may be considered as the first in the revival of the salt-glazed stoneware, it was reserved for England to carry this art to its present state of perfection, and it is only a laudable pride to say that at the Lambeth pottery Doulton ware, in its successful manufacture, its range of colouring, and variety of design, has far outstripped the Grès de Flandres which suggested it. The latter was limited in colour, design, and application; but the samples here shown testify to the great strides made by the manufacture of what is now known as Doulton ware. Its application to architectural work has only been attempted within the last few years.

The intense heat to which it is subjected, and the consequent difficulty of keeping its true shape, make its use in this form very difficult. It is comparatively easy in all thrown ware, which, from its circular form, shrinks evenly in all its parts, as may be seen in these vases and pedestals. But in all moulded work the difficulties are immensely increased, the liability to

warp and twist requiring increasing care in all its stages.

That this is not impossible, however, is proved by a work we carried out some short time since, where every portion was salt-glazed stoneware. The vestibule of the Palsgrave, a public building in the Strand opposite to the New Courts of Justice,—is a triumph of patience and skill, and shows how successfully this salt-glazed ornamental stoneware may be used. Mr. Sparke, the principal of the Art School at South Kensington, speaking of this material, says:—

"It comes as an absolutely new application, which it is for the architects of to-day to develop. Such a material if used to touch up a building must be a valuable addition to an architect's resources. With such colours of a soft and rich brilliancy of tone, applicable as they are to every variety of plastic forms: sober, quiet, harmonious, and deep, full of quality, and without any possibility of their ever becoming (even in the hands of inexperienced designers) garish or common; almost any conceivable effect may be produced. The very virtues of this stoneware, which are the results of its greater trials, make it of different application to terra-cotta, as by the greater closeness of texture and the greater heat that must be employed to verify it, a greater risk of warping and cracking is inevitable. This at once indicates its use in small pieces, and in such places where absolute flatness of surface is not indispensable, but under these conditions it may be applied with admirable effect to lighten mouldings, or to panel terra-cotta pilasters, as bases and capitals, especially as shafts to ornamental columns, and as bosses. It is also clear that the disadvantage attached to the use of polished marble for shafts or decorative bosses are completely overcome by the unalterable nature of the new material and the certainty that it will retain its brilliant surface for centuries, without any exfoliation or weathering which too often leaves the most delicate composition without a point of interest, except a regret at its premature decay."

I have thus endeavoured briefly to lay before you some of the advantages accruing from the use of pottery as a building material, both in terra-cotta and stoneware. The necessary cost from the difficulty of manufacture will doubtless limit the latter in its application, but the increasing use of terra-cotta shows its value and popularity, whereas a few years ago one had to search for examples; now they may be found in every part of England and in every style of architecture, from the severe type of work carried out by the Brothers Adam to the picturesque Elizabethan in Early English, not omitting even the Classical.

The durability of terra-cotta, its strength, its economy, its picturesque appearance, will all tend to its extended use. As I have already said, there are difficulties in the way of its universal application, but these are being continually met, and doubtless when the material is more fully understood it will be even more extensively used.

[At the close of the lecture the wheels again shown, and Mr. Butler, who is one of the principal artists at the Lambeth Pottery, showed his skill in carving shafts of columns, bosses, &c.]

The last of this series of lectures was given on Wednesday last by Mr. Banister Fletcher, M.P., F.R.I.B.A., on "The Influence of Architecture upon Carpentry." The lecture, which was frequently applauded, was illustrated by many drawings and models. A report will appear in our next issue.

### Illustrations.

#### RIDGEMEAN, ENGLEFIELD GREEN.

THIS house has been lately built for A. de M. Mocatta, on the high ground near Cooper's Hill College. It commands very extensive and beautiful views to the north, and has been so planned that the windows of the principal rooms may have advantages of outlook, and, at the same time, be not without sun.

The materials are Bracknell red bricks, stone, and Fareham tiles.

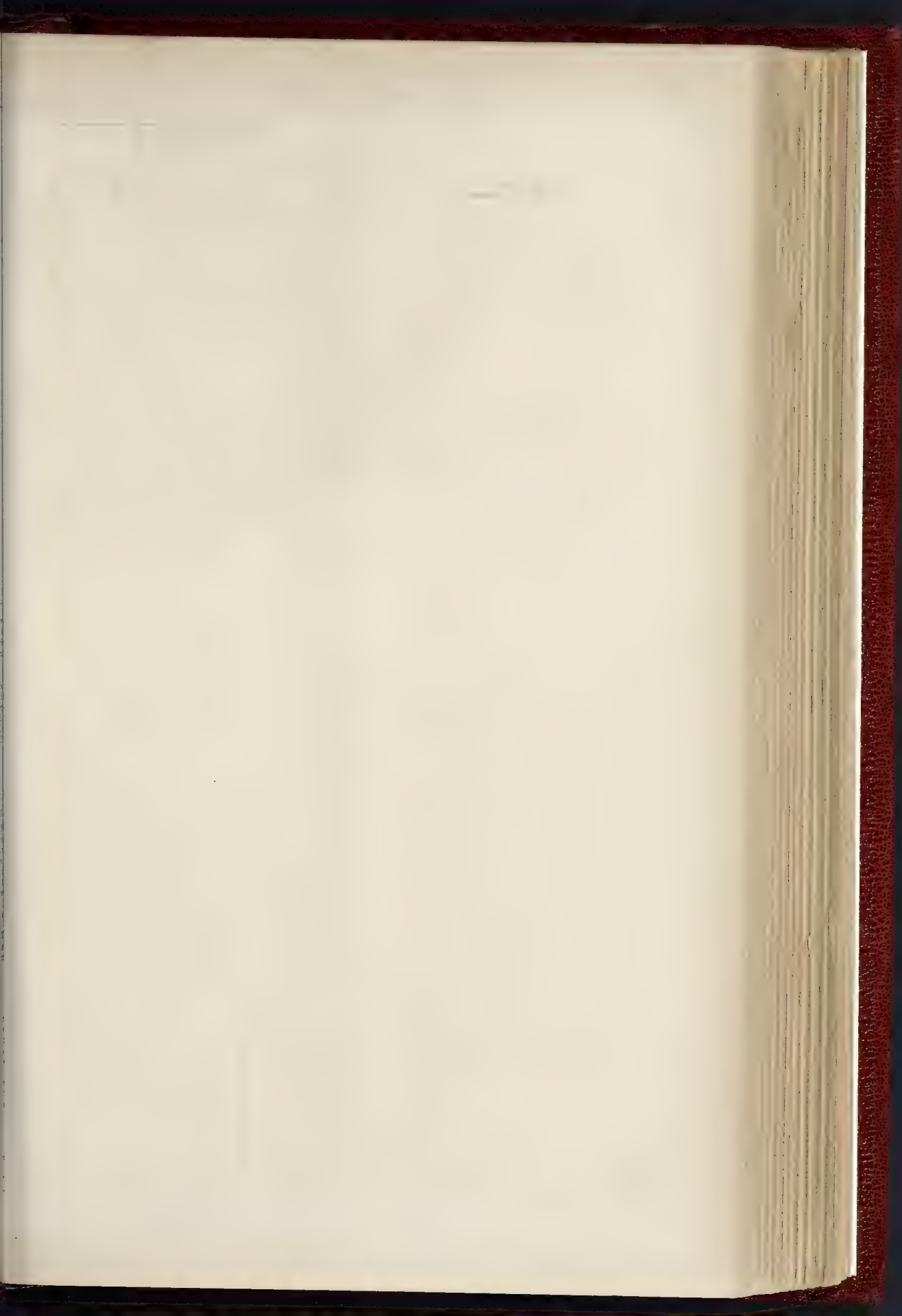
The works have been executed by Watson, builder, of Ascot, from the design and under the superintendence of Mr. F. Cowell Boyes.

#### FONTAINE D'AMOUR: DESIGN FOR STAINED GLASS.

THIS, a reproduction of the style of French Renaissance glass, is one of the works designed by M. Champigneulle and exhibited him in the "Exhibition du Travail," held at Palais d'Industrie at Paris in the autumn last year, and referred to in our "Lettres Paris" of November 7, 1885. We have previously given another of the windows, "Return of Alsace and Lorraine," exhibited the same time and by the same artist.

#### LAYER MARNEY TOWERS.

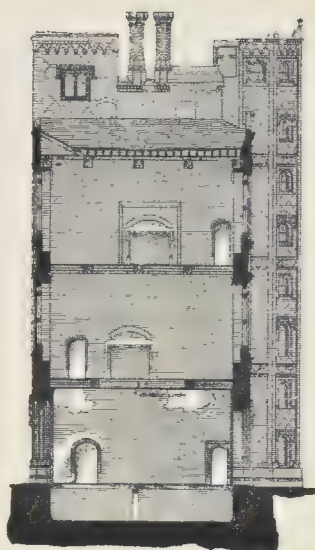
We give this week the further measurements, drawings, made by Mr. A. B. Mitchell, of an interesting building. For a descriptive historical sketch, see the first article in this week's number.





# LAYER · MARNEY · TOWERS · · ESSEX ·

A TYPICAL EXAMPLE OF THE EARLY SIXTEENTH CENTURY  
COUNTRY HOUSE STILL IN PART RETAINING ITS OLD

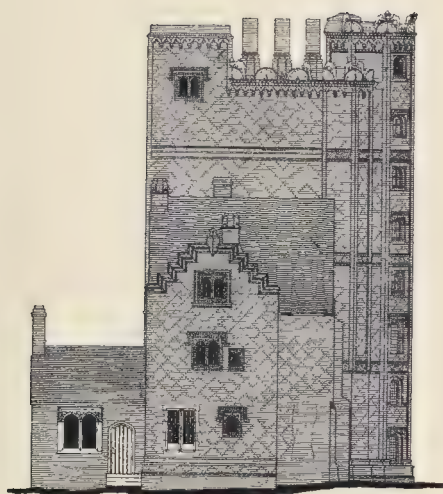


SECTION ON LINE A-B





NORTH ELEVATION

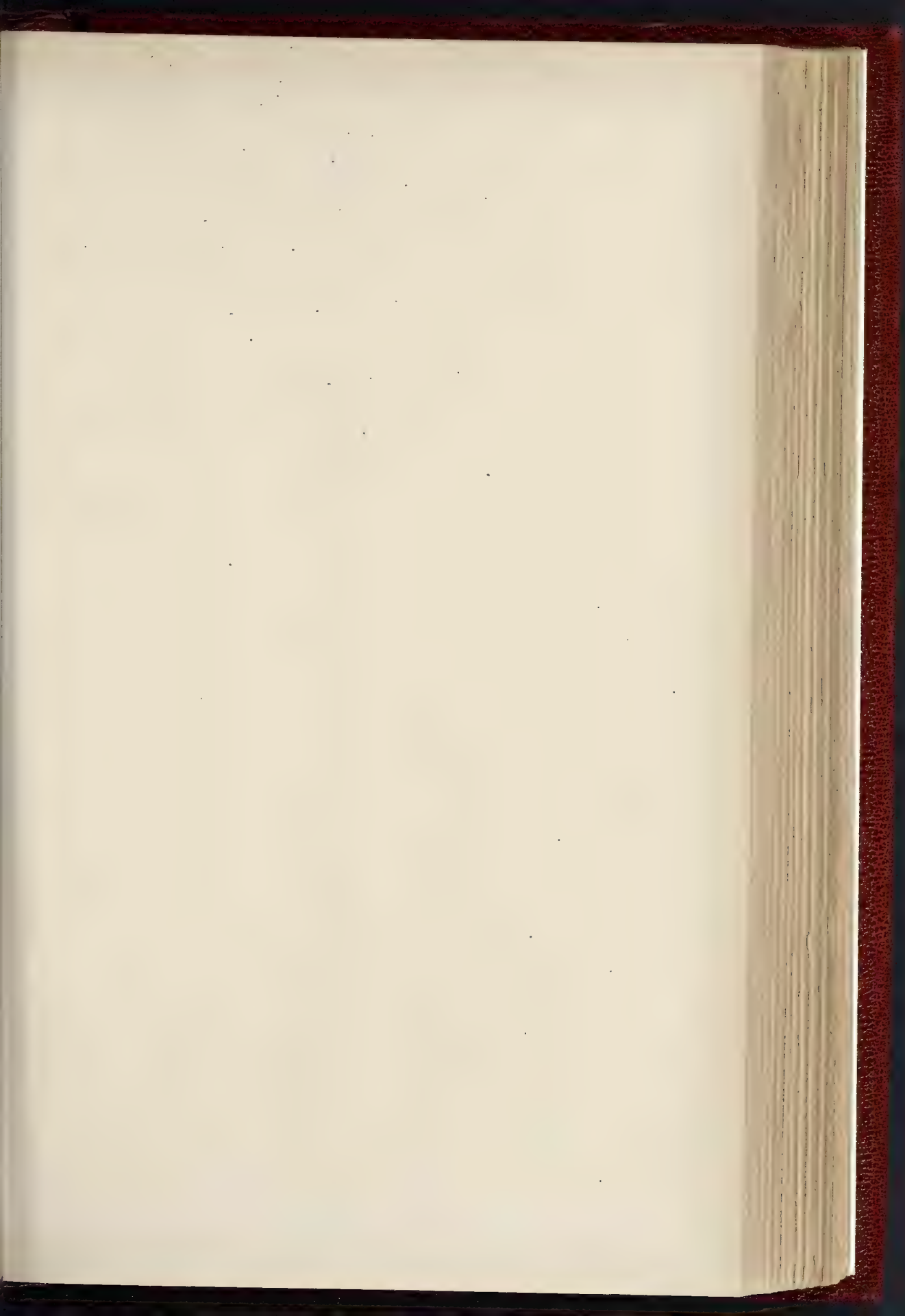


WEST ELEVATION

PHOTO. J. H. SPRAGUE & CO. LONDON









THE BUILDER, APRIL 10, 1886.

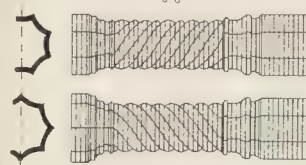
# LAYER · MARNEY · TOWERS ·

1506 FD



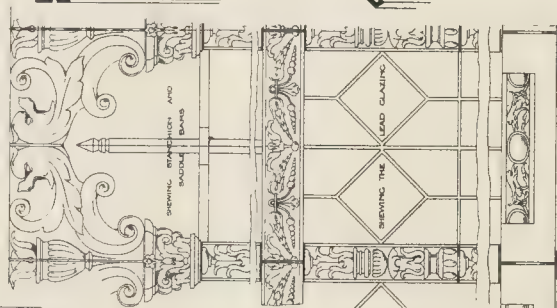
DETAIL OF THE  
TERRA-COTTA WATER  
TO LARGE WINDOW.

HEAD TO WINDOW OVER GATEWAY



C.T. BRICK  
CORNER SPAND

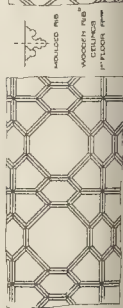
ARCHITOL TO  
GREAT GATEWAY IN FRONT



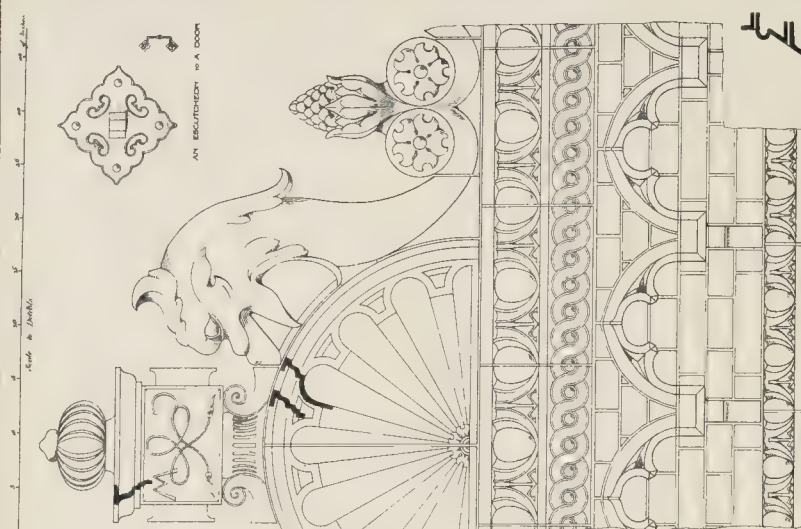
SECTION THROUGH HEAD  
AND TOWERS  
SHOWING PLAN OF  
TOWERS

ARCHITOL TO  
GREAT GATEWAY IN FRONT

INTERNAL AND EXTERNAL ELEVATION OF WINDOW

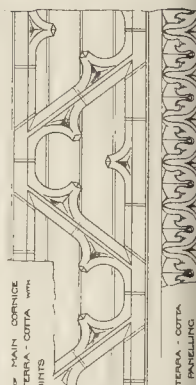


WINDING ROOF  
WOODEN ROOF  
CEILING  
PILON

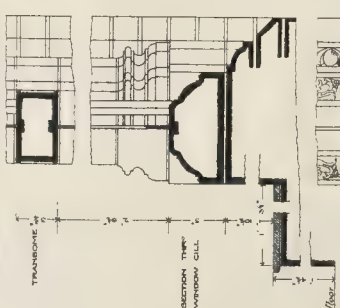


AN ELEVATION OF A DOOR

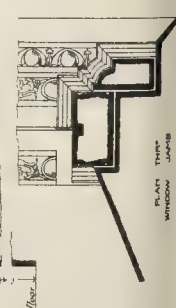
DETAIL OF MAIN CORNICE  
WITH TERRA-COTTA  
PISTILS



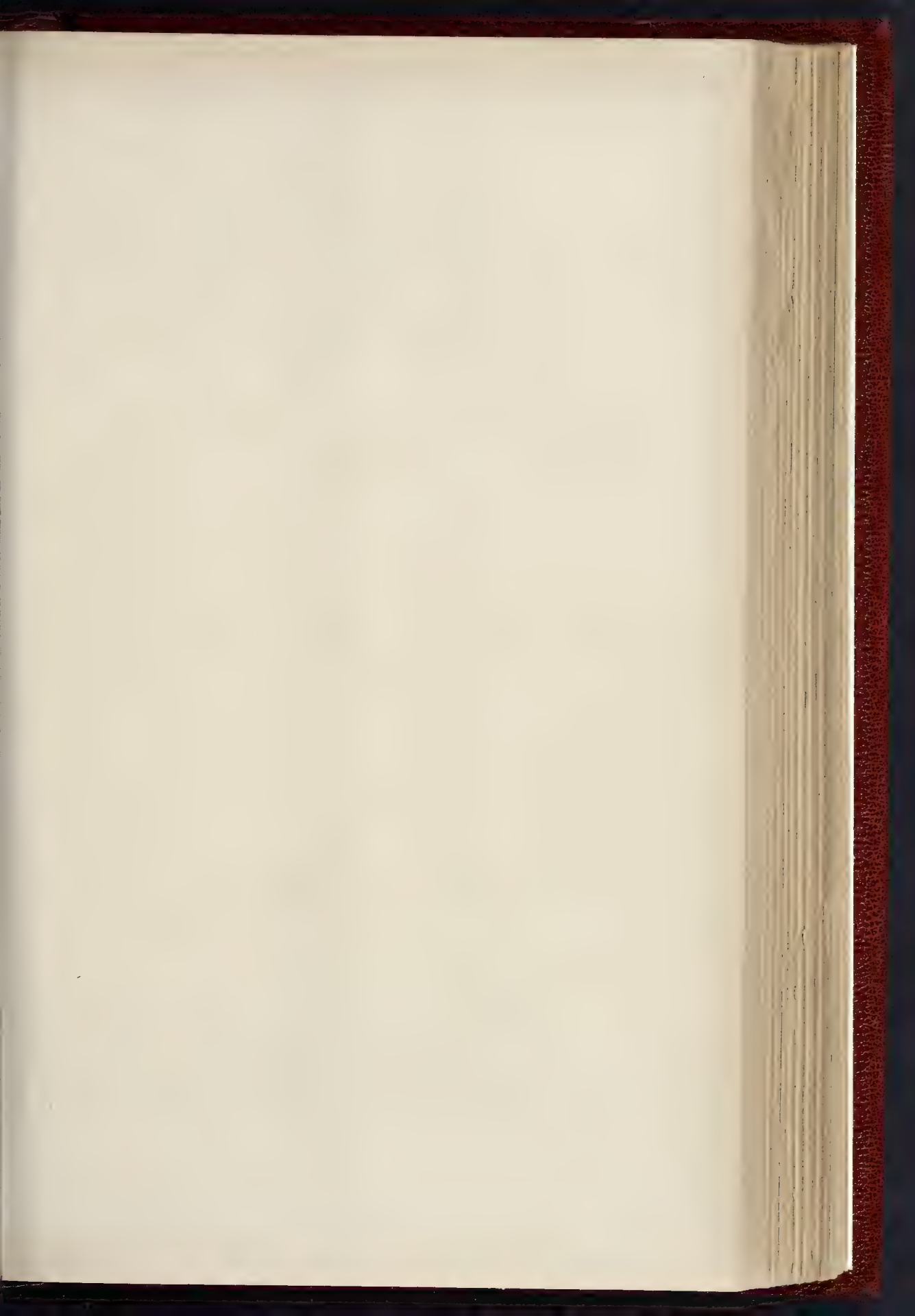
TERRA-COTTA  
PISTILS



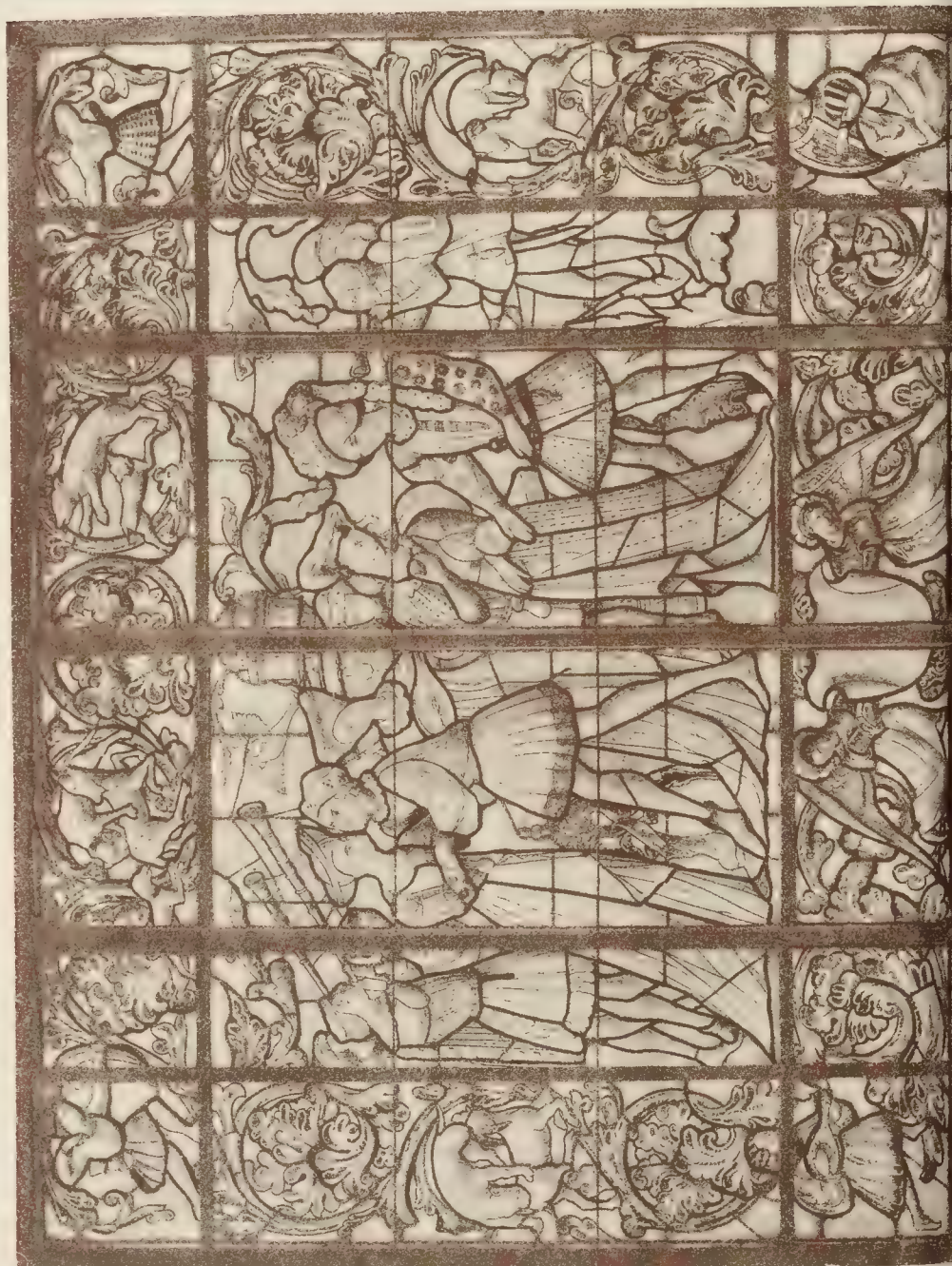
SECTION THROUGH  
WINDOW CILL

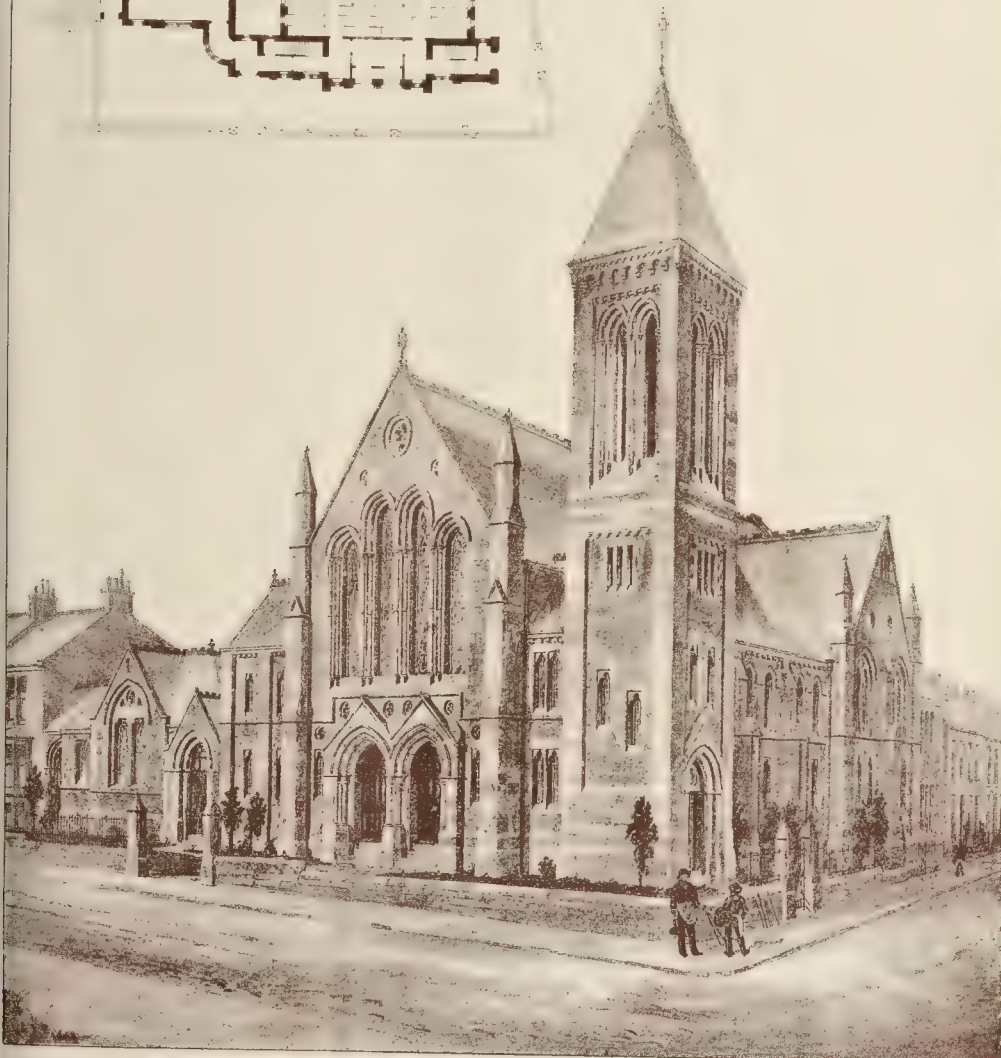
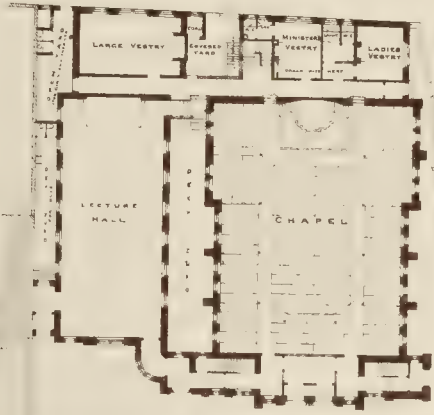


PLAN OF TOWER









1/4 IN. PHOTO. SPRAGUE & CO. LONDON

BAINBRIDGE MEMORIAL CHAPEL, NEWCASTLE.—MESSRS. S. OSWALD AND SON, ARCHITECTS.



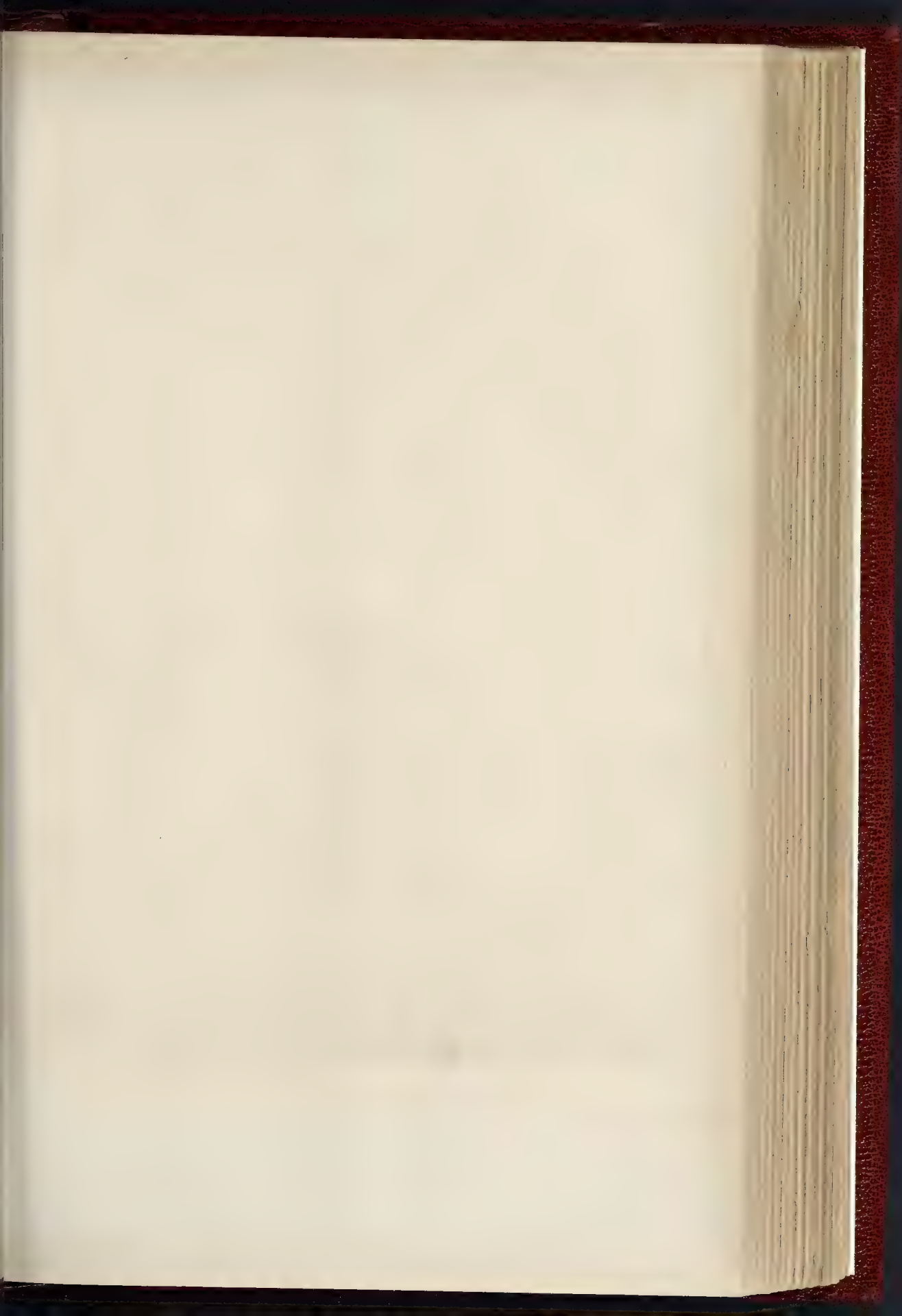




VIEW OF LAYER MARNEY TOWERS  
FROM A DRAWING BY MR. A. B. MITCHELL.











RIDGEMEAD

HENRY G

D, 1886.



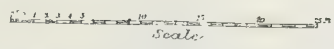
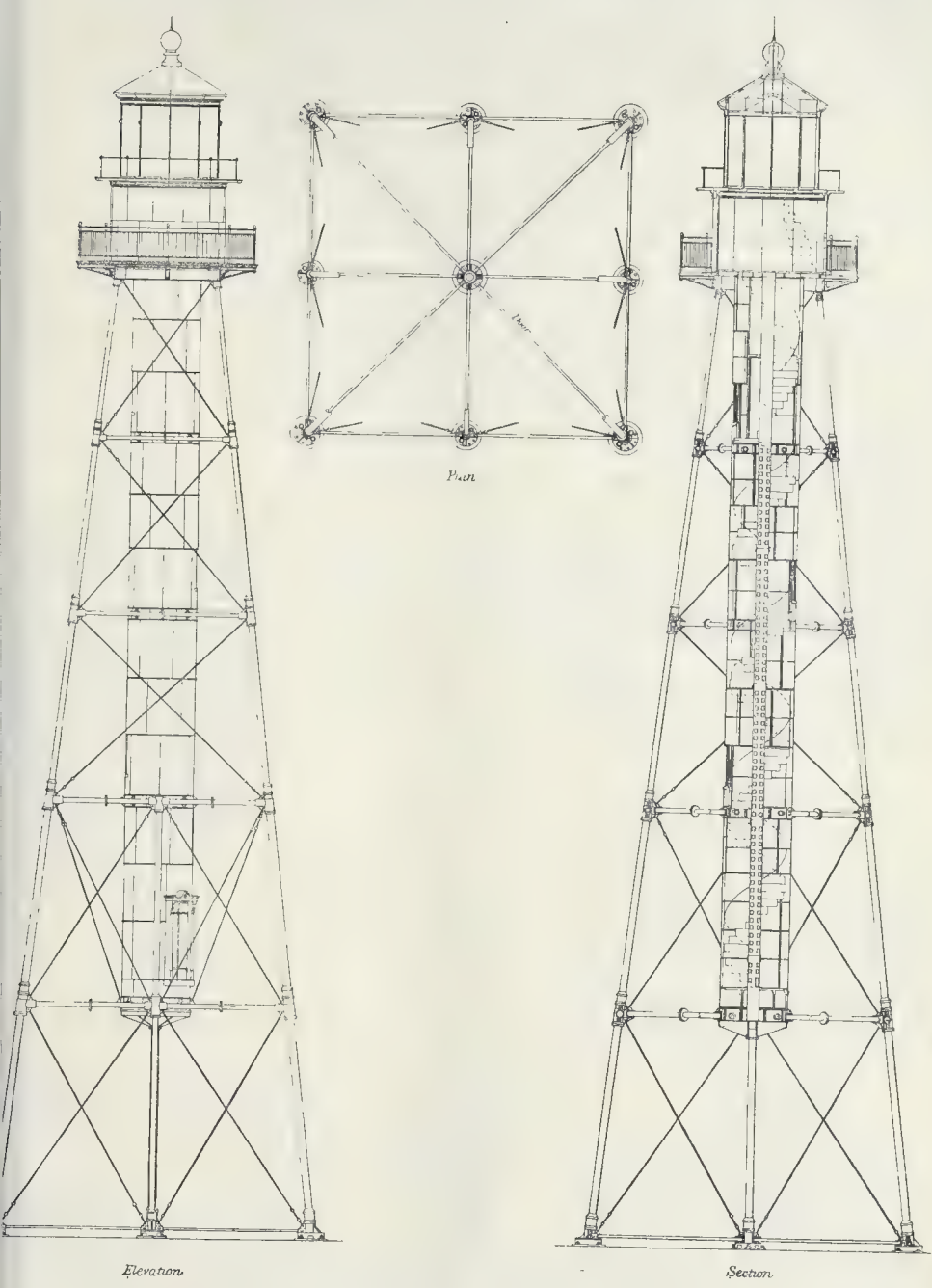
THE PHOTO. SPRAGUE & CO. LONDON

ELD GREEN.

CHITECT







IRON LIGHTHOUSE, SANIBEL ISLAND, U.S.



### "BAINBRIDGE MEMORIAL" CHAPEL, HEATON-ROAD, NEWCASTLE-ON-TYNE.

This building, erected for the Wesleyan Methodist Lodge, was opened in November, 1885. The chapel has sittings for 900 adults, capable of increase upon occasions to upwards of 1,000. The lecture-hall adjoining will accommodate 300 to 350 persons, and there are five vestries or class-rooms on the ground and first floors.

In plan the chapel consists of a nave with side aisles and shallow transepts, the extreme internal dimensions being 98 ft. by 55 ft. 6 in. by 40 ft. high to ceiling. There are galleries all round the interior, that for the choir and organ being behind the platform in an apsidal recess. The edifice is substantially built of stone, with internal fittings of pitch-pine. The general contractors were Messrs. Gresson & Stockdale, of Gateshead, who executed the carpenter and joiner's work, and entrusted the mason work to Mr. T. H. Hutchison, and the ironwork to Messrs. Bainbridge & Crimmon, also of Gateshead; the lead glazier's work to the Gateshead Stained Glass Company; the slating to Mr. John Hewitson, the plastering to Mr. Thomas Wallace, the plumbing to Mr. R. Herron, and the ordinary glazing, painting, and varnishing to Messrs. A. Robertson & Son, all of Newcastle. The gas-fittings have been supplied by Messrs. T. Thomason & Co., of Manchester; the lightning conductor by Messrs. Henry Walker & Son, of Newcastle; and the warming and ventilating apparatus by Messrs. Dinning & Cooke, Newcastle.

The clerk of works was Mr. James Grant. The buildings are warmed by hot water on the low-pressure system, arrangements being made for the admission of fresh air warmed by passing through coils of pipes, while the tower (90 ft. high) is utilised for ventilation and forms a powerful extracting-shaft for the vitiated air; tests by anemometer showing that the air of the interior of the chapel can be changed every twenty minutes.

The architects are Messrs. S. Oswald & Son, of Newcastle, whose designs were selected in limited competition, and the whole of the works have been carried out under their supervision at a cost within the contract amount of 4,956l. The total cost, including site, &c., was about 6,500l.

### LIGHTHOUSE, SANIBEL ISLAND.

In many places round the coast of the United States, in the large inland lakes, and in important rivers, the Government have built and are now erecting many Lighthouses which are designed in the Government Offices at Washington, D.C. Iron is extensively used in their construction, some of them being built wholly of this material, and of bold and original design. The drawings are very carefully elaborated, every detail being worked out, and are especially valuable as showing what is, perhaps, one of the most successful of the systems of iron construction for buildings.

I am indebted to Mr. P. J. Peltz for the fine series of lighthouse drawings, some of which were exhibited at the Institute recently. The one here given, on Sanibel Island, may be taken as a type of the class. JOHN B. GASS.

### COMPETITIONS.

**Congregational Church, Sidcup.**—In a competition between five architects for a Congregational Church at Sidcup, Kent, the plans submitted by Mr. George Baines, of Great Winchester-street, London, have been unanimously selected by the committee. The church will ultimately seat 840 persons, and will be in the Geometric Gothic style, with a tower and spire.

**Whitehaven Colliery Recreation Ground and Buildings.**—The designs of Mr. George Dale Oliver, architect, of Carlisle and Workington, submitted in competition, for laying out the recreation-grounds and for the new club buildings, pavilion, &c., have been selected by the professional adjudicator, and awarded the premium. The committee has confirmed the award.

**New School, Coatbridge, Scotland.**—The School Board of Old Monkland have selected designs submitted by Mr. James Higgins, architect, 95, Bath-street, Glasgow, out of thirty-two sets submitted in open competition for new school, Whifflet, Coatbridge. The selected plan is designed to accommodate 1,000 children at a cost of about 8l. per scholar.

### CLERKS OF WORKS' ASSOCIATION OF GREAT BRITAIN.

THE third annual dinner of this excellent Association was held on Monday evening last, in the Venetian Saloon of the Holborn Restaurant, Mr. T. Chatfield Clarke, F.R.I.B.A., in the chair. About 220 members and visitors sat down to table. The usual loyal and patriotic toasts were heartily received, Mr. Aitchison replying on behalf of "The Reserve Forces."

Mr. J. Wilkinson proposed "The Architects," coupled with the name of Mr. Francis Chambers, F.R.I.B.A.

Mr. Chambers, in an able and entertaining speech, said that in his younger days those who were entitled to be ranked as architects might almost be counted on the fingers of one's hands, but owing to the extensive rebuilding operations which had been going on during the last half century in London and other large cities of the country, architects had greatly increased in numbers, although many an incompetent person had dubbed himself "architect" without any right to that honourable designation. Not only land-agents and undertakers, but even linen-drillers had been known to call themselves architects. With a view to prevent this sort of thing, and for the protection of the public, the Institute of Architects had a few years ago set on foot a system of examination in order to test the fitness of the candidates for architectural practice. Mr. Chambers went on to speak of the indebtedness of architects to clerks of works, remarking that, just as it had been said that no man was a hero to his valet de chambre, so might it be said that very few architects were perfect in the eyes of their clerks of works. It was the clerk of works who generally found out the weak points in specification or drawing, and who very quietly and respectfully pointed them out without making any fuss.

Mr. Brady proposed "The Surveyors," on whose behalf Mr. H. H. Leonard responded.

In proposing the toast of the evening, "The Clerks of Works' Association," the Chairman expressed his great gratification at the success of the Association, and said that the clerk of the works was still a very important personage, although he was no longer in holy orders, as was the fact in mediæval times. In 1365, it was recorded that the pay of the clerk of the King's works was £18. 4s. per annum—a very different sum to that which was now represented by those figures. He quite endorsed what had been said by Mr. Chambers as to the immeasurable advantage which it was to any practising architect, struggling with a number of diverse engagements, to have a responsible man upon whose perfect integrity and ability he could rely to see that the specified requirements of construction were met. The clerk of works of the present day had to supervise the details of a number of special things, such as fireproof construction, electric lighting, and heating and ventilating arrangements, all of which called for some amount of study of scientific matters. With the toast he coupled the name of Mr. F. Dashwood.

Mr. Dashwood, in reply, stated that the Association now numbered 98 members, all of whom were men of proved experience.

The other toasts were, "The Honorary Treasurer, Mr. John Oldrid Scott" (proposed by Mr. Woodley), on whose behalf Mr. Redden responded; "The President, Vice-Presidents, and Committee," proposed by Mr. Calvert, and replied to by Mr. Hocking (who stated that the President, Mr. Girling, was absent through having met with an accident, and expressed the hope that the time would come, and that before very many years, when the Association would have its own library, lecture-hall, and building museum); "The Past Officers" (proposed by Mr. King, and responded to by Mr. Moore); "The Press" (proposed by Mr. Dillon, and responded to by Mr. Brady, the editor of the *Journal of the Association*); "The Visitors" (proposed by Mr. Griffiths, and replied to by Mr. Burch); and "The Chairman," proposed by Mr. Birchall.

**Tunbridge Wells.**—Salvation Army barracks are to be erected at Tunbridge Wells, on the site of the Old Gasworks in Varney-street. The style adopted is the Jacobean, and the front elevation is of brick, with stone dressings. The building will seat about 1,000 persons. For week-night services revolving-shutters will be so fixed as to shut off the gallery and part of the main hall. Mr. E. J. Sherwood, of Queen Victoria-street, is the architect.

### SALE OF THE MATERIALS OF LORD CARRINGTON'S HOUSE.

A FEW weeks will see the last of Lord Carrington's house, Whitehall, which is about to be taken down to clear the site for the Whitehall improvement and the new approach to the Thames Embankment, which is to be called Horseguards Avenue. The first portion of the materials of the mansion was sold on Tuesday last by Messrs. Horne, Son, & Eversfield, in direction of the Commissioners of Woods and Forests. They comprised the fixtures and fittings of the ball-room, the bow-room, the painted-ceiling room, the music-room, the north and south drawing-rooms, the centre-room, the dining-room, and the landing at the top of the principal staircase. The sale attracted a numerous attendance, which was not confined to the ordinary dealers in building materials, but included several gentlemen who were large purchasers of the most valuable lots. It was considered that unusually high prices were realised for the whole of the lots submitted, the competition throughout being very active. The chimney-pieces in the different apartments fetched the longest prices, 85l. being given for that in the dining-room, consisting of white statuary marble, inlaid with Brocatella. That in the painted-ceiling room, consisting of statuary marble, inlaid with Sienna marble, realised 75l.; whilst the wood chimneypiece in the steward's room, having carved caryatides, centre, mouldings and frieze, and marble jambs, was sold for 60l. That in the music-room, consisting of statuary marble, inlaid with Brocatella, and having carved trusses and ornaments, fetched 56l. Those in the north and south drawing-rooms, consisting of statuary marble, with Genoa green marble frieze and jambs, were sold for 30l. and 32l. respectively. The carved wood chimneypiece in the bow-room, with Sienna marble frieze and jambs, realised 20l., while the statuary marble chimneypiece in a bed and ante-room, inlaid with Sienna marble, was sold for 16l. 10s. With one or two exceptions the whole of these chimneypieces were purchased by a gentleman who was understood to be the representative of a nobleman who is erecting a new mansion, in which the chimneypieces are to be introduced. The several carved and panelled doors realised prices ranging from 5l. to 8l. each. All the floors of the various rooms are in oak, and it was noticed that the flooring of the ball-room,—60 ft. i length and 30 ft. in width, was not to be sold. The stone steps of the principal staircase, 6 ft. in width, together with the balusters and handrail, were similarly reserved. During the sale specimens of photographic views of the different apartments in the interior of the mansion were exhibited by Messrs. Bedford Lomere & Co. architectural photographers. The remainder of the materials of the mansion will be sold on Tuesday, the 20th inst. Views of the dining room and of the staircase appeared in the *Builder* for Aug. 9, 1884. These interiors are attributed to Sir William Chambers.

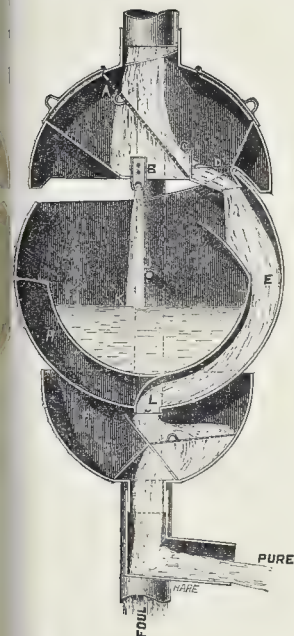
The Parliamentary Committee of the Metropolitan Board of Works have resolved to recommend that the Board's petition against the Horse Guards Avenue Bill be withdrawn until the promoters undertaking to strike out the words providing that the Board may contribute towards the cost of the work, and to convey the Board another piece of ground in exchange for any portion of the Embankment Garde which may be taken for the purpose of the undertaking.

**Exhibits for Edinburgh and Liverpool.** Messrs. Strodé & Co., the well-known gas engineers, have made a large number of articles for the forthcoming exhibitions at Liverpool and Edinburgh, including gaseliers, brackets, &c., for gas, in wrought iron and brass; number of lamps for burning oil; some wrought iron dog-grates and fenders; handy and elegant "five o'clock tea tables"; and a variety of miscellaneous articles, all characteristic of good in workmanship and design. We had opportunity of seeing the goods on Saturday last, at the factory in Osamburgh-street, prior to their being sent off. While speaking Messrs. Strodé's work, we take occasion to call attention to their special pliable wrought-iron gas-pipe, which is manufactured with special regard to bending without fracture, and appealingly to come into general use wherever gas work is desiderated.



## ROBERTS'S RAIN-WATER SEPARATOR.

This useful invention, which was noticed in the *Builder* some two or three years ago, has lately been considerably improved, and the improvements form the subject of a new patent (No. 10,994 of 1885). The new separators are divided into two classes, the simple and the compound; the latter being specially contrived to remain canted for five hours after the cessation of rain, so that any subsequent rain, falling within that period, shall be at once conveyed to the storage-tank. This form is not fitted for use in towns, but is intended for country houses where it is necessary to economise rain-water to the utmost. The simple separator, illustrated in the accompanying figure, is preferable wherever the occasional loss of a few gallons in showery weather is not of importance; it is free from all complication and needs no attention under ordinary circumstances. Both the simple and the compound separators possess the following advantages over the earlier forms of apparatus:—1st, they do not require such a heavy rainfall to start them; 2nd, the time of starting varies inversely with the heaviness of the rainfall; 3rd, the exact amount of washing allowed for the roof is very easily regulated by the insertion of different time gauges at B to



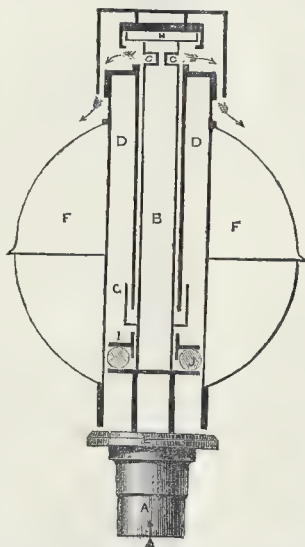
into the position shown in the section. When there is more rain than can pass through B it flows through an adjustable sluice-passage C, which can be made wider or narrower by the aid of a graduated scale marked upon it, to correspond to the area of the roof. With each increase of rainfall, the depth of the stream flowing out at the sluice C increases, causing a slight increase of pressure, and consequently a greater flow of water through B. A is the strainer, removable for washing; D is the outlet for surplus water; E the delivery-pipe.

The use of one of these rain-water separators, combined with a properly constructed and adequately-protected tank, will, we should think, be found to solve the question of water supply in the case of many an isolated house, for by their means the water of copious rainfalls may be stored up against times of drought. In towns, the usefulness of the appliance in securing a good supply of clean soft water for domestic purposes is likely to be fully appreciated. Prior to the introduction of Mr. Roberts's separators it was not possible to obtain rain water in towns in any appreciable quantities without the sooty and other impurities from the roofs. By the use of the separator all these impurities are carried away by the first flush, and only the clean water is stored. The separator is to be seen at the Building Trades' Exhibition.

## A NEW CISTERN-VALVE.

MANN's patent high-pressure cistern-valve, of which the accompanying diagram represents a section, has been devised with a view to the utilisation of the power given by the force with which water propels itself through mains from any elevated point. The pressure, which varies according to the head of water,—say, from 20 lb. to 100 lb. to the square inch,—is, in this invention used as a means for stopping the supply the moment the cistern becomes full.

The water enters the valve at the inlet union A, passes up the stem B, and issues, at full pressure, from outlets C until the cistern is



charged. As soon as the level of water in the cistern has reached and covered the lower half of the ball F, the ball and cylinder, D, commence rising from the base-plate E. Having risen  $\frac{1}{2}$  in., the force of water, by the partial closing of the outlet ports C, immediately takes possession of the interior of the cylinder D, by passing down the annular tube between the cylinder and the stem B into the pressure receiver G. The force of water from this receiver, being directed upwards, strikes the upper internal portion of the cylinder D, thereby causing the ball and cylinder to leap from the level of the water in the cistern to the rubber seating, H, at the top of the valve. This at once seals the outlets C. The full pressure then acts instantaneously

between the internal head portion of the cylinder D, and the loose flange collar, I, resting on the rubber seating, J. This seating, by the pressure of water on the flange collar, expands, and effectually closes the lower portion of the cylinder D; and thus, in conjunction with the air confined in the cylinder, the supply is immediately stopped in a silent manner. The working portion of the valve has free play, and is clear of any kind of packing. The diameter of the ball is  $5\frac{1}{2}$  in., and the length from base E is 9 in.

We are informed that this valve has been severely tested, and that its use has been sanctioned by several of the London water companies. It is manufactured by Mr. George Day, of 31, Liverpool-road, Islington.

## WOOD-BLOCK FLOORING.

An improved system of wood-block flooring has recently been introduced by Messrs. Geary & Walker, of London and Manchester, who are well known as specialists in this class of work. The distinguishing feature of the patent, which will be known as "Geary's improved patent 'Invincible' system of Wood Block Flooring," is that each block forming the flooring is firmly "keyed" to the substructure by means of metal "keys," which are dovetailed into the under-sides of the blocks; the other extremities of these "keys" being embedded in a specially-prepared matrix; the latter acting not only as a damp-proof course and a preservative against dry-rot, but also as a "floating" to the concrete foundation, thus rendering the usual cement-finished surface un-



necessary. Reference to the illustration here given will make this clear. By this system of flooring, each block is keyed, independently of its neighbour, to the substructure. An additional key is also formed by means of the 4-grooves which traverse the sides of the blocks, as shown in the illustration: the mastic being forced into these grooves, thereby binding the blocks to each other and to the concrete foundation. The grooves also prevent the mastic working to the top of the blocks, and enable perfectly close joints to be obtained. As the mastic on which the blocks are bedded is strongly adhesive, a third agency thus assists in constituting what is a thoroughly solid and immovable flooring, admirable for use in warehouses, basements, railway station waiting-rooms, and offices, hospitals, churches, mansions, schools, and public buildings generally.

Messrs. Geary & Walker employ a new form of machine for preparing the blocks, ensuring mathematical accuracy in size, and consequently perfect joints when laid.

## The Proposed Railway up Mount Pilatus.

The project for a railway to the summit of the well-known Alpine height, Mount Pilatus, is making very satisfactory progress. A considerable portion of the 2,000,000 francs required for carrying out the undertaking has already been subscribed in Switzerland. The line will start from Alpnach, and rise gradually to a height of nearly 7,000 ft., terminating at the Hôtel Bellevue, which is situated at that altitude. The total length of the railway will be rather more than  $2\frac{1}{2}$  miles, of which distance fully one half will be occupied by the necessarily circuitous curves and windings. The majority of the curves have a radius of from 200 ft. to 300 ft. The gradient varies from one in ten to one in four. Amongst the principal features of the work will be a viaduct over the Wolfbach, as well as four tunnels. When completed, the cars, which will be drawn by a rope moved by a stationary engine, will perform the ascent in about eight minutes. The Mount Pilatus railway will, in fact, be a somewhat serious competitor to the similar line already in existence up the Rigi, and the rivalry will, it appears, be still greater when the new hotels which it is designed to build upon Mount Pilatus shall have been finished.



# ASSOCIATES OF THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

SIR,—The new Charter of the Institute was yesterday, at the close of an all-day sitting, finally passed by the Fellows without dissent. Under this Charter the right of voting on all questions, except the making of by-laws, is secured for every Associate, and nothing is enacted to prevent Associates being placed on the Council, should the by-laws so provide.

At the ordinary business meeting held on the 29th ult., another very important step, directly affecting the Associates, was taken by the Institute; and as the attendance at that meeting was not very large, I desire to draw special attention to the subject.

The scheme of a "Departmental Action" originated by Professor Kerr, and brought into form by a Special Committee, of which I have the honour to be a member, was, with certain alterations, accepted by the Institute; and the members of the four standing Committees, thus created, are to be appointed at the annual meeting on the 3rd of May next.

Six seats on each of these Standing Committees are reserved for Associates, and the Council has requested Associates to volunteer to serve on them.

I wish now to impress upon my brother Associates that it is their duty to throw their energies and their enthusiasm into the work of the Institute. It will be shameful for them to complain in the future that the Institute is "sleepy" or "useless"; if such be the case it will be their own fault.

In whatever direction their particular taste and abilities lead them, there is opportunity for assisting in the work, as the four committees deal, respectively, with:—1, "Art," including Archaeology; 2, "Science"; 3, "Literature"; and 4, "Practice of the Profession." These committees appoint their own chairmen, vice-chairmen, and hon. secretaries, and have the power of initiating their work; it will be their duty to carefully watch and consider everything of interest to architects, each in its special department, leaving the council free to exercise all the functions properly appertaining to the supreme executive authority.

I therefore hope that Associates will now come forward, and be prepared to exercise some self-denial, for the sake of our noble art, of the honourable profession to which we belong, and, may I add, of our representative Institute, which, having successfully struggled with those ills which are incidental to childhood and to youth, has now passed into the period of manhood. May it be a vigorous and a useful one!

April 7. G. RICHARDS JULIAN.

## SUNDERLAND MUNICIPAL BUILDINGS COMPETITION.

SIR,—I understand it is freely rumoured in Sunderland and the district that a Sunderland architect, with friends among the authorities, had his sketch-design prepared before the advertisements were issued, and is more than likely to be the successful competitor in the Sunderland Municipal Buildings Competition. Time will show what truth there is in such rumours. But, as a competitor, I for one intend to address a letter to the Council, urging them to give a guarantee of fair play, by appointing Mr. Waterhouse or some equally eminent architect, to adjudicate on the plans, in which case the local architects will stand as good a chance as others. A COMPETITOR.

## STONE-SAWING AND MOSAIC MANUFACTURE.

SIR,—As some of the readers of the report of the stone-working machinery race (Hall & Co. v. Burke & Co.), in your issue of March 27th [p. 489], may be interested in the conversion of marble, granite, and other hard stones, I send you a short description of the Belgian machines purchased by the defendant, and referred to in the trial, as they are without doubt considerably in advance of any machines for the like purpose yet made in this country.

The swing or saw-frame carrying the blades is driven by a crank attached to a countershaft in the usual manner, but in place of the connecting-rod being attached to the end of the saw-frame, a pair of side levers are arranged to take hold of the frame at about the centre on either side, thus giving a longer connecting-rod and increased steadiness in working. The blades are lowered into the stone by an improved form of downward screw-feed, which can be regulated in speed in proportion to the hardness of the stone being cut; at the same time, the blades are kept steadily to their work at an even

pressure. One of the chief difficulties in converting hard stones is in securing a regular and uniform supply of sand and water over the whole surface of the block, but this has been well overcome in the machines under notice. In the place of the ordinary contrivances a wooden sand-box extending the whole length of the stone is employed; this is perforated, and jets of water from a flexible pipe are allowed to fall in it in the usual way, but by an ingenious automatic cam-motion the sand-box is arranged to traverse slowly in a transverse direction across the face of the stone, thus all the blades are equally supplied with abraded particles, and their cutting is uniform. By simply pulling a lever the saw-frame containing the blades is automatically raised or lowered as may be required. There are other good points in these frames, but the above are the most important. The downward cutting speed in tolerably hard marbles is about  $\frac{3}{4}$  in. per hour.

M. POWIS BALE,  
Author of "Stoneworking Machinery," &c.

## THE MARNEY MONUMENT.

SIR,—There is a passage in the inscription quoted from the Marney monument at Little Horwessley, Essex, which preserves a mode of address or designation now repudiated as "bad form." Your engraving reads thus:—"Wife to Mr. Thomas Fynden, Esquire." We do not now admit the conjunction of magister and squire, and it is of interest to know if the inscription is correctly so read.

The prefix "layer" is not topographical, but, like the affix in Layer Marney, both words are patronymics. Sir Robert de Marney, Kt., temp. Ed. III., married Alice, daughter and heir of Richard Layer, and their joint names are thus preserved to this day. Layer is a common name in the Eastern Counties, where it is possibly connected with oyster culture (J).

April 3rd, 1886.

A. H.

## The Student's Column.

### OUR BUILDING STONES.—V.

RESISTANCE TO THRUSTING STRESS.

STONES having a somewhat similar appearance to each other are often found on examination to be of different strength, so that considerable attention has been paid to the results of experiments dealing with this part of the subject.

The weight necessary to crush a stone varies with the state of cohesion and hardness of the particles composing it. It follows, therefore, as the amount of water a stone absorbs is proportionate to the state of aggregation of the particles composing it, that the crushing weight will be proportionate to the amount of absorbed water. Or, to put it in another way, suppose we know the average amount of water absorbed by certain stones, we can get an idea of their relative strength. A careful comparison of several published accounts of crushing weight and absorption of water by stone, would show that this rule is almost invariably borne out. The few exceptions that exist are due in a great measure to the insufficient manner in which the stones have been described, causing the comparison to be made between stones widely different from each other, but which, unfortunately, bear the same name.

In comparing published results of experiments with each other, care should always be taken to see whether the exact stratigraphical horizon of the stone in each quarry is stated. Many recorded "crushing weights" do not show this, and it is quite evident, therefore, that mistakes are sure to happen, unless there is only one bed worked for building purposes in each of the quarries whence the stones were respectively obtained.

Again, where stones found in quarries adjacent to each other are known collectively under one term, it is very necessary to be certain not only of the exact horizon, but of the name of the quarry of each of the specimens examined. The terms Portland stone, Corsham stone, Bath stone, for example, require something further to qualify them, for there are several kinds of stone included under each of these headings, varying greatly in structure, texture, and durability. Unless these terms are qualified, all records of their chemical or physical characters are of little or no use.

Occasionally, after going carefully into the matter, we may find that the beds from which certain kinds of stone, having good repute a few years ago, were obtained, have been worked out or abandoned, as becoming too expensive to work. In spite of this, however, to keep up the

rate of sale the same names are retained to the present day, and designate stones which may come from the same localities, but are quite different in many particulars from those to which the names originally referred. (We shall point them out as these articles progress.) The discrepant results, on comparison, which may arise from this cause are at once manifest. Sometimes no appreciable difference in quality or durability exists between the original stones and those bearing the original names, but the latter are quite as often stones of inferior quality. In all cases the crushing weight, amount of absorption of water, &c., must vary, and it is for these reasons that all recent results should be the most trustworthy. Unfortunately, however, in the absence of recent experiments, the old ones are still adhered to: hence many serious errors arise.

Stones made up of large shells are difficult to deal with in selecting pieces for crushing; it is not easy to obtain average pieces. It is simply ridiculous to find the strength of 1 in. cubes of such stones (as has often been done): large pieces should always be experimented upon, certainly not smaller than 6 in. cubes. It can be shown that in many cases no very great difference exists between the relative crushing weights of 1 in. and 6 in. cubes of stones of homogeneous character; but when rocks contain large crystals, such as the porphyries, or large shells, such as are found in many limestone, the crushing weight must vary considerably according to the general position of the cleavage planes of the crystals, or the predominant direction of the exterior faces of the shells.

A small cube might fail to prove the existence of cracks and flaws invisible to the naked eye, in large blocks of the same stone. The comparative strength of the large blocks would thus be lower than the examination of the small cube would seem to warrant, for it must be remembered that the strength of a stone is only the strength of its weakest part.

Experiments as to the strength of stone also vary according to the machinery used, as well as the skill and care with which the experiments are made and recorded.

In a paper read at the Royal Institute of British Architects,\* Captain Seddon, R.E., says:—

"If we take a stone which has been commonly used, perhaps, than any other, namely Portland, we learn from Barlow that its crushing strength ranges from about 1,384 lb. to 4,000 lb. per square inch, whilst, in the experiments made by this Institute and recorded in your sessional papers for 1864, the mean resistance to crushing per square inch arrived at was, for 2-inch cubes, 2,576 lb.; for 4-inch cubes, 4,099 lb.; and, for 6-inch cubes, 4,300 lb.

"According to Rennie its crushing strength may be taken as 3,729 lb. per square inch, which has been followed by Moleworth in his 'Handbook,' whilst in Hurst's 'Handbook' it is given as 2,022 lb. per square inch."

The many kinds of Portland stone, the different methods pursued in making the experiments, amount of seasoning and direction of the natural bed of the stone when crushed, no doubt cause the discrepancies between these results.

In testing the crushing weight of stones it is desirable, for comparison's sake, that the should be of the same size and shape. Cubes are generally used, but occasionally quadrants and octants of columns of different diameter and heights are tested for special purposes. The results obtained from the latter should be kept by themselves as much as possible.

When cubes are used they should all be carefully dressed by rubbing down in the ordinary manner, and the faces which have to receive the compressing force should be made parallel. Some experimentalists, knowing how important it is to have these faces exactly parallel with each other, and to have all the specimens of the same height, as nearly as possible, finish them with a steel frame, which encloses and holds all the stones at the same time. After dressing or setting of faces in this manner they are all turned over, and the opposite set is similarly treated. Before being crushed, some stones have been gauged to the thousandth part of an inch.

It is particularly necessary to notice whether the stones to be crushed are placed on or against their natural bed.

\* See the Builder, vol. xxi. (1872), p. 418.



The machine used to ascertain the amount of distance to thrusting stress is generally the hydraulic press. The principle of the press is obvious to any one who understands the equal transmission of fluid pressure. Conceive that a vessel with its upper surface level is completely filled with water, and that two openings are made in it, which are replaced by pistons of 1 and 10 square inches. If a weight of 1 lb. be placed on the smaller piston, a pressure of 1 lb. will be felt everywhere in the interior of the fluid, and the pressure on the larger piston will be 10 lb. Thus a force of 1 lb., acting on the area of 1 square inch, produces a pressure of 10 lb. on the area 10 square inches.\*

The principle of the press admits of extension as far as the strength of the containing sides of the pressing-chamber will permit. Very large presses have a hemispherical base.

The circular of Messrs. Poole & Son relating to the press states that the specimens are loaded in the press between parallel iron plates, and the pressure is communicated to the cubes interposing above and below each cube, two parallel plates of sheet lead, and the upper or variable plate communicates its force upon the lower plates of lead by a conical heap of sand carefully pressed by the upper plate into a parallel mass, so as to press equally over the upper bed of the cube. It is stated that this method was adopted to insure an equal pressure on every particle of the upper and lower beds of the stone.

The pieces of stone are also frequently loaded with pieces of pine varying from 1 in. in thickness; and leather has likewise been used.

Mr. David Kirkaldy, who has had great experience in testing the crushing weight of rocks, we may judge from the number of results before us, appears to prefer to experiment on 6-in. cubes. It is not an easy matter, however, to get all the cubes exactly 6 in.; so, for precise, he shows the dimensions of the cubes to two places of decimals. He works on the base area of each sample, shows the pounds per square inch, and tons per square foot when the stones cracked slightly; and similarly when they were crushed and the yard dropped. The mean strength of the pieces is then struck.

Some authorities seem to think that experiments should be made on prisms, whose heights are about one and a half times their diameters.

It is pointed out that the weight necessary to crush a stone varies considerably in different samples, and even in different cubes from the same sample. Although it is usual to strike an average in all cases, in practice it will never be possible to get all the stones equal to the average, and therefore very great allowance must be made for weak, bad, and cracked cubes. Thus, we see that experiments indicate that the mean strength of the material is not the strength of the material.

Professor Rankine shows that this remark applies for another reason, for the fracture of stones under compression generally takes place through their shearing on a plane inclined at a slope of 1½ rise to 1 of base.

There is practically no cause of danger in masonry buildings by the crushing of the stones, which they are built.

Thus,—"The greatest stress that comes upon part of the masonry of St. Paul's Cathedral is only 14 tons per square foot. In St. Peter's, Rome, it is about 15½ tons per square foot. The weakest sandstones (used in buildings) that exist will bear a compression of 120 tons per foot, while the resistance of ordinary light stones ranges from 140 to 500 tons per square foot, and in the case of granites and gneisses 700 or 800 tons per square foot."

It is stated that stones in some forms of arches, retaining a wall, &c., are liable to be crushed by reason of pressure being concentrated upon certain parts. The walls of buildings made of stone of different qualities are sometimes subjected to severe strains by reason of the inferior stones decaying, leaving the pressure which was acted on them to be distributed on the others of better quality surrounding.

Very few experiments testing the transverse strength of stone have been carried out. We have seen that some stones are more capable of resisting a bending stress than others, and seeing so many stones in practice are subjected

to a bending stress it is remarkable that so little attention has been paid to it. Most of the samples which have been tested are used for paving, but we want to know more about the transverse strength of stones used for stairs, &c.

RECENT PATENTS.  
ABSTRACTS OF SPECIFICATIONS.

16,485, Quays, &c., Retaining Walls, and Similar Structures. H. J. Fourmond (Rouen).

The walls are of plated ironwork in place of the ordinary stone or concrete now in use. Beams and uprights are so placed that earthwork may be thrown up behind and around them, the front of the uprights being plated with iron, mud or earth in liquid or plastic state is poured in so as to fill all the interstices, and, if desired, may be built on shore and sunk into place by means of air-tight caissons, which are then removed. Piers are constructed in a similar manner, two walls tied together being employed and sunk into position, and then filled in the same way as described. Docks, locks, &c., are built on slipways, launched, floated, and then sunk into place by being filled with water. Retaining walls can be founded on concrete or masonry in place of tiles, as their foundations are not commonly under water, and are anchored to piles or masonry in a precisely similar manner to that described above.

17,039, Core Stoves. R. Buchanan.  
Stoves for drying moulds and cores are heated by gas from a gas producer in connexion with the stoves. The gas is admitted to the stove with air, and burns near the roof the products passing away through holes in the floor.

17,078, Chimney Top. E. and J. M. Verity.  
A cylindrical shaft which may have a conical top is constructed externally with a number of spiral, trough-like flutes, or hollow grooves having open spaces or slots between them. The whole is made in sections which can be easily fitted together.

17,070, Fixing Rounds of Ladders. T. Ray.  
The hollow metal bar or tube which forms the round of the ladder has taper ends, and when inserted in a counterbore hole in the side-piece to which it is attached, this taper portion is pressed outwards by pins to fill the hole and fix the tube in position.

NEW APPLICATIONS FOR PATENTS.

March 28.—4,235, R. Steffert and T. Dykes, Construction of Girders.—4,239, A. Wood, Ladders, &c.—4,243, J. Brierley, Ornamenting Wooden Floors, &c.—4,255, R. Little and T. Duncan, Water-waste Preventer.—4,271, A. Tipper, Screwdrivers, &c.—4,281, W. Hellier, Brick Moulding Machines.—4,288, J. Walker and H. Worsey, Sash, Casement, and Door Fasteners.

March 27.—4,350, G. Couch, Brick, Stone, Terra-cotta, Concrete, or other Walls.—4,352, G. Couch, Ridge, Hip, and Wall Tiles.—4,351, G. Couch, Roofing and Flushing Tiles.—4,355, J. Tonks, Screw driver.

March 29.—4,361, J. Walker, Door Knobs, &c.—4,375, J. Barnes, Syphon Cistern.

March 30.—4,435, W. Rowe, Plough and Sash Filloster Plane.—4,439, J. Sharp, Chimney Cowl and Ventilator.

March 31.—4,479, G. Inglis, Window Guard.—4,482, C. Wharton, Automatic Window-sash Fastener.—4,496, T. and J. Holt, Flushing Cisterns.—4,507, N. Thompson, Connecting Lead Pipes, &c.—4,521, A. Boulton, Earth Closets.

April 1.—4,547, W. Johnson, Springless Sash Machinery.—4,551, A. Nichols, Springless Sash Fastener.—4,567, G. Rayner and H. Hughes, Retaining Doors or Shutters in Open or Closed Positions.—4,577, A. Harding, Air Extractors.—4,580, J. Parker, Dry Earth and Ash Closets.—4,585, W. Lennon, Counterbalances for Window-sashes, &c.—4,599, C. Abel, Preventing Fungus in Flooring.

PROVISIONAL SPECIFICATIONS ACCEPTED.

447, H. Peters, Portland Cement.—2,199, W. Taylor and Others, Closet-basin Joints, &c.—2,310, D. Swan, Pigments.—2,482, W. Crow and W. Coley, Compound for Coating Wood, Stone, &c.—2,553, B. Hawkeham, Sawing Machines.—2,671, C. Swindell and W. Clifford, Chimney or Ventilator.—3,230, 3,057, J. Hallett, Artistic Exposing and Erecting of Gas-pipes throughout Buildings to form Picture Rods.—3,073, E. Chatham, Connecting Pipes.—3,909, H. Peters, Portland Cement.—2,789, D. Swan, Pigments.—3,019, G. Buffham, Ventilators.—3,940, J. H. Hutton, Cramps or Clamps.—3,106, H. Johnson and Others, Electric and Magneto Bells.—3,123, H. Rothery, Locks and Latches.—3,230, B. Webber, Drawing Boards and T-squares.—3,570, J. Clayton, Mouthpieces for Speaking Tubes.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to opposition for two months.

2,718, R. Adams, Self-closing Appliances and Check-cocks.—4,465, G. Haywood and G. Williams, Ventilating Apparatus.—4,032, J. Ebner, Composition for Securing Parquet Flooring to Stone,

Concrete, Wood, &c.—7,204, J. Kinnaird and Others, Cooking Ranges.—7,410, J. Morley, Waste-preventing Ball Valve and Lever.—2,301, S. Wright and R. Bate, Flushing Cisterns for Water-closets, &c.—6,837, J. Corbett, Connecting Lead Pipes, &c.—6,889, W. Paul, Window Ventilator.—7,189, W. Joy, Manufacture of Cement.—2,961, J. Davis, Nailfast Fasteners.—2,983, A. Boulton, Ventilators.

RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

MARCH 29.

By G. A. WILKINSON.

City—2, Laurence Poultry Hill, 25 years, ground-rent 120l. £4,900

Marylebone—25, Montagu-square, and stabling, 16 years, no ground-rent 1,890

By V. VETTOR, BULL, & COOPER.

Dulwich, Friern-road—The residences, Fairholm and Hillcrest, freehold 1,240

MARCH 30.

By W. R. NOBBS.

Waterloo-road—24, Oakley-street, 25 years, ground-rent 10l. 310

By E. E. CROUCHER & CO.

Stoke Newington—8, Gordon-road, 73 years, ground-rent 4l. 6s. 305

By A. RICHARDS.

West India Dock-road—Nos. 68 and 70, copyhold 900

Teddington—Ground-rent of 8l. a year, reversion in 30 years 155

Stratford, Carnarvon-road—Two plots of freehold land 240

By A. WALTON.

Greenwich, 64, Ashburnham-grove, 67 years, ground-rent 4l. 4s. 290

By BRADSHAW BROWN.

Bow-road—16, Addington-road, 61 years, ground-rent 5l. 465

Wandsworth—1 to 4, Sultan-road, 90 years, ground-rent 10l. 275

MARCH 31.

By RUSHWORTH & STEVENS.

Pentonville—31, Lloyd-square, 36 years, ground-rent 122. 10s. 650

Grosvenor-square—85, Park-street, 14 years, rent 130l. 410

By BLAKE & DANWAT.

East Dulwich—89 and 91, Henslow-road, freehold Greenwich—17 and 18, The Circus, freehold 1,280

32, Lorne-terrace, 78 years, ground-rent 6l. 0s. 6d. 270

By WORSFOLD & HAYWARD.

Easby, near Dover—The freehold residence, Lauriston House, and 6½ acres 1,125

The Wheelwright's Yard and Workshop 250

Walton Cottage, and four other cottages, freehold 710

Freehold Orchard, 3a 3r 34p. 140

St. Margaret's—The Hope Inn, freehold 900

St. Margaret's Villa, and two Cottages, freehold 765

MEETINGS.

SATURDAY, APRIL 10.

Architectural Association.—Visit to the Constitutional Club, Northumberland-avenue. Members to assemble at 3 p.m.

St. Paul's Ecclesiastical Society.—Visit to the Church of St. Bartholomew the Great, Smithfield. 3½ p.m.

Royal Institution.—Professor Oliver Lodge on "Fuel and Smoke." I. 3 p.m.

Edinburgh Architectural Association.—Visit to Hatton House.

MONDAY, APRIL 12.

Surveyors' Institution.—Adjourned discussion on Mr. Wm. Mathew's paper on "The Taxation of Real Property." 8 p.m.

Society of Arts (Cantor Lectures).—Mr. Alan S. Cole on "The Arts of Tapestry-making and Embroidery." II. 8 p.m.

Society of Antiquaries of Scotland (Edinburgh).—8 p.m.

TUESDAY, APRIL 13.

Institution of Civil Engineers.—(I) Discussion on Dr. Percy Frankland's paper, "Water Purification." (2) Time permitting. Paper by Mr. Henry Ward on "Brick-making." 8 p.m.

WEDNESDAY, APRIL 14.

Society of Arts.—Dr. C. Heymott Tidy on "The Treatment of Sewage." 8 p.m.

THURSDAY, APRIL 15.

Society for the Encouragement of the Fine Arts.—Mr. E. P. Loftus Brock on "Old Engravings of the Italian Schools." 8 p.m.

Parkes Museum of Hygiene.—The Rev. F. Lawrence on "Bremascausis: Sanitary Burials." 8 p.m.

Edinburgh Architectural Association.—Address by Mr. James Bellare, of Glasgow. 8½ p.m.

York Architectural Association.—Mr. William Hopper on "The Development of Window Tracery in England." 7½ p.m.

Dundee Institute of Architecture.—Social Meeting. 7 p.m.

FRIDAY, APRIL 16.

Parkes Museum of Hygiene.—Extraordinary General Meeting for the purpose of considering the desirability of amalgamating with the Sanitary Institute, and applying for a Royal Charter. 5 p.m.

SATURDAY, APRIL 17.

Royal Institution.—Professor Oliver Lodge on "Fuel and Smoke." II. 8 p.m.

The Working Lads' Institute.—The Committee of the new Working Lads' Institute, Whitechapel, have instructed their architect, Mr. George Baines, to prepare plans for the second section, consisting of a large swimming-bath and gymnasium and lecture-hall for 550 persons. About fifty unemployed workmen have recently been engaged in the excavations for the swimming bath, 400l. having been voted from the Mansion House Relief Fund for this purpose.

ref. Goodere, "Princ. of Mechanics" 1883, p. 263.  
Notes on Building Construction." H. Rivington, 1879.  
III., "Materials," p. 8.



## Miscellaneous.

**Brickmaking in New York.**—The largest brickmaking district of the United States is that of Haverstraw, New York State, on the Hudson River, thirty-two miles above New York. The forty-five brickyards of the district, with a capacity for making 340,000,000 bricks annually, turned out 300,000,000 in 1885, and a similar number in 1884. Employment is found for about 2,000 men, besides 300 in the river carrying trade, which keeps forty-four barges and fifty small vessels going. Haverstraw bricks are preferred on account of the excellent sand and clay used, and fetch between 25 and 50 cents more per 1,000. Their average price last season was 6 dols. per 1,000 in New York, after paying 1 dol. river freight and 1 dol. to 1.25 dol. per 1,000 royalty to the owners of the land where the yards are situated. The works used during a season 42,000 cords of wood for heating the kilns, at 5 dols. per cord; 12,000 tons of coal dust, at 2 dols. a ton; and 4,000 tons of coal, at 4.25 dols. a ton; total cost for fuel, 251,000 dols. The total amount of royalties paid was about 337,000 dols.; and wages (averaging 2.25 dols. a day), 776,000 dols., during a season lasting about six months. Two hundred patent brick presses are employed in the manufacture. The total gross receipts last year are given at 1,800,000 dols. The industry was established at Haverstraw about fifty years ago. At that time 3 dols. per 1,000 was a fair price. Quotations have been as high as 9 dols.

**New York Underground Electric Railway.**—The New York District Railway Company recently published an illustrated circular descriptive of its projected system of underground railways for the great American port. In addition to the routes extending from the Battery to Harlem, there are several others running to the Second and Ninth Avenues at Union-square, as well as a western division along the Upper Broadway. The Broadway is, according to the plans, excavated from curb to curb, to a depth of not less than 16 ft., and occupied by four railroad tunnels. There are likewise a series of smaller tunnels for the purpose of conveying water, steam, gas, &c., besides other electrical conductors of various descriptions. The roof structure is supported by iron columns, which separate the tunnels, whilst the panels in between consist of a new non-resonant material, called forlax. It is proposed to construct the roof of iron beams and steel plates, upon which there will be laid a concrete foundation for the pavement surface. The cars will, when completed, be run by electricity, thus entirely preventing the smoke nuisance, and, moreover, rendering travelling far more healthy. The cars and stations will also be lighted up with the electric light. The Company omits to state the estimated cost of the enterprise.

**A New Sewage Process.**—In the *Chemical News* of the 3rd of April we have an account of a new sewage process, the invention of Mr. A. McDonald Graham. It is well known that the sewage of many manufacturing towns in the North of England consists for the most part of surface-water and refuse from mills and factories, and contains but little plant food. It would be a very costly operation to irrigate land with such a large volume of water, and when treated by precipitation, the sewage of these towns deposits mud which the farmers cannot be induced to cart away. Mr. Graham proposes to regenerate this mud at a comparatively small cost, and make it again available as a precipitating agent; and by the same process of slow oxidation, to burn off the organic matter without the escape of any noxious or unpleasant odours. The first crude conception of the process appears to be due to a Japanese gentleman who was a student at the Imperial College of Engineering, Tokio, Japan, in 1879, and being Asiatic in its origin, it differs somewhat from our preconceived European ideas. One thing worthy of notice is the fact that the burning or oxidation process commences at a point furthest from the source of heat, travelling from the top of the mixture to the bottom.

**St. Thomas Charterhouse School of Art.**—The Lord Mayor will, on Saturday afternoon at 3 o'clock, distribute the prizes awarded to students of this school. The chair will be taken by the Rev. J. R. Diggle, M.A., chairman of the London School Board. On Friday evening there will be a free exhibition of students' works.

## Birmingham Architectural Association.

The eighth ordinary meeting of the current session was held in the library at Queen's College on Tuesday evening last. The President, Mr. F. B. Osborn, was in the chair, and there was a good attendance. The Vice-President, Mr. John Cotton, gave his annual address, in the course of which a contrast was drawn between the ancient guilds of masons, wrights, &c., and the modern system of professional practice. Mr. Cotton very ably pointed out the immense advantages to be gained by architects associating together for purposes of study, and for the advancement of their art; and in referring to the junior members of the Association, showed very clearly the great profit which might be derived if the attendance at the various classes held during the session was regular and enthusiastic. A vote of thanks, proposed by Mr. W. Doubleday, and seconded by Mr. V. Scruton (hon. sec.), was unanimously accorded to the Vice-President for his very instructive address. After a response from Mr. Cotton, the meeting terminated.

**The Relation of Geology to Engineering.**—On the 2nd inst. Mr. George F. Harris, F.G.S., lectured before the Junior Engineering and Scientific Society on "The Relation of Geology to Engineering" at the Hawstone Lower Hall, Westminster-road, S.E. The lecturer prefaced his remarks by explaining the mode of formation of sandstone, limestone, granite, and slate, and showed by the variations in thickness of strata, together with their natural sequence, that a civil engineer should lay the foundation of his profession by acquiring a knowledge of geology. Reference was made to the great value of stratigraphy in estimating contracts for the construction of tunnels and railway-cuttings, and the conditions necessary to ensure the success of artesian wells and well-boring generally. Subsequently attention was directed to some of the principal difficulties met with in coal-mining, and the scientific methods of laying foundations of large structures, such as embankments, piers, and breakwaters, were explained. A brief account of road-metal and the kind of stones necessary to bear heavy traffic brought an interesting lecture to a close.

**Crystal Palace Company's School of Art.**—A division of this School for promoting the study of the artistic and economic improvement of estates and landscape gardening, has just been made. The principal is Mr. H. E. Milner, A.-M. Inst. C.E. We learn from the prospectus that the student is under articles which secure both theoretical instruction and the advantage of practical outdoor work. During the employment of the student in practical work, a certain salary may be allowed. The term of studentship is three years, one year at least of which is devoted to outdoor work. A premium is payable to the Company. The lecturers in connexion with the classes are:—For Architecture, Mr. G. Richards Julian, A.R.I.B.A.; for Physiological Botany, Soils, &c., Mr. R. H. Hoston, F.L.S.

**Turpin's Parquet Floor, Joinery, and Wood Carving Company, Limited.**—This Company, of which the prospectus is printed in our advertisement columns, has been formed for the purpose of taking over as a going concern, and further developing, the well-known business of parquet flooring, joinery, wood carving, and modelling, which has been carried on in London by Mr. M. F. C. Turpin for the past thirteen years and upwards. It is stated that the accounts of the business during the four years ending the 31st of January last show the profits to exceed 25 per cent. upon the capital employed. The services of Mr. Turpin will be retained by the Company as Managing Director. We may mention that some of Mr. Turpin's productions are on exhibition in the Building Trades' Exhibition at Islington.

**Royal Academy.**—The Class for Modelling in the Architectural School has terminated for the session; and a series of demonstrations will be given by Mr. Stannus, on Monday evenings from six to eight p.m., on "Accessory Features in Architectural Ornament," as follows:—April 12 and 19, "Tablets and Shields"; May 3 and 10, "Festoons," &c.; May 17 and 24, "Masks," &c.; June 1 and 8, Miscellaneous.

**Faversham.**—Mr. William Eve, Union-court, Old Broad-street, has been selected by the Guardians of Faversham to re-value, for rating purposes, the whole of the rateable hereditaments in their Union, extending over an area of 44,000 acres.

**Monument to Liebig.**—For some time past subscriptions have been collected for the purpose of erecting a monument to the late Baron von Liebig, whose fame as a chemist was as great in England as in his native country, Germany. Up to the present the sum of 5,000*l.* has been subscribed, and the committee one of whom is Liebig's celebrated pupil, Professor Hermann, formerly of the London College of Chemistry, have unanimously decided that the monument shall be erected at Giessen, at whose University the deceased chemist first attained distinction. It is intended that the monument shall consist of a statue of Liebig, surrounded by several figures, symbolical of the sciences and agriculture, all cast in bronze. The pedestal is to be of polished red granite placed upon a foundation, bordered by a series of steps in black granite. The committee have not yet arrived at a final decision as to the precise spot where the statue shall be erected, but it will, in any case, be placed in a commanding position facing the University, and in all probability, close to the new chemical laboratory.

**Luton.**—New "Salvation Army Barracks" are about to be erected in Lea-road and Vicarage-road, Luton, Bedfordshire. The lowest estimate received for the work is 2,190*l.*, and the hall will accommodate 2,000 persons. The plans and quantities have been prepared by Mr. E. J. Sherwood, Queen Victoria-street, London, and the work will be carried out under his superintendence.

**Lifts.**—Messrs. A. Smith & Stevens have received an order for a large 1-ton lift travelling 70 ft., for Messrs. W. Briscoe & Son's new warehouse at Sydney. This will be driven by a gas-engine, and is to be a duplicate of lift supplied last year for the Hon. B. Rundle's new building in the same town.

**Leyton.**—Mr. George Baines, architect, Greenwich-street, London, has been instructed to prepare plans for a Baptist church at Can't Hall-road, Leyton. The designs provide accommodation for 660 persons, and are in the Romanesque style.

## PRICES CURRENT OF MATERIALS.

TIMBER.	£.	s.	d.	¢.
Greenheart, B.G. .... ton	6	0	0	7 0
Teak, E.I. .... load	12	10	0	18 0
Sequoia, U.S. .... foot cube	0	8	6	0
Ash, Canada .... load	3	0	0	4 10
Birch " " " " " "	3	0	0	4 10
Elm " " " " " "	3	10	0	4 15
Fir, Dantsic, &c. .... ton	1	10	0	10
Oak " " " " " "	3	0	0	5 0
Canada " " " " " "	5	10	0	6 10
Pine, Canada red " " " "	3	0	0	4 0
Lath, Dantsic " " " " " "	3	10	0	5 0
St. Petersburg " " " " " "	4	0	0	6 0
Wainscot, Riga " " " " " "	2	15	0	4 15
Deal, Finland, 2nd and 1st. std. 100	7	10	0	8 10
" 4th and 3rd " " " " " "	6	0	0	7 10
Riga " " " " " "	6	0	0	8 0
St. Petersburg " " " " " "	6	0	0	14 0
" 2nd " " " " " "	7	0	0	8 15
" white " " " " " "	7	0	0	10 0
Sweden " " " " " "	7	0	0	15 0
White Sea " " " " " "	7	0	0	17 10
Canada, Pine 1st " " " " " "	17	0	0	30 0
" 2nd " " " " " "	12	0	0	17 0
" 3rd, &c. " " " " " "	8	0	0	10 0
" Spruce 1st " " " " " "	8	0	0	11 0
" 3rd and 2nd " " " " " "	8	0	0	7 10
New Brunswick, &c. .... ton	5	0	0	7 0
Battens, all kinds " " " " " "	4	0	0	12 0
Flooring Boards, sq. 1 in.—				
Pared, first " " " " " "	0	8	0	0 13
Second " " " " " "	0	7	6	0 8
Other qualities " " " " " "	0	5	0	0 7
Cedar, Cuba " " " " " "	0	0	0	0 34
Honduras, &c. " " " " " "	0	0	0	0 0
Australian " " " " " "	0	0	0	0 23
Mahogany, Cuba " " " " " "	0	0	0	0 0
St. Domingo, cargo average " " " " " "	0	0	0	0 0
Mexican " " " " " "	0	0	0	0 31
Tobacco " " " " " "	0	0	0	0 0
Honduras " " " " " "	0	0	0	0 41
Maple, Bird's-eye " " " " " "	0	6	0	0 0
Rose, Rio " " " " " "	7	0	0	10 0
Bahia " " " " " "	0	0	0	0 10
Bor, Turkey " " " " " "	5	0	0	18 0
Satin, St. Domingo " " " " " "	0	0	0	0 1
Porto Rico " " " " " "	0	0	0	0 8
Walnut, Italian " " " " " "	0	0	0	0 4

## METALS.

Iron—Pig in Scotland " " " " " "	0	0	0	0 0
Bar, Welsh in London " " " " " "	4	10	0	3 7
" " " " " " " " " " " "	4	6	0	4 10
" Staffordshire, London " " " " " "	5	15	0	8 10
Sheets, single, in London " " " " " "	6	10	0	8 13
Hoops " " " " " "	6	0	0	7 0
Nail-roads " " " " " "	6	15	0	6 10
COPPER—				
British, cake and ingot " " " " " "	4	10	0	45 10
Best selected " " " " " "	46	0	0	47 0
Sheets, strong " " " " " "	53	0	0	0 0
" India " " " " " "	44	0	0	50 0
Australian " " " " " "	47	0	0	15 0
Chili, bars " " " " " "	41	7	6	43 0



GRAVESEND.—For a fermenting room at the Welling-		
ton Brewery, for the trustees of the late Mr. Walker.		
Mr. Arthur Kinder, architect, Laurence Pountney Hill.		
Quantities by Mr. Alfred Howard:—		
Nightingale	£998	0 0
Muntlos & Wallis	780	0 0
Gates	780	0 0
A. C. Rayner	729	0 0
Goldfuch & Son	718	0 0
W. E. Wallis	711	0 0
W. Tuffee	699	0 0
W. H. Archer (accepted)	689	0 0

*Epitome of Advertisements in this Number.*

## CONTRACTS.

LONDON.—For enlargement of Messrs. Carter Paterson & Co.'s Depot, Deptford, under the superintendence

J. Twyford, Neasden ..... £1,875 0 0  
J. K. Coleman, Poplar (accepted) ..... 1,850 0 0

[illegible]



Collecting Business Promises.

**BANNER BROS. & CO. Sanitary and Ventilating Engineers.**  
11, BILLITER SQUARE, LONDON, E.C.



# The Builder.

VOL. L. No. 2354.

SATURDAY, APRIL 17, 1886.

## ILLUSTRATIONS.

Grand Staircase, Albany Capitol, U.S.	576-577
Design for a Town Mansion.—By Mr. E. Guy Dawber, Architect	580-581
The New Corporation Market Buildings, Birmingham.—Messrs. Osborn & Reading, Architects	581-585
Sculpture: "Cain, the Outcast" (Royal Academy Gold Medal Competition).—Successful Design by Mr. F. W. Pomeroy;	589
Design by Mr. G. Frampton	589
Memorial Fountain to Dante Gabriel Rossetti.—Designed by Mr. J. P. Seddon; Figure modelled by Mr. Ford Madox Brown	589

## CONTENTS.

Gray's Inn	585	Tapestry making	578	Case under the Metropolitan Building Act: What is a	593
Fine Old English Architect.	586	New York State Capitol, Albany: Grand Staircase	574	"White"	593
res Lectures to Artisans at Carpenters' Hall: The Influence of	586	Design for a Town Mansion	574	Stone Sawing and Milling Manufacture	593
Architecture on Carpentry	586	Corporation Market Buildings, Smithfield, Birmingham	574	The Student's Column: Our Building Stones.—VI.	594
he University and Cathedral City of St. Andrews	570	The Rosetti, Monument	574	Recent Patents	595
h. Thomas, Charlestown, School of Art	572	Sculpture: "The Remorse of Cain"	581	Recent Sales of Property	595
itary Organisation and Legislation: The Metropolitan	573	Drainage and Sewerage Works	591	Meetings	595
Sewage Question	573	Architectural Association: Indoor Architecture	591	Miscellaneous	595
he Congress of French Architects for 1886	573	The Building Trades' Exhibition	592	Liverpool Engineering Society	596
		Fulham Vestry-Hall Competition	593	Prices Current of Building Materials	596

### Gray's Inn.\*



who, at this distance of time, would discourse upon London of the past, should consider whether he shall write for the diversion, or for the instruction, of his readers. If he do not aspire higher than their easy entertainment, ample materials lie ready to his hand; and we shall scarcely be richer by yet another compilation like to those which Hare, or Thornbury and Walford, supply. So infinitely vast and varied a field tends before the genuine historian that we have long been of opinion that to produce a really valuable book an author must perforce confine his labours within some closely-drawn limits of research. Of such a book, and on such a subject, the latest example is open before us,—being a distinct and conspicuous advance in every respect upon the cognate chapters of W. Herbert's "Antiquities of the House of Court and Chancery."

In the choir of St. Paul's Cathedral the fifth right-hand stall appertains to the ancient prebend of Portpoole. That, with other prebendal manors, lay within Osulstone tithred. In his "History of St. Paul's" Dugdale names one Theobald as its first prebendary. The date of his collation, says Mr. Douthwaite, is not given, but he is supposed to be the same person who is mentioned as abbot of Essex in 1218 and again in 1228. The "streets of Holbourne and Portpoole" are said in the Fine Roll, 42nd Henry III. (1257);† 1st Parton, in his "Account, &c., of St. Paul's-in-the-Fields," tells us that the manor mentioned in a deed of 46th Henry III., whereby one Robert de Portpoole,—possibly then owner,—charges his house in St. Andrew Holborn parish, with 10s. yearly, to 1 a chaplain to celebrate his anniversary in St. Giles's Hospital church. We next find of Portpoole Manor as being vested in Greys of Wilton. Reginald, grandson to Mary de Grey, of Codnor, co. Derby, lived died here. According to an inquisition taken after his death (1st Edward II.) at Portpoole, he died seised of a certain messuage, 14 gardens, and with one dove-house, which worth by the year beyond reprise 10s. 6d., together with certain named thirty acres of arable land, valued at 20s. yearly, and a windmill,—whence Windmill-hill,—also Gray's Inn, its History and Associations; compiled from original and unpublished documents by William H. Douthwaite, Librarian. London: Reeves & Turner, 1885. 2s. 6d.

assessed at 20s. yearly, he is stated to have held of the Dean and Chapter of St. Paul's, in chief, by a service of 42s. 2d., payable at two terms of the year.\* John de Grey, his son and heir, was granted a licence in mortmain, under letters patent May 27th, 1315, to assign thirty acres of land, two acres of meadow, and 10s. rent with the appurtenances in Kentish Town and in St. Andrew Parish, without the Bar of the old Temple, to St. Bartholomew's-the-Great for a chaplain to celebrate daily service in perpetuity in the chapel of his manor of Portpoole. The existing Gray's Inn Chapel is credibly believed to mark the site of John de Grey's chantry. Subsequent inquiries go to show that the *Hospitium* in Portpoole remained in possession of the family. By an inquisition of 19th Richard II. taken after the death of Sir Henry de Grey de Wilton, knight, we learn that he had enfeoffed Roger Harecourt and others in fee "of his manor of Portpoole, in Holburne, called Greysyn . . . holden of the Dean and Chapter of the Church of St. Paul, London." And so, until the year 1505, when Edmund, Lord Grey de Wilton, conveys his manor, with the chantry, advowson, and all his possessions in the parish to Hugh Denny and Mary his wife, and other feoffees, some of whom were members of Gray's Inn, and eminent lawyers. Eleven years later, in the 7th Henry VIII., the survivors of these feoffees obtain a royal licence to alienate to Shene Priory "the manor of Portpoole, with the appurtenances . . . and four messuages, four gardens, one toft, eight acres of land, and 10s. rent . . . holden as an escheat for that Robert Chigwell, of whom the manor aforesaid and other the premises were holden, died without heir, by service, fealty, and the rent of one red rose." Mr. Douthwaite's inquiries into the connexion of the Chigwells with this property are of great interest, and will repay careful perusal. As touching the monastery at Shene, it appears that for some years the society continued to pay to the prior an annual rent of 6l. 13s. 4d. That rent afterwards passed to the Crown, and was eventually sold to Sir Philip Matthews, to whose co-heirs it descended. Having enjoyed for 200 years previously continuous and undisturbed possession, the Society purchased back again the fee-farm rent in the year 1733. Since that date our author triumphantly affirms that they have held and now hold the property unencumbered by any rent or other payment.

We have spoken of the old Temple. The Knights Templar on first coming to London were settled in Holborn, almost directly opposite to the now Gray's Inn gateway, for nearly seventy years. A reference to their sojourn in this quarter, succeeded by a migration to what

since became one of the four "great" Inns of Court, would complete the pretty picture given in the introduction to this book. Again, to his list of the Chancery Inns which clustered around Holborn, Mr. Douthwaite might have added Scroope's Inn, thus styled as being the original town-house of the Lords Scroope of Bolton, next eastwards to Ely-place. Under the name of Serjeants' Inn it passed, by an indenture dated the 8th of February, 1494, from Sir Guy Fairfax, of the King's Bench, to Sir John Scroope, knight, Lord Scroope of Bolton. Its memory,—as with that of the Old Temple,—was long preserved in Scroope's, latterly Union Court, over against St. Andrew's Holborn church.

The old-world chronicles of Gray's Inn as an Inn of Court, of the Readings, its famous Masques and Revels, of the Boltings and Moots,—these last have been recently revived, and with great success,—are all faithfully recorded. Quaint presentments of obsolete manners are afforded by the orders for regulating the conduct and apparel of the fellows and other members; to which may be added the practice of "chumming" in chambers. At a pension, held on July 9th, 1530, Sir Thomas Neville agreed to take Mr. Attorney-General, Sir Christopher Hales, for bedfellow. In the 21st Elizabeth it was ordered that "henceforth no Fellow of this House shall make choice of his bedfellow, but only the Readers." The personal associations of the Inn centre around the names of Chief Justice Gascoigne; the author of "De Naturâ Brevium" and of the "Grand Abridgement," Sir Anthony Fitzherbert; David Jenkins, the patriotic and loyalist Welsh judge; and the regicide Bradshaw; Riston, Camden, and Dugdale; Gardiner and Laud; Johnson and Goldsmith; the Cromwells and the Claypoles; Butler, Chapman, Cleveland, and Southey; and William, Lord Burghley (here best known, by the bye, as a genealogist). To these should be added Whitgift; Dr. Richard Sibbes, author of the "Soul's Conflict" and the "Bruised Reed"; Archbishop Usher, who, being then bishop of Meath, was admitted 26th Jan., 1623-4; Sir Nicholas Bacon, Lord Keeper, and his son, Viscount St. Alban. We cannot dwell herein upon the public life of one who united the loftiest intellect with so despicable a soul. Yet there is a fascination in tracing Sir Francis Bacon's intimate relations with Gray's Inn. Here together with his four brothers, he entered as student in November, 1576. Here he laid out what he himself terms "the purest of human pleasures, . . . the greatest refreshment to the spirits of man"; the same gardens, having at that time a clear prospect towards Hampstead, in whose good air Sir Roger de

\* Chanc. Inq. P.M. 1st Edward II., No. 64.



Coverley did love to clear his pipes, and whither Mrs. Pepys would repair to observe fashions of the ladies. Hence set forth the goodly procession which accompanied Bacon to Westminster when he became Lord Keeper; and hither he returned, broken in credit and fortunes, after his condemnation. In retreat at Gray's Inn he passed, mainly, the remainder of his life. As from his "chambers at Graie's Inn this 30th of January, 1597," he dedicates the first ten of his Essays; so hence, in later days, he gives to the world his "History of King Henry VII.'s Reign"; his "De Argumentis," an expansion of the earlier "Two Bookes of Proficience and Advancement of Learning";\* and his "Apophthegms: New and Old," besides completing the "Instauratio Magna," whereof the "Novum Organum" formed part.

The naturalist will welcome Mr. Douthwaite's notices of the rooks that yet revert to their pristine, though sadly denuded, haunts; as well as of the carrion crows who can boast of a pedigree which dates back, in all likelihood, to well-nigh three hundred years since. Cuckoos, jackdaws, robins, and wrens, rank as smaller, though by no means lesser, favourites, whilst their more tuneful brethren share refuge amongst the planes and sycamores that are often rendered vocal with the notes of the thrush. A detailed category of the several emblazoned charges which adorn the Hall windows appeals forcibly to students of genealogy and heraldry. Some coats are known, *testibus* certain cited MSS., to carry us back to Queen Elizabeth's reign. Her portrait hangs over the high table whereat her pious memory is solemnly invoked beneath their parti-coloured light. A comparison made with a list of the armorial bearings engraved for the *Origines Juridicales* shows that particular escutcheons, as prefigured in Dugdale's work, have altogether disappeared. Moreover, "from an heraldic point of view many of these coats have a special value, in being assigned to individuals who bore arms somewhat different from the blazons given in heraldical dictionaries." Such discrepancies may be partly owing to an incorrect re-fixing of much of the ancient glass which, and notably at the eastern window, has suffered grievously from time to time through tempest or other disaster.

Mr. Douthwaite says that Bacon's chambers were in the building now "known as No. 1, Gray's Inn-square." Thus also Basil Montagu. There is, however, a tradition that Bacon occupied a large house opposite to the great gates in Field-court, whither Fulke Greville would frequently send him some home-brewed beer from Brooke House in Holborn.† Lord Campbell's statement, in his "Lives of the Chancellors," that Bacon's rooms remain as they were during his tenancy, and are still visited by those who worship his memory, should be read with a passage in the "Historian's Guide," third edition, 1688, to the effect that the house (site of No. 1, Gray's Inn-square) and sixty other chambers were burned down on February 17th, 1679. Mr. Douthwaite does not mention this particular fire, though he tells us that the greater part of Coney-court was destroyed by fire in 1683-4 and rebuilt in 1687. This is the Coney-court of the Survey of 1688, which, with the Middle, or Chapel-court, occupied the area known since 1793 as Gray's Inn-square. From Strype's "Stow," edit. 1720, quoted by Mr. Douthwaite, it is clear that Coney-court was the more northern of the two. A plan of 1720 shows no division (east and west) between these two courts, north of the Chapel and Hall. So, looking to the present site of No. 1, Gray's Inn-square, we conclude that Bacon lived in Chapel, but known in his time as Middle, court. South-square was formerly Holborn-court; a reference to the "Pickwick Papers" will show it was known as Holborn-court less

than sixty years ago. Plans of the former buildings, if, indeed, they are to be found,—that is to say, to a much larger scale than the view in the map by Ryther, of Amsterdam, 1604,—would make a useful complement to the pleasing modern-day illustrations contained in this volume. The Hall was built in 1556-9, and deservedly ranks next, in London, to those at Charterhouse and Middle Temple for the beauties of its screen and open roof. Like to that of Lincoln's Inn, the red brickwork and stone dressings of its exterior are defaced and hidden by compe and tasteless appendages. It contains, we have observed, a picture representing its former state, with the original and characteristic lantern. In congratulating Mr. Douthwaite upon his able treatment of a worthy theme, we think the Society are equally fortunate to possess a librarian who can put to such good account the copious materials at his command.

#### A FINE OLD ENGLISH ARCHITECT.

**I**N these days, when the happy student is solicited by so many aids to study and advancement that he may almost be said to glide by easy gradients to the Temple of Fame, rather than ascend the sacred hill by toilsome effort, it may not be impertinent if we outline for him the history of an architect of the olden time, when encouragements to art were scanty and discouragements rife, and when self-reliance was the only road to success.\*

Born in 1787, John Dobson was apprenticed at fifteen years of age to a builder, where he learned to make a plan, and acquired some practical acquaintance with builder's work, filling up spare time by studying land surveying, and receiving from a versatile Italian refugee instruction in the curiously various arts of fencing, enamel-painting, and perspective. Betaking himself to London, he sought instruction in art from an eccentric painter, who would only engage to give lessons at five o'clock in the morning, at which early hour our ardent young student never failed to present himself. Returning to his Northern home, he boldly started as an "architect" finding, as might have been expected, little or nothing architectural to engage him, and occupying himself in "painting scenery for the local theatre,—the school of so many English artists. Meanwhile, he sketched and measured old buildings assiduously, and in an age when Gothic architecture was considered merely barbarous, gave his heart to the study of all the Mediaeval remains in his neighbourhood, "rising constantly at four or five o'clock," and working frequently till midnight. A strange, lonely, courageous life, this earnest student led, without immediate aid or helpful appreciation, but destined to be rewarded thereafter by deserved success.

Architects were not wanted there and then because their functions were not understood and their proper duties were usurped by builders. It is not without an involuntary moistening of the lips that one can in these days of fierce competition read that in our young hero's time there was but one architect between York and Edinburgh. A certain Mr. Payne, of whom history has hitherto been strangely silent, was, it appears, after Sir John Vanbrugh, the architect of the North of England. He seems to have been employed by the nobility and gentry, and to have run off his designs in an easy-going manner, fluently, and upon a uniform plan. Entrance in centre of south front. Hall in centre, staircase opposite, drawing-room on one side, dining-room on the other, library behind. This artful arrangement was thought to be so suitable and perfect that the honest English squires would, in their simple way, order a house of their builder "on Payne's plan," with rooms of such and such a size. But the houses built by the ingenious Mr. Payne had one drawback, they were draughty and cold,—too trying even for our hardy fore-

fathers. The rough winds entered them unopposed; coursing round their vacant halls they blustered up the stony corridors, and swirled around the domestic hearth, in wintry gusts.

Our friend saw the weak point and it remedied. He turned the entrance away from the principal view and screened it by shrubs and trees, defended his halls by porches, and by lobbies and "air-traps" he restored tranquillity to the fireside and the domestic temper,—abating and allaying breezes more than one description. He was soon called upon to remodel Mr. Payne's work, and as his fame spread abroad, was entrusted with new buildings of importance, in the erection of which he was so happy to give unvarying satisfaction to his clients. By dry areas and hollow walls, of which it may be said to have been the local inventor, he still further improved the sanitary quality of his houses, and his instinctive love of a and patient study of ancient examples enabled him to improve in picturesqueness the somewhat frigid and formal structures of his predecessor. The castles, mansions, and private houses which were either built or enlarged by him form a goodly list. But he was equally active in other directions, actually building Gothic churches before later lights had begun to study them. With the growth and consolidation of his fame he was beset by commissions of all sorts,—railway station-prisons; characteristically qualifying for attacking the former problem, then a new one, spending three days in mastering the details of the routine of railway life, and for the latter by friendly conferences "with more than one noted burglar." The remodelling of his native town, and the erection of its principal streets and public buildings, fell naturally to him, a his sound knowledge of the values of property and his known integrity, combined to bring him a vast amount of arbitration and such lucrative employment. His first great work was the rebuilding of Seaton Delaval after destructive fire; and it is curious that a second fire caused a second reconstruction which proved his last professional work. His long, honorable, and useful life has been well written by a daughter's hand, who is unwilling that the history of her father and his work should be unrecorded. She has performed her task with remarkable skill, tact, judgment, and has shown an acquaintance with technical and professional details which could scarcely have been expected even from an architect's daughter. Her book will not, without its usefulness, and we can only regret that it has not been found possible to illustrate her father's numerous works. His portrait conveys the idea that he was a shrewd, genial gentleman, and of his great ability there is no question. He died in the seventy-seventh year of his age, and the daughter, who admired and loved him so much, has unconsciously written the epitaph an architect would perhaps most desire to merit. "He never exceeded estimate, and never had a legal dispute with a builder."

#### NOTES.

**F**URTHER particulars are now in hand in regard to the competition for a new façade to Milan Cathedral, which has been ordered possible by a legacy left with the object by a citizen of Milan, the late Sig. Aristide de Togni. The competition is open to the world, and the Directors of the Cathedral have, in a spirit too rare now-a-days, placed no limit on the cost, the object being to secure a great work regardless of pecuniary considerations. Architects are free to add "whatever, in their judgment, is best adapted to suit the historical and artistic renown of the Cathedral," change the number, form, or size of the openings, or advance the façade beyond its present line,—so far, at least, may not interfere with the traffic of the Piazza,—but they must conform to the style and material of the building, and the width of the nave and aisles. The jury will consist of the Director of the Cathedral, who will preside

\* First published, in one vol., 4to., price 10s. 6d., at the Holborn Gate by Henry Tames, 1866. This gate was opened in 1592.

† The tenement at what is now the north-western corner of Falmouth's Rents is possibly old enough to have originated this belief. Its aspect is certainly more ancient than those of its neighbours.

\* Memoir of the late John Dobson, M.R.I.B.A., of Newcastle-upon-Tyne. By Margaret Jane Dobson. London: Hamilton, Adams, & Co. Newcastle-upon-Tyne: Lambert & Co.



member of the clergy; four architects, French, German, Italian, and English, chosen by the "Accademia di Belle Arti" of Milan; a painter or sculptor and an architect, chosen by the Municipality of Milan; a Fellow of the Royal Lombardy Institution of Science and Literature; an architect chosen by the Commission for the Conservation of Monuments in the Province of Milan; an engineer and an architect chosen by the Royal College of Engineers and Architects in Milan; and four artists, two architects, one painter, and one sculptor, to be elected by the votes of the competitors of their agents in Milan, under regulations to be learned from the official paper of instructions, published by U. Hoepli, bookseller, Milan. Designs will be received between the 10th and 15th of April, 1887 (under motto), and after a public exhibition of them, the jury will select from ten to fifteen for a second competition. In this second competition 40,000 francs will be given to the author of the design considered worthy of execution, half down, and if after he has worked out the detail and made a model in relief. Other prizes, three of 10,000 francs, three of 3,000 francs, and others of 2,000 francs, will be given according to merit. There is a great opportunity; but a word of warning to ambitious young English architects: they will find the commission will certainly go to an Italian architect.

HERE is still a great deal to be done in the Indian and Colonial Exhibition, the majority of the colonial portion being still in very backward state, and presenting in many parts only the outward and visible sign of refusal of packing-cases. But the Indian department is in a sufficiently forward state to render it evident that this portion at least will be one of the most charming and interesting exhibitions that has been seen in London. The great avenue of the Exhibition is lined with examples of elaborately-carved woodwork in the shape of house and shop fronts and balconies and windows, showing a variety of useful workmanship such as ought to open the eyes of English artisans, who are not accustomed to have anything like this demanded of them even in the work on what are intended to be first-class houses. Opposite the entrance-way of the Old London Street, which remains as an example of the style of our own time, is erected the marble gateway from Gwalior, which was formerly in the Calcutta Exhibition, and was sent over here as a present from our Government from the Maharajah of Gwalior, and, as we have previously remarked, was suffered to lie in matting in a corner of the ground outside the South Kensington Museum for a couple of years. It is a piece of work, and makes a curious and pleasant contrast to the plain and comparatively clumsy architecture of the Old London Street Gateway. The Gwalior Gateway gives access to a reproduction of the courtyard of an Indian palace, which deserves a good deal of finishing yet. The plan section is in a tolerably advanced state, and the walls have been decorated in a characteristic and effective manner, with vertical stripes of black and yellow alternately, decorated by stencilling. It is curious to notice things repeat themselves. Among the Indian fronts are many details having to do with Greek or Renaissance architecture, in one place we noticed the Greek "keys" ornament in its purity; while the African Court is a barbaric wooden stool the surface of the seat covered with an ornament of hatched lines in squares and ovals, so exactly like the decoration of the archaic vases in the British Museum Vase-room that it might have been taken from them. At the top of the central air avenue a great canvas is stretched over two circles on it prepared for a map of the world's colonies and dependencies, and over the five clock-faces marked respectively "Ottawa," "Cape Town," "Sydney," and "London," and intended, we presume, to show, when completed, the time at the same instant in these five places; a statistical argument, whether intentional or

not, in favour of that adoption of a single "world-time" of which a good deal has been said recently, and which will assuredly be adopted sooner or later. As far as any of the Colonial work is up, it is melancholy to see how on coming to it from the Indian galleries all beauty and art and taste seems to disappear. We enter the New South Wales section through a temporary arched erection of the weakest and most commonplace Renaissance detail; and in the court allotted to Victoria the principal central object so far is a great trophy of biscuits behind glass cases, forming a kind of obelisk in lessening stages up to the roof. Thus the English origin of these colonies aesthetically asserts itself.

THE great iron roof of the National Agricultural Hall, designed by Mr. Am Ende and Mr. Walmisley, which is now in process of erection, will be one of the most remarkable constructions of the kind. The whole width of the hall is 250 ft., of which 40 ft. on each side are occupied by the aisles with low roofs, and the semicircular roof over the centre space has a span of 170 ft. The principals are semicircular lattice ribs of 7 ft. depth, springing from cast-iron columns, which are treated on a new method, the connexion with the principal at the head, and with the base plate, being made by a ball and socket bearing, so that the column will have free play in regard to any expansion and contraction of the roof. The abutment for the principals, which are in reality iron arches rather than girders, is formed by the framing of the iron trussing forming the constructive portion of the side aisles, which is again based on a subterranean truss bolted to the baseplate of the column and carried down into a deep trench across the width of the side aisle, which will be filled up with concrete in a solid mass surrounding the iron truss or subterranean cantilever, as it may be termed. Any thrust from the haunches of the arched girders is further provided against by a member between the horizontal and raking members of the aisle roof, the raking member taking a bearing on the top of the  $\Lambda$ , the inner leg of which is in tension (in the case of any thrust) and is bolted down to the horizontal girder of the aisle. The roof is thus entirely independent of the brick walls, which are mere enclosures. The first of the arched principals is nearly complete now. An immense travelling-stage, comprising 1,000 cubic feet of timber, has been erected, wide enough to take two principals (34 ft. apart), and high enough to admit of the manipulation of the upper sections of the principals by a travelling-crane on the top of the staging. Considering the great span, the roof is wonderfully light in appearance; the strain on every member has been carefully calculated so as to avoid any unnecessary "margin," and the result is a roof which will be exceedingly strong and stable without any appearance of massiveness, which, in the case of ironwork on a great scale, is a consummation to be wished, though architects would not wish to apply the same principle, perhaps, to masonry or brickwork. We only regret that a concession to a mistaken idea as to the employment of ordinary architectural forms will lead to spoiling and falsifying the effect of the best and most original point of the work, the treatment of the columns. The appearance of these, with their ends tapering to the ball and socket bearings, is, in fact, both elegant and scientific, this genuine piece of scientific engineering is to be masked by the application of foliated capitals, which are quite unsuitable in form for treatment in iron, and which will conceal the real nature of a very clever piece of construction, and render it commonplace as well as deceptive in appearance. We very much wish that the architect and the engineers concerned would, even at the last moment, reconsider this point, and have the boldness to treat the construction as what it really is, and not what it is not and could not be.

THE report on the Boiler Explosions Act, 1882, for the year ending June last, has lately been laid on the table of the House of Commons. It appears that inquiries were held

into forty-three explosions, in which explosions forty persons were killed and sixty two were injured. Of these accidents, twenty were caused by deterioration or corrosion of boilers and safety-pipes, and eleven by defective design or construction; four were from shortness of water, four from ignorance or negligence of attendants, and four arose from miscellaneous causes. It is clear from this that thirty-one explosions out of the whole forty-three, arose from the proper repairs not being executed by the owners of boilers, either from motives of economy or from mere carelessness. No censure can be too strong for owners who risk the lives of workmen as if they were not worthy of thought. Thus in regard to an explosion of a boiler at a certain Mr. Jones's brick-works, at Broad Green, near Liverpool, the inspector remarks, "Although no one happened, fortunately, to be killed, I look on this explosion as one of a very serious nature, and for which, with its attendant risks, the owner was solely responsible. He must have been aware of the responsibility he incurred in working an old boiler without proper supervision, and he persistently ignored the insurance company's repeated warnings." In another case, "the boiler was worn out, and unfit for any pressure whatever." It is, therefore, not surprising that the boiler blew up, killing one person, and wounding a boy and a woman, who seem to have recovered from their injuries. Fortunately or unfortunately, the person killed was the owner of the boiler, who must have, probably for the sake of saving the cost of a new boiler, preferred to risk his life every day on which the boiler was used. It is to be regretted that, in spite of the publicity given to these inquiries, there were two explosions more which had to be inquired into in 1884-5 than in 1883-4. But we fear that the cupidity or the rashness of men will always cause a certain number of these and similar misfortunes.

THE case of Harris v. De Pinna, on which we commented in a recent article in regard to the meaning of the word "building" in respect to the law of light, came before the Court of Appeal last week. This court, however, did not think it necessary to consider the word "building," it being sufficient for their decision that the light had not been continuously enjoyed in a definite mode through the same apertures. It may be remembered that the structure in respect of which the light was claimed was practically no more than a roof with floors beneath and open sides, which was used for the purpose of storing timber. It is stated in Roscoe's "Digest of the Law of Light" that "the right to light means such an amount of light over the servient tenement through an aperture or apertures in the dominant tenement as is sufficient," &c.; this proposition will therefore now be further supported by this recent decision of the Court of Appeal, which, taken together with that of Mr. Justice Chitty, will put an end to claims in respect of structures which are not actually houses, shops, and similar substantial and walled-in buildings.

THE system of propelling sewage through pipes by means of compressed air, in substitution of the ordinary method of pumping, seems to be extending. The Local Government Board has just given its sanction to the construction of a separate scheme for the disposal of the sewage of Heston, Isleworth, and Hounslow, at a cost of 77,000*l.*; and one of the principal features of it is the adoption of this system of sewage propulsion in the low level areas of these districts. At the recent Hounslow Inquiry of the Local Government Board some strong evidence by experts was given in favour of this compressed-air system. It was stated that this mode of sewage propulsion obviates the necessity, the risks, and costs of deep gravitating pipes; while the system operates as an automatic flusher. It is asserted that the ejectors, by the velocity with which the sewage is propelled through the pipes, prevent those accumulations of decomposing matter which are at the root of all the difficulties and evils in connexion with the problem of sewer ventilation. The system which has



just been adopted in Hounslow, and which has been in operation at Eastbourne and Warrington for some time, is that in which Shone's Pneumatic Ejector is used.

WE learn from the *Gazette Archéologique* that M. Ravaisson has presented to the Académie des Inscriptions et Belles Lettres a cast reproducing a mould (made in Roman cement) of half of the beautiful slab from the Parthenon frieze, the original of which is in the Louvre. The great value of the mould consists in the fact that it was taken at the time when M. Choiseul was ambassador, &c. in or about 1785. At that time the original slab was in far more perfect condition than it is at present. The mould restores to us two of the heads of the maidens and some details of drapery. It is much to be wished that a cast from this mould should be exhibited near the original, in Paris, and, we may add, near the cast which replaces the original in the British Museum. The mould was found in England.

THE Marlborough Art Club "consists of some fifty members, who are all, more or less, united in their art sympathies," and have associated themselves together with the view of holding an annual exhibition, for which purpose they have engaged the old room of the Institute of Painters in Water-colours, in Pall-mall, now called "The Marlborough Gallery." The first exhibition, now open, conveys the idea that the general tendency of the Club is towards "impressionism," so far as that indicates a view of art which attaches more importance to general composition and colour than to finish or detail. We should imagine a considerable French influence pervaded its members. But the exhibition is no common-place one, at all events; the average standard is high, though some of the pictures are much too large for their subject, and Mr. La Thangue's "In the Dauphiné," besides this defect, appears to us to be only a bare repetition of Manet. Mr. H. S. Tuke's "The Bathers," some boys partly in shadow and partly caught by sun-light over a rock by the sea, is a capital study of its kind. There is a great deal of point and feeling in Mr. Gogin's "Soothsayer," a wizard "space-ing fortunes" in a crystal globe, watched with intense earnestness and apprehension by the object of the inquiry. Mr. Tuke's "Basking," a lad lying on the seashore in bright sunlight, is very successful in giving the effect of bright light, though not otherwise interesting. Mr. Bartlett's "Venturesome," a young girl seated on a rock, preparing to slip into the water, is a very pleasing study in the same category as Mr. Tuke's "Bathers," realistic in a sense, but not in a mere mechanical sense, and very graceful. Mr. Goodall's "Last Load" is a reminiscence of Millet, to some extent. There are a good many reminiscences in the gallery, but some of them are not the worse for that. Mr. Sargent's "Portrait of Mrs. Barnard" is an example of the smears school,—not without character, but simply suggesting the notion that it is a first sketch for a portrait never completed. What purpose in art is gained by painting a dress, or, rather, indicating it, so that it looks palpably like a mass of paint and not like a dress? "The picture would have been better painted if the painter had taken more pains," is the criticism one naturally thinks of here. Where did Mr. Steer, who paints a musical group called "Andante," see a girl with so small a head as she who plays the violin? "Hard Times" and "Waiting" by Mr. Fred. Brown, should be looked at, and there are other small character-paintings of interest. Mr. Gotch's very ambitious allegory, "Destiny," is a mistake; the poetic nature of the subject only calls attention to the prosaic character of the figures. But the exhibition is a distinctly interesting one, and represents some tendencies in the painting of the day which can hardly be said to have a recognised place in the other contemporary exhibitions in London.

WE have before referred to Mr. Muir's remarkable series of fac-simile reproductions of Blake's engraved poems which are in

course of publication by Mr. Quaritch. The copy of the "Milton," the last published of the series, is before us,—one of the longest of Blake's illustrated poems, and containing some of his most powerful, and also some of his wildest, work in the illustrative plates. The illustrations here differ very much from those of the "Songs of Innocence and Experience" and the "Book of Thel" (which, we hold, will always remain Blake's central and most typical works of this class); they are much less pictorially beautiful, and are in a very different manner; some of them are in a curious combination of line shading with colour over it; but the principal ones are of great power and even sublimity, in despite of the peculiar defects of drawing characteristic of their author. There is one showing two figures asleep on the rocks by the margin of the sea, with an immense eagle hovering over them, and a weird unreal light pervading the whole scene, which is one of the most extraordinary designs Blake ever made. What it means who can tell?—but, then, the meaning in the literal sense is of no consequence; it is a sublime conception, and may suggest its own allegory to each observer. Another very powerful design is the one on page 15, of which the general allegorical meaning is obvious enough: a nude figure goes up to grapple with an aged figure, who rests his failing hands on two stones inscribed with mystical characters; this obviously represents the emancipated man putting down the reign of old law and custom; above is a kind of procession of the emancipated ones amid rays of light, playing on various instruments and dancing. The design illustrates the idea which runs through all Blake's strangely-expressed philosophy of life and art, that nature is holy; it is the tyranny of laws and customs that fetters and debases mankind. Few purchasers will read through the "poem," which is in the picturesque but crabbed writing which Blake employed for these engraved poems, and is rendered more decorative, but more difficult of perusal, by the shading and colouring behind the writing and the numberless little sketches and ornaments with which it is interwoven. It contains, however, very grand passages amid much of "wild and whirling words," and the preface, with the beautiful little poem attached to it, is worth every one's reading. The first portion, in prose, is a protest against unimaginative worship of precedent in art, and the running after commercial success. "O young men of the new age, set your faces against the ignorant hirelings. . . . Painters, on you I call! Sculptors! Architects! Suffer not the fashionable fools to depress your powers by the prices they pretend to give for contemptible work, or the expensive advertising boasts they make of such work. . . . We do not want either Greek or Roman models if we are but just and true to our own imaginations, those worlds of eternity in which we shall live for ever."

MR. TRISTRAM ELLIS'S exhibition of water-colour drawings illustrating the watering-places of the Channel, which is now to be seen at the Goupil Gallery in New Bond street, has a popular as well as an artistic interest. Mr. Ellis is well known for his drawings of Cyprus and other parts of the world, but we think that the present exhibition will considerably add to his reputation. The versatility which these drawings display is very remarkable and very gratifying, when so many capable artists seem satisfied to work altogether in one groove. To take two instances at random: No. 38 represents the Butterwalk, Dartmouth, a drawing of some old houses built about 1620 on granite pillars. But this is not a mere architectural drawing; Mr. Ellis depicts the Butterwalk on a soaking wet day,—it might well be entitled "A Wet Day," so much is it a study of rain and atmospheric effects. The next drawing to it, No. 39, is "A Rising Sea, Dawlish,"—a study of waves and foam warning us of the coming storm. Here, then, are two drawings quite in contrast, and the entire exhibition is illustrative of this versatility.

THE galleries in the British Museum, the former bird galleries, which were re-opened the other day, are now filled with a very interesting collection of work, including some fine cases of Chinese porcelain, a large collection of arms and armour, and a number of examples of barbaric art-work from various parts of the world. The general arrangement and style of the collection suggests South Kensington rather than the British Museum. It is a relief to have got rid of all recollection of the stuffed animal department, and to see the great central museum occupying its proper function as a repository of art and archaeology.

WE desire to draw attention to the correspondence, printed in another column, in regard to the Fulham Vestry-hall competition, on which we will leave those interested in the subject of architectural competitions to make their own comment.

#### FREE LECTURES TO ARTISANS AT CARPENTERS' HALL.

THE INFLUENCE OF ARCHITECTURE ON CARPENTRY.

THE last of the present course of free lectures, which have been inaugurated by the Carpenters' Company, was given on Wednesday, the 7th inst., in Carpenters' Hall, by Mr. Banister Fletcher, M.P., F.R.I.B.A. He said:—My subject is the actual work of carpentry in all ages, and its action and reaction upon architecture. The faculty which both architect and carpenter must each possess in order to attain excellence must be the power of earnest thought on his work. The architect's is the inventive quality of art, the carpenter's is the actual work. The artist's pencil and the carpenter's tools, though wielded with the utmost skill, would, in the absence of earnest thought, produce but poor and imperfect results. Technical education has its limits; like the notes of an organ, its tones are fixed, and these can be learned to a degree of excellence by all; but to produce a new design or original thought could never be arrived at by simple study, however closely applied. Turning a moment to consider the birthplace of architecture, it would be seen that a primeval civilisation, like the faculties of childhood, could necessarily only conceive simple ideas, and these were converted into the first tangible forms of construction. The rapid architectural development of the earlier nations must be ascribed to the constructive faculty of mankind; but the epoch of simplicity of construction gradually yielded under the dominion of forced requirements, stimulating the forerunners of the art to increased efforts. The first efforts of plait, post-and-rail construction gave place to a more homogeneous mode of building, and, bit by bit, construction more or less rude, was, from time to time, added, the material essence of nature being lost by material coverings and symbols. The instinct of construction is as common to men as to animals, and is undoubtedly the origin of architecture. It is, to my mind, extraordinary how, in all discussions on this subject, both in the present and the past, how much this has been overlooked. See how the beaver builds a house, whose construction, when analysed, is even from a carpenter's point of view, simply wonderful in its applied use of material. With this instinct, man himself can claim kinship, and from this desire to shelter himself and his offspring proceed the first germs of construction. Man, having satisfied the natural craving for a mere shelter, commenced his first efforts at architectural embellishment, which, of course, though naturally primitive, were purely the outcome of nature and her surroundings, and these, to a great extent, dominated its votaries in these early times, and even in a later period when rapid strides had been made towards perfection; and I think, even in these late days, advantage might be derived from a little more attention being paid to the sources from whence sprang the germs of architecture. In early buildings, the carpenter held an important place and he was, in fact, the architect, with this advantage over modern ones, that he himself put his ideas into execution, so that you have the actual impress of the man's thoughts shining out through his works to all ages, speaking in a way that no other form could tell; for who can give such loving care to a mould or framing as he whose mind first thought it out? It is



like the difference between a picture by a great artist and a mere copy of the same, for the latter, however clever, can never give it that nameless something which stamped it with the impress of a master-mind. After the final decay of architecture in its Southern birth-place, a new creation arose in its Northern borders, and it was to the new creation we owed the roofs of modern Europe. During this period the art of carpentry advanced by leaps and bounds till we stood gazing with wonder on the marvellous beauties of construction left us in many a wide-spanned roof of church and hall. These were no formal copies of the work of preceding ages, but the pure outcome of earnest thought brought to bear on its new conditions. What the debt of gratitude is that we owe to these earnest workers and thinkers of the past (synonymous terms these in many cases), we cannot tell until we have searched through the various musty documents of the past treasured up as heirlooms in many a lonely monastery, showing the loving hours that were expended on these works by those long-forgotten monks. During the Norman period the roof, though plain, was often open to the actual frame timbers. It was evident, from the weather-mouldings, which frequently remained to this day on Norman towers, that the outer roofs of this style were often of a high pitch, but sometimes they were very low. They appeared to have had generally, if not always, the beams placed very near together, on the under-side of which a flat boarded ceiling was perhaps made. It might be doubted whether any example of this period now remained, though we have sufficient evidence to show what they were in several instances. Portions of some very remarkable wooden roofs of this style remained at Oakham and at the Bishop's Palace, Hereford. Of the Early English style few roofs still remained in country districts, specially in Sussex. They were of steep pitch, and either cantled or of a circular form like a barrel-vault, and had generally tie-beams. Alesowen Church, and one of the aisles of Rochester Cathedral, had roofs with moulded beams clearly of Early English character; and Old Shoreham was a tie-beam with the tie-beam ornament on the original circular braces, coming to the Perpendicular period, we find Westminster Hall one of the finest specimens of a large span roof. The principals were here made into a sort of trefoil arch, and the interstices of the framing were filled with panellings; there were also arches from principal to another. Of the same class were the roofs to Crosby Hall, and Christ Church, Oxford; but this style of roof was not common in churches, where the flat, or nearly flat ceiling, was more usual. Half-timbered houses were frequently erected in the Perpendicular period, both in this country and in Germany and France. The houses of the richer burghers were often constructed in this manner, and were enriched with ornamental carving, in woodwork, while not belonging to art of very high order, being generally entirely executed by the carpenter; was pervaded, as a rule, by a peculiar charm. In our own country, specially in Warwickshire and Cheshire, numerous picturesque specimens could be seen, and a holiday would be well and pleasantly spent in studying the examples remaining in Warwick, Coventry, or Cheshire, and Lancashire. In most cases, if the works were minutely examined, they would be found to bear the impress of real artistic work, rightly applied, although many instances these were purely the outcome of the individual workman's ideas. However much work had been lavished on a building, seldom was the same moulding, stop, or ornament employed throughout, and this constituted the real charm of the treatment. In order to show the advantage of living among and studying these works, I call attention to a moulded end to beams, both the outcome of the workman, independent of architectural control, both taken from buildings erected in Warwickshire. The one, which is refined in its taste, was taken from the neighbourhood of Leicestershire; the other, debased and clumsy character, was surrounded by stucco and sham work. Much in the same way architecture always affected carpentry, and I consider that it is only architects working up to a high standard of art, that the workman could improve himself, by discussing these wooden house-fronts, roofs, and other huge pieces of mechanism, which depicted in boldness and variety, it should not be

overlooked that the abundance of oak timber in the North of Europe both suggested much of this art, and admitted of bold features of construction from the size of the logs and the tenacity of the material. Timber was in the fifteenth century to be had at low prices and in any quantity, whole cities being mainly constructed of timber. The houses were framed together with posts about 1 ft. 4 in. square in section, arching outwards and meeting the projecting floor timbers, and so with the upper stories. In the Rows of Chester an open gallery or passage was left in the first floor within the timbers of the house-fronts. Projecting oriels often jutted out from these overhanging stories, and the spaces between these framing-pieces were filled in with laths and mortar, or in later years with glass. In London, Rouen, Blois, and Coventry the angle-posts were occupied by niches having statues in them, or fifteenth-century window tracery was sunk in the surfaces. Most of the ornamental work to the early half-timbered houses was, however, confined to the ends of joists, beams, and posts, and it was not till a later date,—about the sixteenth century,—that the panel spaces were filled in with ornament, having nothing to do with the construction, and in some cases not improving the beauty of the work. Architecture, having now reached its zenith, seems to have entered into a period of torpor, when everything that was good seems to have slept, even if it had not entered upon a downward course, which once entered upon is so difficult to stop. "*Facilis descensus averna*" is a well-worn quotation, but still, nevertheless, very true. From this fatal decay of power it had at last awoke, and if not able in its new development to produce anything new or original, it had, at least, the merit of seeing and utilising all that was worth preserving in the past, and its very eclecticism has a beauty of its own, the outcome of which perchance may be a new style and a new power. I will, in the next place, consider carpenters' work in furniture, both ancient and modern, with a view of inquiring if even in this branch of work the carpenter had not had some share in aiding the cause of architecture. In the British Museum are preserved some Egyptian chairs which, from the simplicity of their construction, are well worthy of a visit, putting aside their wonderful preservation after the lapse of centuries. Another old piece of furniture is St. Peter's Chair, at Rome, and this old piece of work, though at times repaired, still retained much of its ancient character. During the sixteenth century especially, furniture possessed an architectural character in its outlines. In the fifteenth century, chests, screens, stall-fronts, doors, and panelling followed or fell in with the prevailing arrangements of architectural design in stone-work, such as window tracery or wall tracery. But in the sixteenth century furniture of architectural character, not proper to woodwork for any constructive reason, was imparted to cabinets, chests, &c.; but I will not dwell on this, as you have recently had the advantage of seeing the charming drawings at the lecture given here by Mr. Statham. They were artificially provided with parts that imitated the lines, brackets, and all the details of Classic entablatures when these had constructive reasons, but which, reduced to the proportions of furniture, had not the same property. These sub-divisions brought into use the art of "joinery." As the vigour of the great sixteenth-century movement died out, the mania for making furniture in the form of architectural models died out also, nor did it again become the fashion until quite modern times, under the Gothic and other revivals, at the end of the last and the beginning of the present century. The architectural idea was in itself full of grandeur, and the production of very beautiful examples in the sarcophagus-shaped chests or cabinets, but the façades of temples, the vaults, columns, and triumphant arches of Rome would not bear reduction to such small proportions. With the introduction of marquetry into more general use, there was apparent not only a new or renewed method of decoration, but a changed ideal of construction. Pieces of furniture were no longer subdivided by architectural mouldings and columns; all such meant extra work added to the sides and fronts. I ask why modern carpenters have not taken in hand some of the work required in designing and executing furniture. At no period had there been such a demand for good,

sound, solid, and substantial work in this direction, work, in fact, well within the carpenter's domain, and a large field was open to the craft in the future. Why should not the hall furniture of a modern house fall entirely to the share of the carpenter? I exhibit some hall furniture designed for my own residence, and which I had executed solely by carpenters some seventeen years ago. They had thus seen in their survey of art, as far as traced, a continual progress of human ideas and conceptions, beginning with evolution, followed by imagination, and completed by adaptation. When we look from our present standpoint of critical examination as to the real manner and use of the various means of construction, it must be counted an anachronism that our predecessors of the last century, incapable of comprehending the true spirit of preceding ages and the principles on which their work was based, should have been so fond of reproducing archaic forms of construction, false alike in art and principle, and unsuited to a material in which they wrought. The error into which they fell was that they attempted only to reproduce the forms of older work without regard to its spirit. What we wanted was the love of truth that animated the workers in olden times, and when we had mastered the first principles of such a revival we should be on the high road to success. The designer should so use every material dealt with as to bring out its distinctive properties. One great and too common error was that of not letting well alone. How often did we find a well-moulded beam spoiled by the addition of meretricious ornament, having nothing in common with the member itself, and injuring by its presence what it was intended to enhance. As a result of the spread of technical schools, art is, I am pleased to notice, making its influence felt in our workshops, and I am hopeful that in the not far distant future our workmen would take their right place in the hierarchy of art, and a better understood connexion between the arts of construction and design would assuredly be the outcome. More than anybody, the carpenter had greater opportunities in the present day of improving his knowledge. Nearly every modern roof proclaimed the fact from the house-tops. The roofs of our Georgian forefathers were perhaps nearly without exception the most unobtrusive fragments of a shanty age. Concealed between lofty parapets from without, and by lath and plaster work went on hand in hand unchecked; but a change for the better had now opened, and instead of seeking to hide his work, each architect vied with another to show more and more both of the roof and its construction. No one could deny that the change was for the better. The man of all others to whom our thanks were due for this alteration in public taste was the late Mr. Pugin. He it was who first played havoc with the old tie-beam school of construction, without which the whole superstructure of collars and braces would have fallen to the ground. In our enthusiastic effort after the ideal we were sometimes apt to adopt archaic forms, which in our sober moments we were sorry for. I refer more particularly to the debased form of French and Flemish roofs just at present in vogue of the bedpost order, wherein the canons of the constructive position of materials are sometimes set at naught. The old carpenters evolved from their experience the constructive excellence that we found in most of their work. We must not, in our efforts to be eclectic, sin on the other side, and lose all trace of real worth. One point that was sometimes overlooked in adopting old examples by rule of thumb without taking into account the age in which they were executed is, that the extra strength of timbers in old roofs has been in many cases the main cause of their stability. Parts evidently designed under the direct laws of stress, intended originally to act as a strut, had, under changed conditions, come to serve the purpose of a tie, and if, on examination, the pins had given way, we might be certain that some power other than originally intended had been exerted, as pins could never have been properly utilised where tension of the part had been pre-supposed. The peculiarity of the present position of architecture was the reversal of the conditions under which it progressed. In the past the secular element was subordinated to the religious conception; now the utilitarian preceded all others, and it was the multiplicity of the requirements of our latter-day architecture that made the fulfilment so difficult a task. To



the young man starting in life my advice is, study anywhere and everywhere, but learn to sift the tares from the wheat, striving to remember that old work was not necessarily good because it was old. If the young student could sink self and learn to follow the spirit that animated the constructors of the thirteenth century,—the period when construction had attained its full development,—without copying all its forms and conditions, he would eventually retain something worth knowing. The unfortunate part of it was that the workman, like too many members of the architectural profession, only made bad copies of the old forms, taking little heed of the different conditions and requirements of the work. I would remind my hearers of Mr. G. E. Street's last address at the Institute of Architects, in which solid construction was insisted upon, and from a recent Royal Academy lecture by Mr. Aitchison pointing out that,—

"We modern architects are too much divorced from our materials, so that our mouldings are too apt to represent artistic rather than real needs. The early Medieval architects were mostly masons, even so late as the building of the Ducal Palace at Venice. The architect, Bon, was called a stone-cutter (*lapideus pistor*). Carpenter, too, is extinct in England, and so are carpenters: excepting the hedge-carpenter, we have none,—they are all joiners,—and their maxim is never to work timber, but to case it. The Saracen architects did the same. Their beams are often round balks, with the square ends, and fretwork in thin casing. In consequence of this the architect loses all sense of constructive propriety in his mouldings,—their only propriety is æsthetic."

I think that jerry building will soon have had its day; the work of the future will be solid, substantial work; that solid woods will be used, and veneer discarded. I find houses built from my designs and in a solid manner by so-called speculative builders let and sell far more quickly, though a larger price is asked for them than for the usual flimsy class of house, whereas these stronger, more solid, and more expensive houses would not have let or sold a few years ago. In my judgment, therefore, the time has arrived when to build solidly and well will pay best even the speculative builder, and this will make the carpenter more than ever in request if he will give his attention to technical knowledge. The scope of his trade will be increased, for the demand for solid and substantial houses will influence the furniture therein, and the carpenter and joiner may certainly make the hall and dining-room furniture, the panelling of ceiling, in conjunction with enamelled iron, the dadoing of halls and rooms, the solid parquet of floors. The great thing that the carpenter must remember is that he must cultivate taste, for this now pays, and its cultivation is one of the weapons we have against foreign competition. In dealing with this subject I have almost refrained from speaking of the carpenter himself, yet permit me before concluding to say one word. I have often thought it should elevate the thoughts of the carpenter when he reflects who it was who condescended to work at his trade,—that it should be his aim not to have one article of furniture in his cottage, house, or room that is not made by himself (excepting, perhaps, the bedstead). Everything the carpenter does should bear impress of his trade; all being solid, simple, yet tasteful. Where he can, he should build his cottage with some portion of half-timbered work, with barge-boards, &c., if not prevented by local regulations; he should be content with bare walls at first, and gradually panel and fit up each room. Nothing would more help to elevate his own taste and the taste of his neighbours, and it should be borne in mind that he would be educating himself as an art workman, and thus the carpenter would be helping to influence the architecture of the future.

#### New Tramway Depots in South London.

The London Tramways Company, which have recently erected large new offices and other buildings in Camberwell New-road for the engineering and general staff, and also a new depot in Rye-lane, Peckham, several acres in extent, have just purchased a site in High-street, Clapham, near the company's present terminus, on which they are about to erect ranges of stabling, carriage sheds, offices, and other buildings. The site is between three and four acres in extent, and during the present week the materials of the mansion and outbuildings upon it have been sold. Stabling will be provided for 400 horses, whilst the sheds will afford standing-room for forty of the company's cars. The several buildings have been designed by Mr. Willing, the company's architect, and will be carried out by their own workmen.

#### THE UNIVERSITY AND CATHEDRAL CITY OF ST. ANDREWS.\*

THE ancient city of St. Andrews is situated at the head of a bay of the same name on the east coast of Fife. As the crow flies, it is about thirty-five miles to the N.E. of Edinburgh. A single line of rails connects it with the North British Railway system at Leuchars Junction, just six miles south of the ill-fated Tay Bridge.

St. Andrews is fast becoming a fashionable watering-place, and on this account the gradual disappearance of its ancient buildings is to be expected.

In name alone is St. Andrews a city; in point of size it is very insignificant, its importance being chiefly due to the presence of the university. Independently of the monastic foundations, the city is very ancient, having been erected into a free and royal burgh by David, first king of Scotland, in 1153. Its leading features are three wide streets, North-street, Market-street, and South-street, all

overlooks the harbour; the second is in the south side, but is not used; the third abuts on South-street; and the fourth is on the north side of the cathedral. The one abutting on South-street is the most important, and was vaulted over; it is called the Ponds. Why it is so called, or whence the word is derived, I have not been able to ascertain.

In the early days of Christianity there was a religious order in Scotland called the Culdees (the word is derived from Gille-de, the Gaelic for God's servants), a branch of which existed at St. Andrews two or three hundred years before it became an episcopal see. Foundations of an ancient church have been discovered on the hill overlooking the harbour, and there can be little doubt that this was the ancient Culdean church. When the Priory was founded, about the year 1130, the Culdees were excluded, because they were a secular clergy,—married, and possessed of property. It is supposed that they refused to acknowledge the Pope, and were gradually deprived of their rights, until they either migrated or died out.



East End of Cathedral, St. Andrews.

converging towards the east, where stand the ruins of the cathedral. This arrangement is in itself almost sufficient to convey the impression that the religious institutions were always of the first importance, and, in point of fact, they were so, until John Knox came and altered the state of affairs. St. Andrews never was a walled city, although there were gates at the ends of the three main streets; the one at the end of South-street, called the Argyle Gate, or West Port, still remains.

The Priory was enclosed with a wall said to have been built by Prior Hepburn, in 1516, part of which is still standing. It was about 20 ft. high, and had large towers at intervals, some of them were square, others round or octagonal, and were ornamented with canopied and crocketed niches.

The walls have four large gateways, the first

St. Andrews was created a bishopric in 87 and some few years afterwards most probably the Church of St. Regulus was built, of which the tower still remains.

The date of this tower is a much-disputed point, but, judging from its architecture, it could hardly have been built before the tenth century, if it were not even later than the nave is clearly of a later date, about 1080.\*

The tower, which might be considered a specimen of Byzantine architecture (and certainly reminds one of some of the Italian campaniles), is 108 ft. high and 24 ft. square at the base. It is built of ashlar from top to bottom, and the stone, which is entirely of different description from any in the other buildings, must have been brought from a distance. It is in a capital state of preservation, and, beyond having been repointed at the

\* Part of a paper recently read before the Liverpool Architectural Society by Mr. R. B. Preston. The illustrations are reproduced or copied from Mr. Preston's sketches.

\* It is now roofless, but the grooves in the tower clearly show that there have been three roofs upon it at different periods.



end of the last century and a new staircase built inside it, stands as perfect as it did 800 years ago; and this is still more surprising when we consider its exposed situation, viz., at the top of a cliff overlooking the sea.

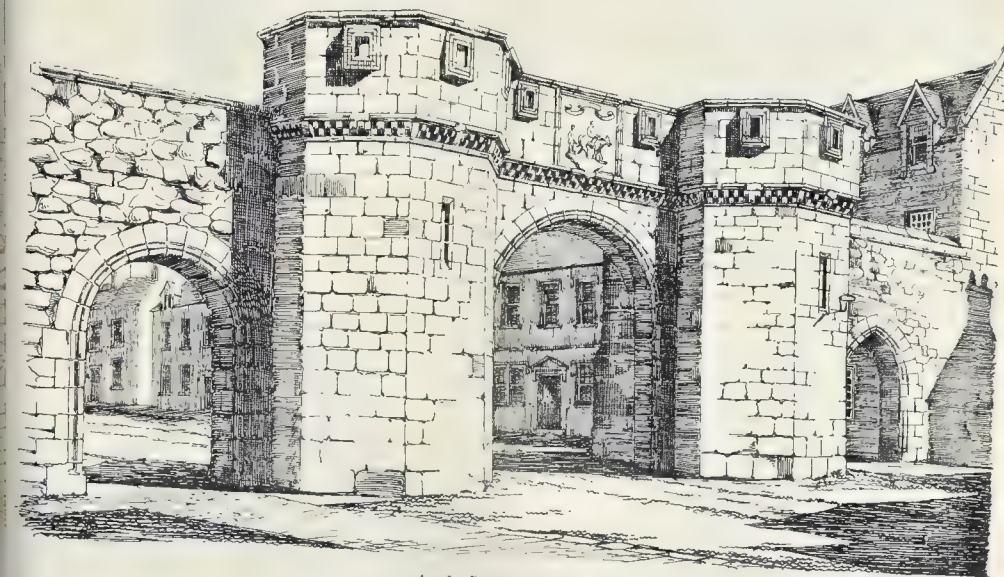
For nothing is St. Andrews more distinguished than by its long line of bishops and archbishops, extending from the year 870 to the year 1688, a period of 818 years. After that time Presbyterianism succeeded

wall of the south transept and the south aisle wall are also still standing.

The foundations of the entire building have been laid bare so that the plan can be easily traced. It was a cruciform building, the plan resembling a Latin cross almost exactly. It consisting of nave and aisles, choir and aisles, north and south transepts, north porch, and central tower. At the east end there was also a Lady-chapel. Of our own cathedrals it most

guest-house, and offices; in addition to these buildings, extending southwards towards the harbour, there were corn-mills, granaries, barns, and stables.

All these buildings have entirely disappeared, for, after the Dissolution, they were left roofless and tenantless, and formed a convenient stone quarry for the townspeople; and fully one half of the older houses in St. Andrews have been built with the stones taken from these buildings.



Argyle Gate, St. Andrews.

Episcopacy, because the Scottish bishops could not take the Oath of Supremacy to William III.

The cathedral was founded by Bishop Arnold about the year 1160, and was finished by Bishop Amberton in 1328; its erection thus occupied 68 years. As was the case with many other churches, they began at the east end and worked westwards, and the gradual change from Norman to Transitional, from Transitional to Early

nearly resembles Peterborough, and in point of size it is not much different. The total length inside the walls is 370 ft.; width across transepts, 180 ft.; across nave and aisles, 65 ft. It was the largest cathedral in Scotland, and is described by Fordun, an ancient writer, in these words:—"To have been built of hewn stone, the pillars and their cornices, with the doors and windows, to have been neatly carved and embossed in the light Gothic manner."

It is generally supposed that although the destruction of the monastery was gradual, that of the cathedral was completed within a few days of Knox's sermon in the town church, wherein he incited the people to this work of wanton destruction. He was so successful that in St. Andrews alone, besides the cathedral and monastery before mentioned, they demolished two churches, the monasteries of the black and grey friars, and three colleges.

The grey friars' monastery has entirely disappeared; but there is a small ruin, said to be part of the chapter-house belonging to the grey friars' monastery, still standing in front of the Madras College in South-street.

Not satisfied with their work of demolition at St. Andrews, the Reformers actually passed an Act in the following year for the destruction of all the remaining abbeys and churches.

It is difficult in Scotland to ascertain the dedications of the various churches one sees; that of the cathedral at St. Andrews I did not succeed in obtaining. The churches are never spoken of by their dedications, but are alluded to as the Parish Church, the College Church, the Town Church, and so on.

The Town Church of St. Andrews, or Trinity, is on the north side of South-street, about halfway between the Pends and the Argyle Gate.

It was founded by Bishop Turgot in 1112; it suffered at the hands of the Reformers, and was rebuilt in 1797, and, therefore, with the exception of the tower and spire, which escaped it, calls for no further remark. This is, fortunately, still untouched, very simple in character, but unusually effective, owing in a great measure, no doubt, to the quaint little square stair-turret at the corner.

The Parish Church of St. Leonard served as a chapel to a college of the same name; a portion of this college was originally a hospital or house for the accommodation of the pilgrims who at that time visited St. Andrews in such large numbers; but in the year 1512 Prior John Hepburn appropriated the funds belonging to the hospital for the building and endowing of the College of St. Leonard.

The College Buildings have vanished entirely, but the nave of the chapel is still in existence, though so much mutilated as to be of little interest except historically.



Plan of part of St. Andrews.

English, from Early English to Early Decayed, can be clearly traced even from the comparatively small portion which remains. The east wall and gable flanked by a pinnacle each side is of very massive character, and is probably due to this that it has escaped the ravages of the fanatic under John Knox. The east front being less massive has not been so fortunate, but sufficient remains for us to judge what the whole must have been. The west

About the year 1420 the upper triplet in the east gable was replaced by a large three-light window, but the west windows seem to be of the same date as the surrounding work. It is recorded that the cathedral had carved stalls, stained-glass windows, and a tiled pavement. There was a cloister on the south side separating it from the monastery, which belonged to the order of St. Augustine. There were the usual dining-hall, dormitory,



St. Mary's College, also in South-street, has been almost entirely rebuilt, and therefore requires no further comment.

The Madras College, which is really a large public school, and also in South-street, is comparatively of recent foundation, having been endowed in 1832.

St. Salvator's College, in North-street, founded by Bishop Kennedy, in 1456, is now known as the United College, because it was united to St. Leonard's, of which I have already spoken, in 1747, but the chief part of the revenues belong to St. Leonard's.

The buildings of the United College are disposed on three sides of a large quadrangle, the chapel, or, as it is popularly called, the College Church, occupying the south or street front. This has in the main escaped destruction by the Reformers, but the remaining buildings have either been rebuilt or so modified that they are of little or no interest. The quadrangle is entered from the street through an archway under the tower and spire, which rises to a height of 160 ft. The proportion between the two is rather unusual, the spire being so much smaller than the tower.

Above the archway before mentioned is a carved square panel, containing the arms of the college, and on each side a canopied niche, which, it is needless to add, have lost their occupants.

The upper portion of the buttresses, the pinnacles, and parapets are restorations not altogether meritorious, but the tracery of the windows has all the appearance of a careful restoration. Two curious angle niches may be noticed to the buttresses of the bay adjoining the apse. Possibly if the figures had not vanished we might have had some clue to the reason for thus placing them. There is also some corbelling to the tower at the south-east corner for which there seems to be no apparent reason. A quaint little turret at the corner of the building, at the east end of the chapel, is a relic of the old college buildings, and I think from this alone we may imagine what a picturesque group they must have formed before the ruthless hands of John Knox and his herd of fanatics were raised against them.

In the spires to the College Church, the Town Church and its corner pinnacle, and the pinnacle at the west end of the cathedral, we may notice that the entasis in every case is considerably exaggerated, so that the outline is something like a bow, and the effect, though unusual, is certainly good.

Inside the College Church the only thing of any interest to us is a monument of the founder, Bishop Kennedy; but this is so elaborate, and at the same time so mutilated, that I did not attempt a sketch of it, and, unfortunately, it has not been photographed. It suffered irreparable injury when, some 100 years ago, the wisacres who had care of the College thought that, because there were no visible supports to the roof (possibly it was a double roof with a flat panelled ceiling below), therefore it must be dangerous. Very likely their ideas went no further than an ordinary king-post roof, so they set to work to pull it down; but they found that it was so firmly framed together that they could not take it to pieces, and were forced to detach it from the walls and let it fall *en masse*. The effect upon the monuments and other valuable furniture below can be more easily imagined than described.

The Castle is placed in a most commanding position at the top of a cliff 80 ft. high, the sides of which rise nearly perpendicularly from the water's edge. Its site has been well selected, for it has the sea on two sides of it; the other two are protected by a wide moat. It was entered by a drawbridge on the south side, through a lofty archway leading into a central courtyard. The keep was at the N.W. corner. It would be difficult now to imagine what it was like originally, as it has been rebuilt three times. It was founded by Bishop Rodger in the year 1200, and served as a palace, State prison, and fortress. It fell into the hands of the English several times, and was once entirely demolished to prevent it being recaptured. It was the scene of the murder of the celebrated Cardinal Beaton, the proudest and most ambitious prelate that Scotland ever possessed. His murderers held the castle for about a year. They were besieged for three months by both Scotch and French troops, and the French king sent a fleet of twenty-one galleys to assist. Cannon were mounted on the abbey wall, the



Portion of West Front of Cathedral, St. Andrews.

towers of St. Regulus, and the College Church. The besieged eventually yielded to the French king, and the castle was demolished for the third time. This happened in 1547. What now remains of the castle was erected by Bishop Hamilton, Cardinal Beaton's successor, whose arms and initials are under one of the south windows, and his device a seven-rayed star, above the entrance archway.

In the keep at the north-west corner is a bottle-shaped dungeon, entirely hewn out of the solid rock; it is 18 ft. deep, 16 ft. diameter at the bottom, and about 4 ft. at the top. The wretched occupants were raised and lowered by means of a windlass. A more horrible spot could scarcely be imagined, or a more perfectly secure place devised for keeping a prisoner. There is a well in the centre of the courtyard, 50 ft. deep, containing 14 ft. of good fresh water. When we consider that it is within a few yards of the sea, it is surprising that the water is not salt.

In 1879, when the foundations of a new house, opposite the castle, were being laid, the workmen came upon a subterranean passage, which, on being explored, was found to lead to the castle in one direction and to the cathedral in the other. It is supposed that, at the time when St. Andrews was constantly occupied by the

English, and the castle therefore continually in a state of siege, the occupiers would, on finding that they could no longer hold it, retreat to the safety of the cathedral precincts by means of this passage.

**St. Thomas, Charterhouse, School of Art.**—The Lord Mayor was present on Saturday last at the annual distribution of prizes in connexion with the St. Thomas Charterhouse School of Art in Goswell-road. The Rev. Joseph Diggle, Chairman of the School Board for London, presided. Mr. Francis Black, the head-master, read the annual report, in which it was stated that 240 students attended during the year, executing 3,894 works, which were forwarded to the Science and Art Department for inspection. He pointed out that this school of art is in need of local scholarships similar to those enjoyed by other metropolitan schools of art, making it possible for energetic, able, and industrious students to lay a thorough foundation in practical art before passing to the head central schools at South Kensington, or to continental schools, for high perfection in knowledge and technical skill. The national scholarship, value 150*l.*, the national bronze medal, and the national Queen's prize for stained glass designs were awarded to Miss Augusta Mair.



# SANITARY ORGANISATION AND LEGISLATION.

## THE METROPOLITAN SEWAGE QUESTION.

At the April meeting of the Association of Public Sanitary Inspectors, held at Adam-street, Adelphi, on the 3rd inst., Dr. Alfred Carpenter read a paper on Sanitary Legislation, which was mainly devoted to an outline of a proposed national scheme of sanitary organisation. Dr. Carpenter claimed to have pointed out at various congresses, from that of the Sanitary Association at Norwich in 1873 to others of more recent date, that to force upon the public, before it had been educated up to the required point, legislation on sanitary matters would be to incur certain failure through the indifference on the one hand of magistrates and administrative authorities, and on the other the opposition of ratepayers and persons interested in letting matters alone. None those views were put forward a great educational advance had been made both on the part of the magistrates and the people, and the work was now better prepared for an extension of sanitary legislation and sanitary work. This was attributed mainly to the influence of the press, daily and weekly, by which daylight had been let into the subject all over the country. Discussions in Parliament, to be useful, must flow, not lead, the discussions among the local authorities, and he regarded it as one of the best results of the works of Edwin Chadwick, Robert Rawlinson, the late Dr. Parkes, and a list of others, that a body of men had been set on foot, such as composed that Association, possessing a knowledge of the real operations of a public health. He had been assailed as a glo-monger, and had been called many other bad names, for having ventured to point out the dangers attending sanitary neglect, but he never had to step in and carry off its holocaust victims before the measures he had proposed were agreed to, and before that society of scientific plumbers could be established which would do more good to society in a dozen Acts of Parliament. He was no advocate of centralisation where local action could be completely relied upon, but he thought ought now to organise a sanitary army, with all power and a real authority in sanitary matters. A commander-in-chief was required to be in touch with medical officers of all ranks all over the kingdom, as well as with the clerk-and-file of the sanitary army, and who would promote to higher duties any unit of the army who had shown superior qualities in the performance of district work. Such men there, as worthy to be called out and decorated the commander-in-chief as any soldier who had earned the Victoria Cross in the Sudanese other campaigns. Such a superior would be possible to Parliament, but he would have to be him generals of division, who should not be affected by changes of Government, and who would be responsible to him for the health of the counties and great cities of the empire. The general of division would be a district medical officer of health who had proved himself an efficient administrator, who should sit with the owner as medical assessor at all inquests, and who should be an expert in the performance of post-mortem, but who should never be permitted to practise midwifery. The nuisance inspectors, the foremen and inspectors of markets, should form the rank and file and the corporals. Sergeants of such an army, working under necessary medical officers, who would represent the lieutenants and captains. The reduction of the symotic death-rate, even in the face of an increase in the density of population, would be such as to ensure a liberal and willing to both the officers and privates of the force, the position of the inspector,—held as he is too often was in the grip of a cleft-stick,—would be greatly improved. Fixity of tenure, increased pay and chances of promotion, would secure a superior class of men, the owners of defective houses, or sanitary property would no longer be able to shelter themselves behind a dodging inspector. The housing of the poor would be really to the front, and landlords would be brought to book. No cottage would long remain without that pure water supply which none could afford. With regard to the great question for the cities of the disposal of their refuse, it seemed to him that legislators were giving a deaf ear to a terrible certainty. The industrial interests were being destroyed, and at the same time, the valuable fertilising

elements contained in the refuse and sewage were being irretrievably thrown away. The Thames and other rivers were being silted up with dangerous mud-banks, which, under the influence of heat, would some day rise up like the toys known as "Pharaoh's Serpents," and destroy the trade of our ports. It ought to be an offence against imperial authority to destroy that material which could and should be utilised for the production of food. China afforded an example of what could be done to produce food for the densest populations without having recourse to outside assistance. The sewage and refuse of every hundred persons would grow two bullocks, and produce milk enough for the hundred people or vegetable food in corresponding quantity. If the Metropolitan Board of Works persisted in its ruinous course of putting into the Thames what ought to go to the surrounding fields and pastures of London, and if the evil were not otherwise counteracted, a terrible retribution would be brought about at an early date. With an increase of population we must have increase of fertility or we should cease to be a nation, and if all sewage products were to be destroyed by fire, or sent into the sea, the end sooner or later must certainly be national defeat and disaster. The lecturer said, in conclusion, that he would much sooner trust Bailey Denton and his school to meet these difficulties than Sir Joseph Bazalgette and his followers. Any attempt to delay the return of the sewage to the soil was manifestly wrong and contrary to the teaching of nature.

An interesting discussion followed, in which the Chairman (Mr. Jerram), Dr. Drysdale, Mr. Bailey Denton, jun., and various members of the Association took part.

The Chairman, in illustration of the necessity for consulting sanitary officials before making laws and by-laws, pointed out a defect in the new legislation proposed. A man might, he said, be compelled before building to make a street, but there was nothing to compel him to put in a drain. He bore testimony to the soundness of the views of Dr. Carpenter as to the utilisation of sewage, and he hoped shortly to be able to point to a large sewage farm of which he had charge as a model to London.

Mr. Bailey Denton said there were twenty towns in England in which sewage had been satisfactorily disposed of by being put upon the land, and in every case the effluent water was pure enough for cattle to drink and for the increase of fish. In the country no difficulty was found, but in London they had not been able to induce the Board of Works to look at plans for the utilisation of sewage. He contrasted the wasteful scheme of Sir Joseph Bazalgette, favoured by the Board of Works, by which it was proposed to continue to get rid of the London sewage by discharging it into the river, with the scheme proposed to be carried out on Canvey Island by his (Mr. Bailey Denton's) father and Col. Jones, in which, after saving the fertilising elements from the sewage of London, and depositing them to enrich the soil of the island, they would be able to return the effluent water, purified, to the stream. Canvey Island was an area of 5,000 acres of low-lying land surrounded by a wall 8 ft. high. By mixing the solid residuum from the sewage with the brick-earth of the island, they would under the scheme provide for the relief of the metropolis for 100 years, and land which was now below the level at high tide would be enhanced in value productively and commercially by being raised above high tide with enriching solidified materials. By means of the brown earth and the shells and sand washed up at every tide the soil could be made as porous as they liked. They could treat sewage at Canvey Island at a cost to the ratepayers of 1½d. in the pound, while the scheme favoured by the Board of Works would only be half done at a cost of 2½d. in the pound.

**Noble's Isle of Man Hospital.**—The following official report was presented at the conclusion of the meeting last week:—"A meeting of the new Hospital Committee was held in the council-chamber for the purpose of considering the revised plans of the new hospital, as submitted by the architects, Messrs. Bleakley & Cubbon, of Birkenhead, which were unanimously approved. Tenders will be invited from contractors for the work forthwith."

# THE CONGRESS OF FRENCH ARCHITECTS FOR 1886.

The following is the programme of the Congress for this year, which will be held in the Ecole des Beaux-Arts from the 7th to the 12th of June, inclusive.

## "PROGRAMME DES SÉANCES ET VISITES."

**Lundi, 7 juin.**  
à 2 h.—Constitution du Bureau et ordre des travaux du Congrès.—Nominations des Commissions sur les questions suivantes: Concours public, Honoraires, Hygiène, Industrie du Bâtiment, Propriété artistique, Responsabilité, Voirie, &c.—L'architecture au Salon, par M. C. Moxaux, architecte du Gouvernement, membre de la Société.—Visite de la Synagogue de la rue de la Vieille, Mr. Aldrophe, architecte, membre de la Société.

**Mardi, 8 juin.**  
à 9 h.—Visite des ateliers de M. Guilbert Martin, chimiste monnaie, lauréat de la Société en 1885, avenue de Paris, 276, Saint-Denis.—Visite de l'Abbaye de l'Hôtel-de-Ville de Saint-Denis.

à 2 h.—Conférence par M. Eug. Guillaume, statuaire, membre de l'Institut, professeur au Collège de France.—Compte rendu du Congrès des Sociétés savantes.

**Mercredi, 9 juin.**  
à 8 h.—Palais du Louvre, les mosaïques du grand escalier, exécutées par M. G. Martin, sur les cartons de M. Lenoire, membre de l'Institut, sous la direction de M. Edm. Guillaume, architecte du Palais du Louvre.

à 10 h.—Visite du chantier de la Sorbonne, M. H. Néel, architecte.

à 11 h.—Visite du Panthéon: mosaïques, peintures, caveaux.

à 2 h.—Conférence par M. Heuzey, membre de l'Académie des Inscriptions et Belles-Lettres, membre libre de l'Académie des Beaux-Arts.—Communications et rapports des Commissions nommées le 7 juin.

**Jeudi, 10 juin.**  
Excursion à Troyes, en Champagne, départ à 8 h. 25 du matin, gare de Strasbourg, retour à Paris, à 9 h. 25 du soir.

**Vendredi, 11 juin.**  
Matinée réservée à la Caisse de Défense Mutuelle.  
à 2 h.—Suite des communications et rapports des Commissions nommées le 7 juin.

**Samedi, 12 juin.**  
à 9 h.—Visite des Catacombes.

à 1 h.—Distribution des médailles décernées par la Société Centrale des Architectes, à l'Architecture privée, à l'Ecole des Beaux-Arts, aux Ecoles d'Albion et de Rome, aux Ecoles privées, au Cercle des Maçons, au parsonnage du Bâtiment, aux Industries d'Art, MM. Paul Sédille et Paul Wallon, rapporteurs.—Notice sur la vie et les œuvres de M. Th. Ballu, membre de l'Institut, par M. Paul Sédille, architecte, vice-président de la Société.—Notice sur la vie et les œuvres de M. Th. Labrousse, vice-président de la Société, par M. Simon Girard, architecte, membre de la Société.

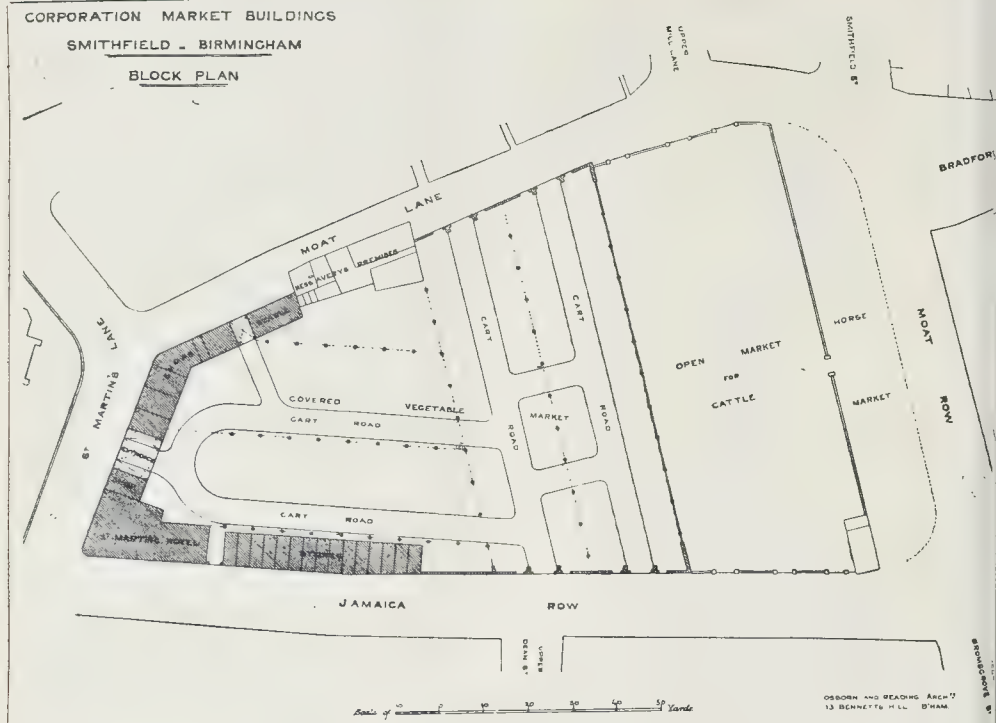
à 7 h. très précises.—Dîner confraternel, à l'Hôtel Continental.

**NOTA.**—Tout membre du Congrès devra prévenir à l'avance le Bureau pour être autorisé à traiter une question relative à l'Architecture ou à l'Archéologie, en dehors de celles indiquées ci-dessus. Pour toute demande d'invitation ou tout autre renseignement, écrire au Secrétaire du Congrès, au siège de la Société Centrale des Architectes, boulevard Saint-Germain, 168.

## TAPESTRY-MAKING.

The second of the series of Canon lectures on "Tapestry and Embroidery," was given by Mr. Alan Cole on Monday evening last, in the Hall of the Society of Arts. The subject of the lecture was tapestry-making. Explaining how the term "tapestry" had been used in two senses, the one having reference to decorated hangings generally, the other to a special process; the lecturer described the process in detail. He then showed diagrams of early specimens made, during Græco-Egyptian times, by that process. These were for ornamenting costumes. The method was known to the modern Japanese, who claimed to have "invented" it quite recently, as well as to the natives of Borneo and the Peruvians. This method was identical with that worked in high-warp and low-warp frames, from the thirteenth century onwards, by *tapisiers* and *tapisseries*. A considerable series of diagrams was devoted to illustrate the predominance, during the fourth to the thirteenth centuries, in woven and embroidered textiles, of a scheme of pattern composed of circular bands enclosing birds and beasts. The earliest known tapestry-made hanging was wrought with such a pattern. It came from the Church of Saint Gereon, at Cologne, and parts of it were now preserved in various museums. The fashion of long and narrow bands with patterns of figure designs illustrative of religions, chivalric, and domestic episodes, survived into the fifteenth century. But towards the middle of the fourteenth, a change in size and shape of hangings (tapestry-made) had taken place. The Dukes of Burgundy, at that time, greatly patronised the particular art, and to the patronage of such nobles, of kings, and pontiffs is due the production of very large hangings of complex pattern, in which hundreds of figures, in elaborated costumes, illustrative of mythological, historical, and allegorical events, are used.





### Illustrations.

#### NEW YORK STATE CAPITOL, ALBANY: GRAND STAIRCASE.

**T**HE New York State Capitol at Albany is approaching completion, portions of it being now occupied. In competition, the designs of Mr. Fuller, now Government architect at Ottawa, Canada, were accepted, and a considerable portion of the structure was built under his superintendence. Owing to some political action, he resigned his position, and Mr. H. H. Richardson, of Brookline, Massachusetts, and Mr. Eidlitz, of New York, were entrusted with designs for completion, having certain parts allotted to each of them, the work being executed under the supervision of a resident architect. The original design was Italian Renaissance in style, but this has not by any means been adhered to, and considerable changes have been made, both externally and internally, parts of the building having been pulled down. The portions designed by Mr. Eidlitz, including a large staircase, and one of the meeting-chambers, are in style a free treatment of ornamented Gothic, which ill accords with the surroundings. Mr. Richardson's work comprises the large meeting-chamber, many important rooms, and the grand staircase, as shown in the illustration. The original from which our illustration is taken formed one of the very fine series of drawings which were exhibited at the Institute among the Godwin Bursary (1885) collection of works illustrating modern American architecture. The design has been somewhat altered in execution. The stone of which it is being built is imported from Dumfriesshire, Scotland. I am informed that the whole of the work throughout the building is being executed by day-work, the men employed being nominated by members of the Houses of Representatives. No expense is being spared in any portion of the building, materials of the most costly description being used in many places.

JOHN B. GASS.

#### DESIGN FOR A TOWN MANSION.

This picturesque design was submitted by Mr. E. Guy Dawber, in the Royal Academy Students' Competition of this year. The plan

was worked out for a domestic town house, and the general design founded on North German types. It was designed with the idea of execution in red brick with stone dressings, and a tile roof.

#### CORPORATION MARKET BUILDINGS, SMITHFIELD, BIRMINGHAM.

IN connexion with the covering over of the Birmingham Corporation Smithfield Market and the widening of St. Martin's-lane, a large block of buildings has been erected in the latter thoroughfare, extending from Jamaica-row to Moat-lane, so as to form a suitable front to the vegetable market. The buildings, which are from the designs of Messrs. Osborn & Reading, architects, are designed in the style of the English Renaissance of the Stuart period, and are constructed of red brick, with red terracotta dressings.

The main entrance to the markets is in the centre of St. Martin's-lane front, and consists of a central roadway for carts and wagons, 15 ft. wide and 24 ft. high, together with a wide entrance on each side for foot-passengers. The piers supporting the large archway are of stone, but the arch itself is constructed of terracotta, richly moulded and carved. Over the archway are two sculptured figures in red terracotta, representing Flora and Pomona. The whole of the carving and sculptured work has been executed by Mr. John Roddis, of Aston. The archways are fitted with massive wrought-iron gates, manufactured by Messrs. Hart, Son, Peard, & Co., of Grosvenor-street, Birmingham. The Jamaica-row front and about one-third of the St. Martin's-lane front are occupied by the new St. Martin's Hotel, which stands as nearly as possible upon the same site as the old hotel, and contains large hall, smoking-room, bar, luncheon and dining-rooms, &c. In the centre of the building, on the ground floor, a manager's office is placed, with windows and doors overlooking the liquor vaults, bars, hotel entrances, and staircases. On the basement, also, there is a large luncheon-bar and a grill-room, entered by a staircase leading down from the doorway at the extreme end of the Jamaica-row front. This room extends under the footpath in Jamaica-row and under a portion of the markets, and is amply lighted by means of prismatic glass.

On the left of the large entrance to the markets has been placed the market superintendent's office, which has a staircase communicating with his house, on a portion of the first and second floors. The remaining portion of the St. Martin's-lane front is occupied by large shops, with show-rooms on the first floor and well-lighted basements extending under the footpath. That portion of the building which faces Moat-lane has been planned to use as a coffee-house, and has a good entrance hall and a staircase leading to all the upper floors.

Extending down Moat-lane, there is an access to the main building, forming a secondary gateway entrance to the markets, a stable and carriage-house for the superintendent, and lavatories for women. The gateway is 15 ft. wide and has ornamented wrought-iron gates, similar to those of the main entrance. The whole upper floor of the extension is occupied by public lavatories.

The various lettings in the building are divided by fireproof floors and walls, and the floors of the kitchens are constructed of fireproof materials.

The contractor was Mr. Frederick J. Brinkley, of Coventry-road, Small Heath.

The cost of the building has been 15,000l.

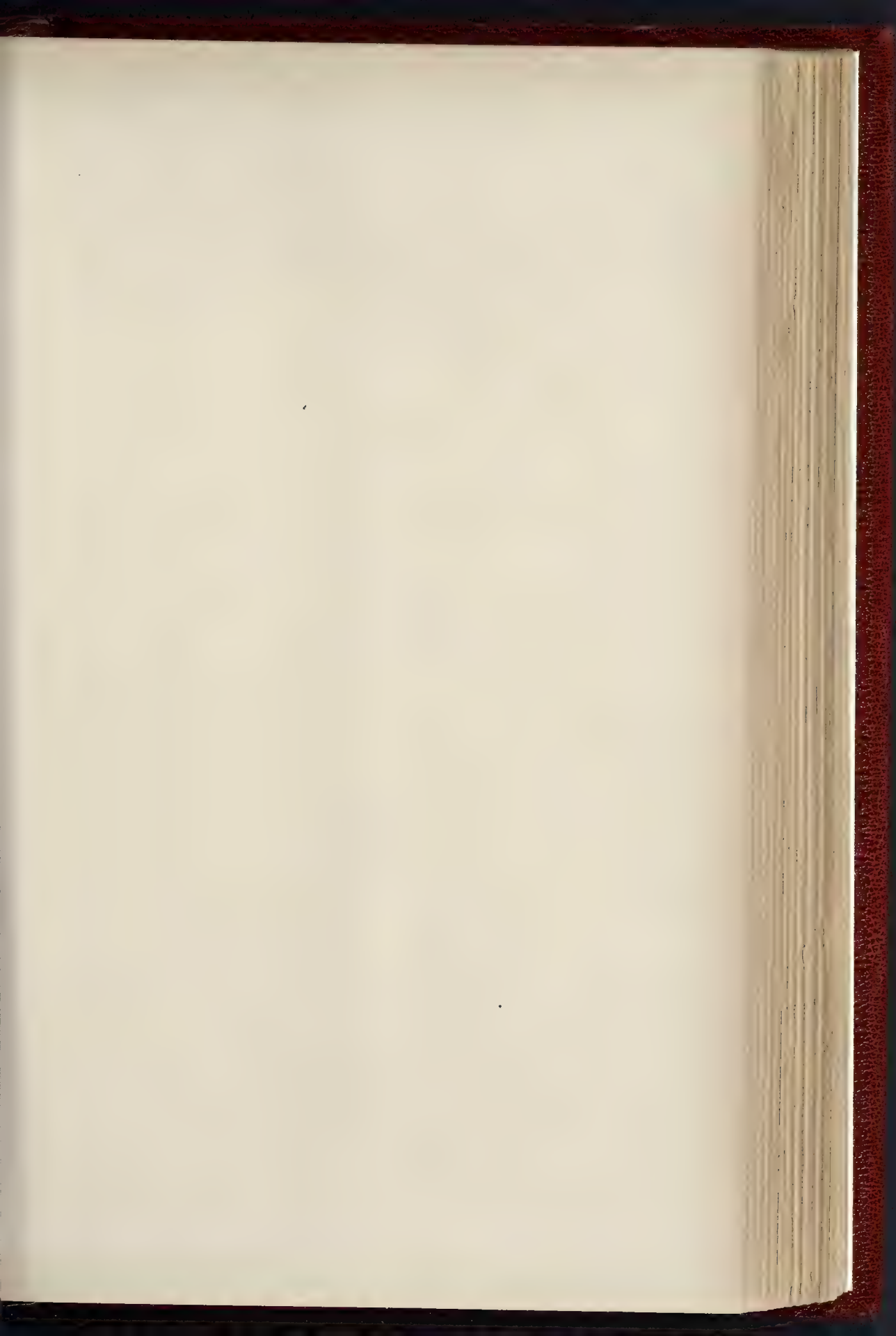
#### THE ROSSETTI MEMORIAL.

It is proposed to erect a monument to the memory of the late Dante Gabriel Rossetti in the public garden of the Embankment, in front of the residence of the painter-poet, No. 10, Cheyne-wall, Chelsea, or some other suitable site.

It is to be executed by two intimate friends of Rossetti's from his early youth, taking the form of a bronze alto-relievo portrait, modelled by Mr. Ford Madox Brown, as the central feature of a granite fountain designed by John P. Seddon.

The plaster-cast, which has been taken from the full-sized clay model made by Mr. Ford Madox Brown, and a small model of the monument are now on exhibition in the South Kensington Museum, having been placed exactly opposite the entrance to the refreshment-room in the corridor adjoining thereto.

The list of the supporters of the proposals is already a long one, and includes numerous







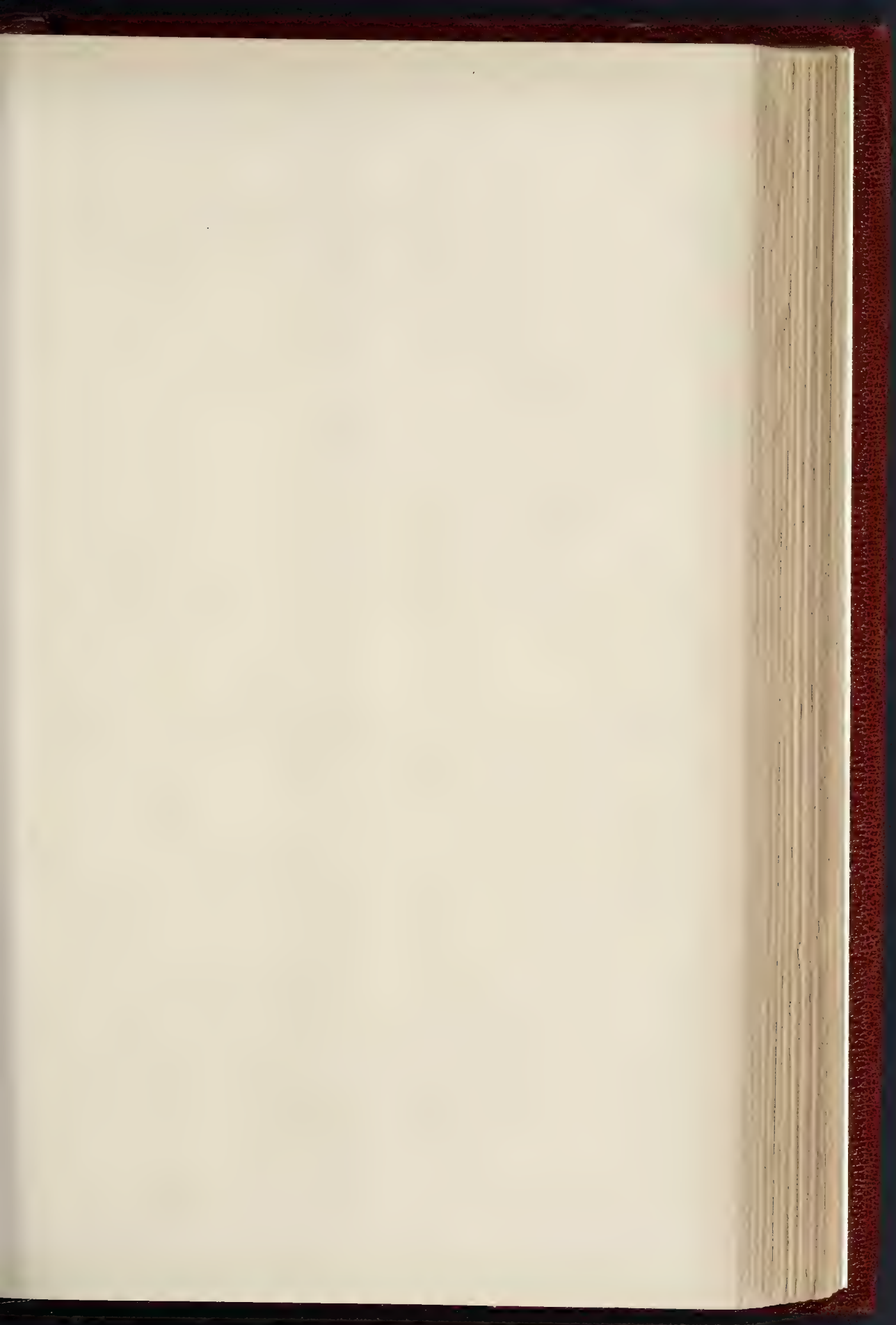
THE NEW CORPORATION MARKET BUILDING



HAM. MESSRS. OSBORN & READING, ARCHITECTS









THE BUILDER, APRIL 17, 1886.

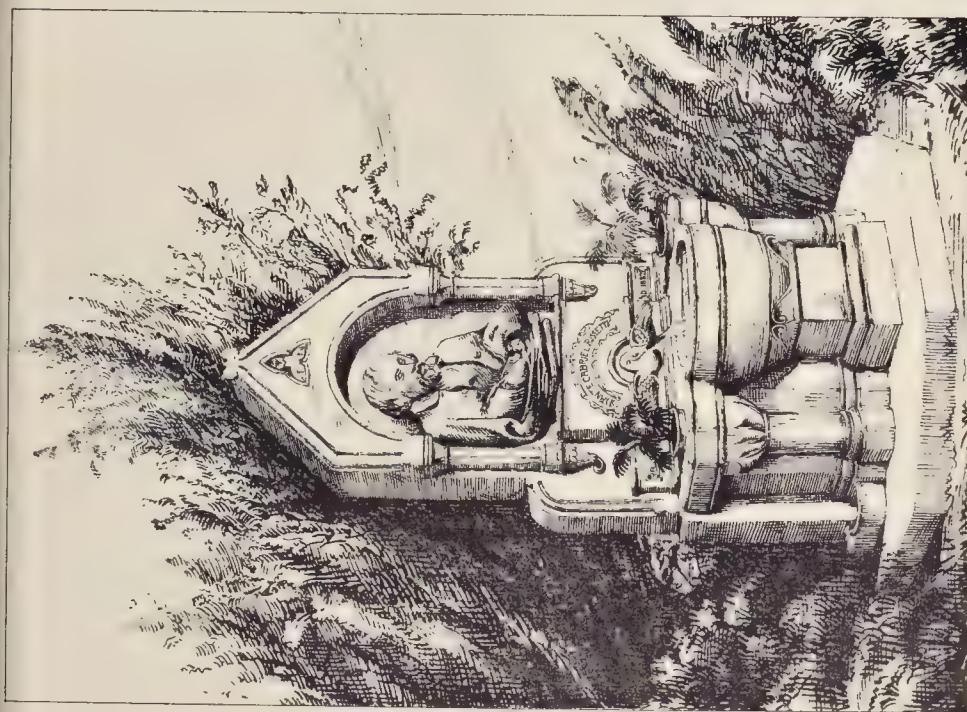


SCULPTURE BY MR. F. W. POMROY.  
"CAIN, THE OUTCAST."



DESIGN BY MR. G. TRAPPAN.

"CAIN, THE OUTCAST."

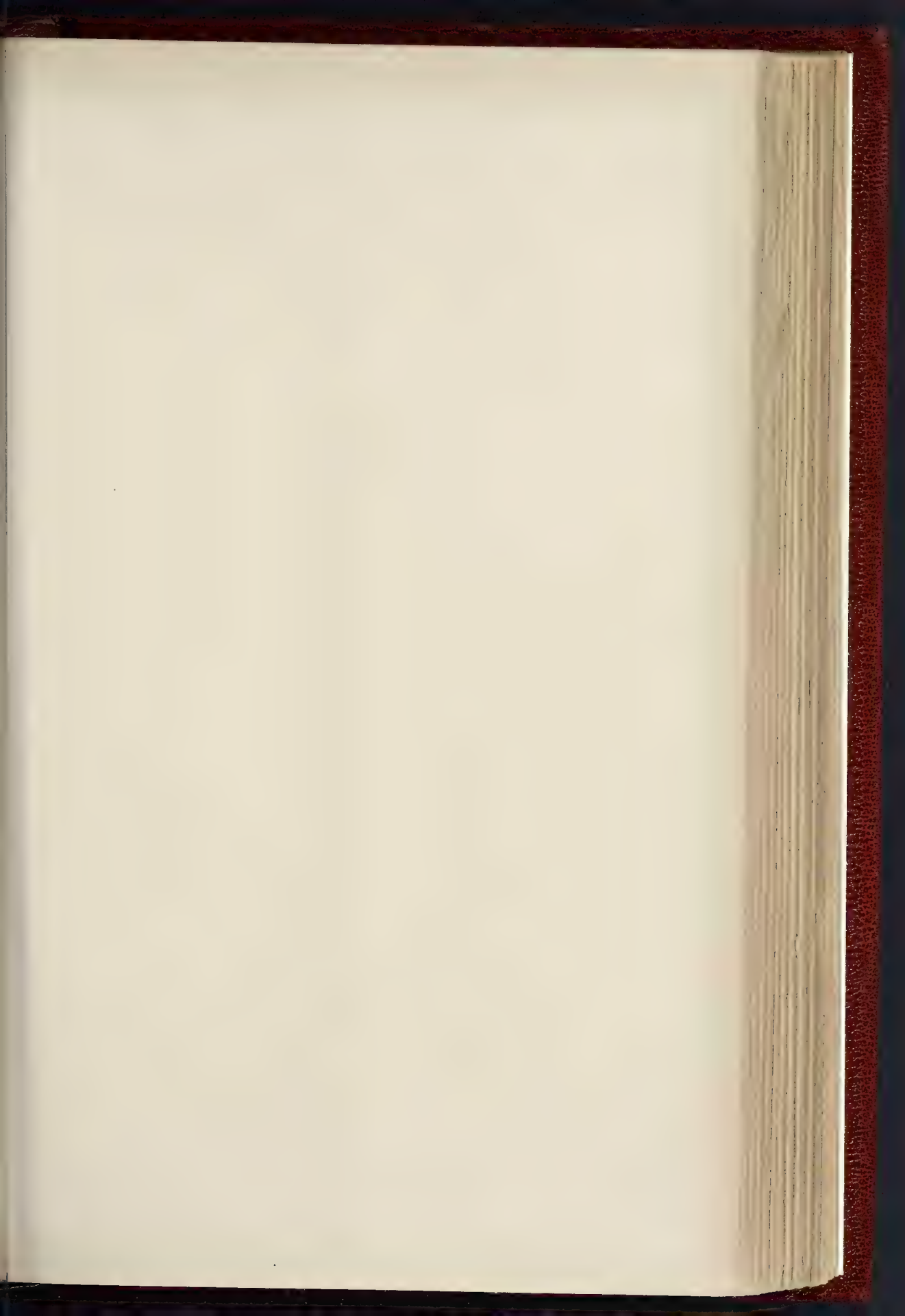


THE PHOTOGRAPH BY SPRAUL & CO. LONDON

MEMORIAL FOUNTAIN TO DANTE GABRIEL ROSSETTI.—DESIGNED BY MR. J. P. SEDDON.  
FIGURE MODELLED BY MR. FORD MADOX BROWN.

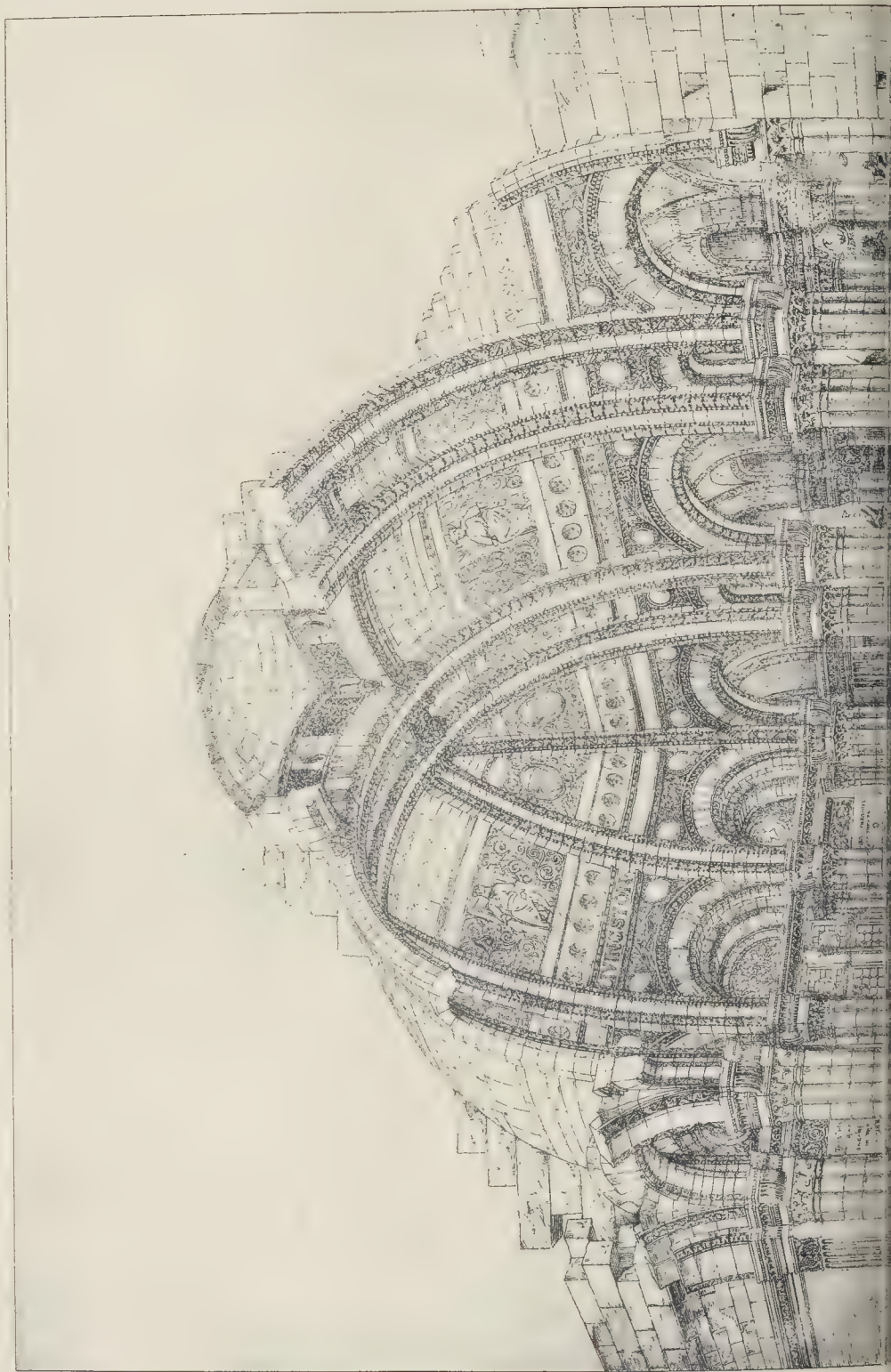




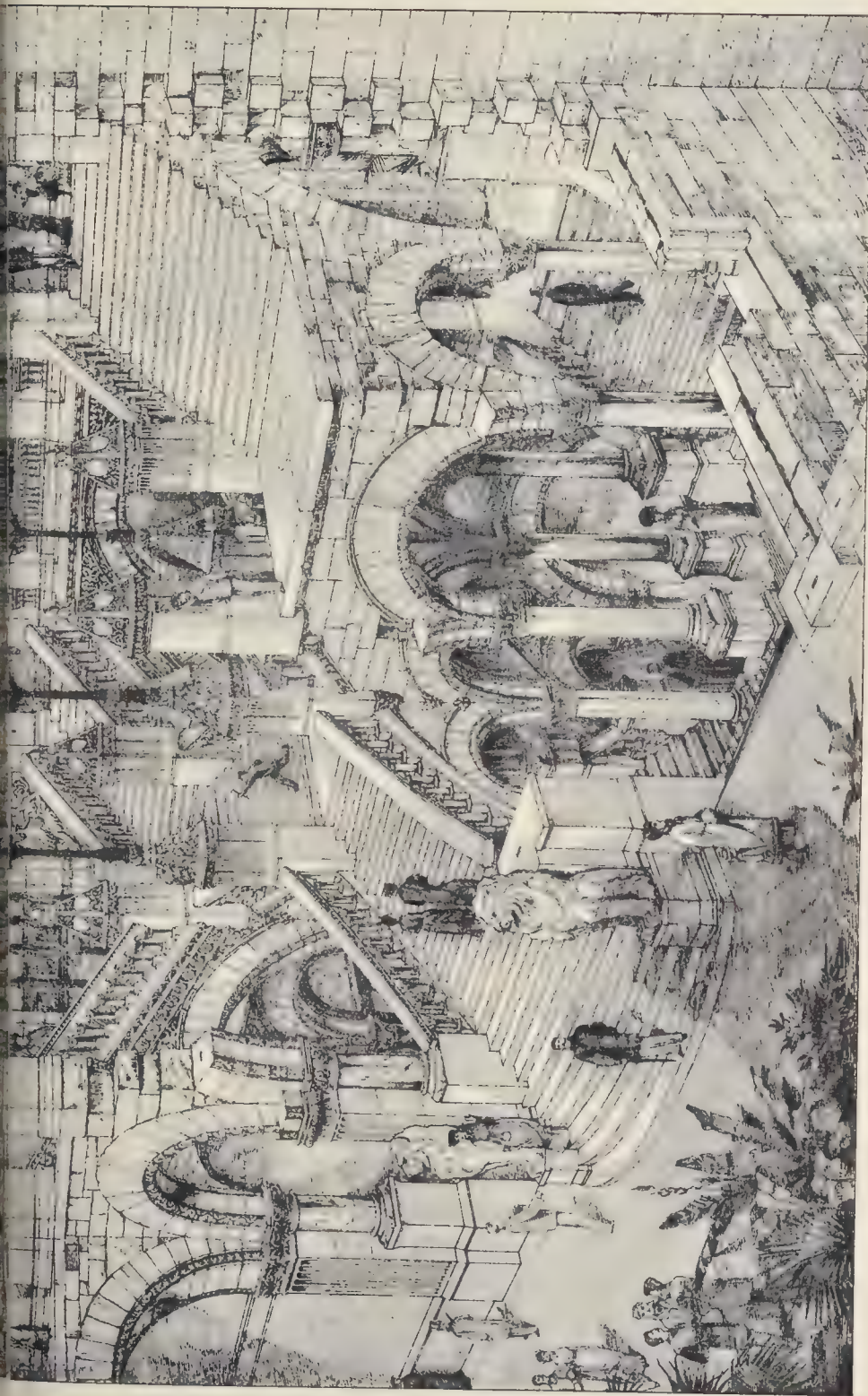




THE BUILDER, APRIL 17, 1895





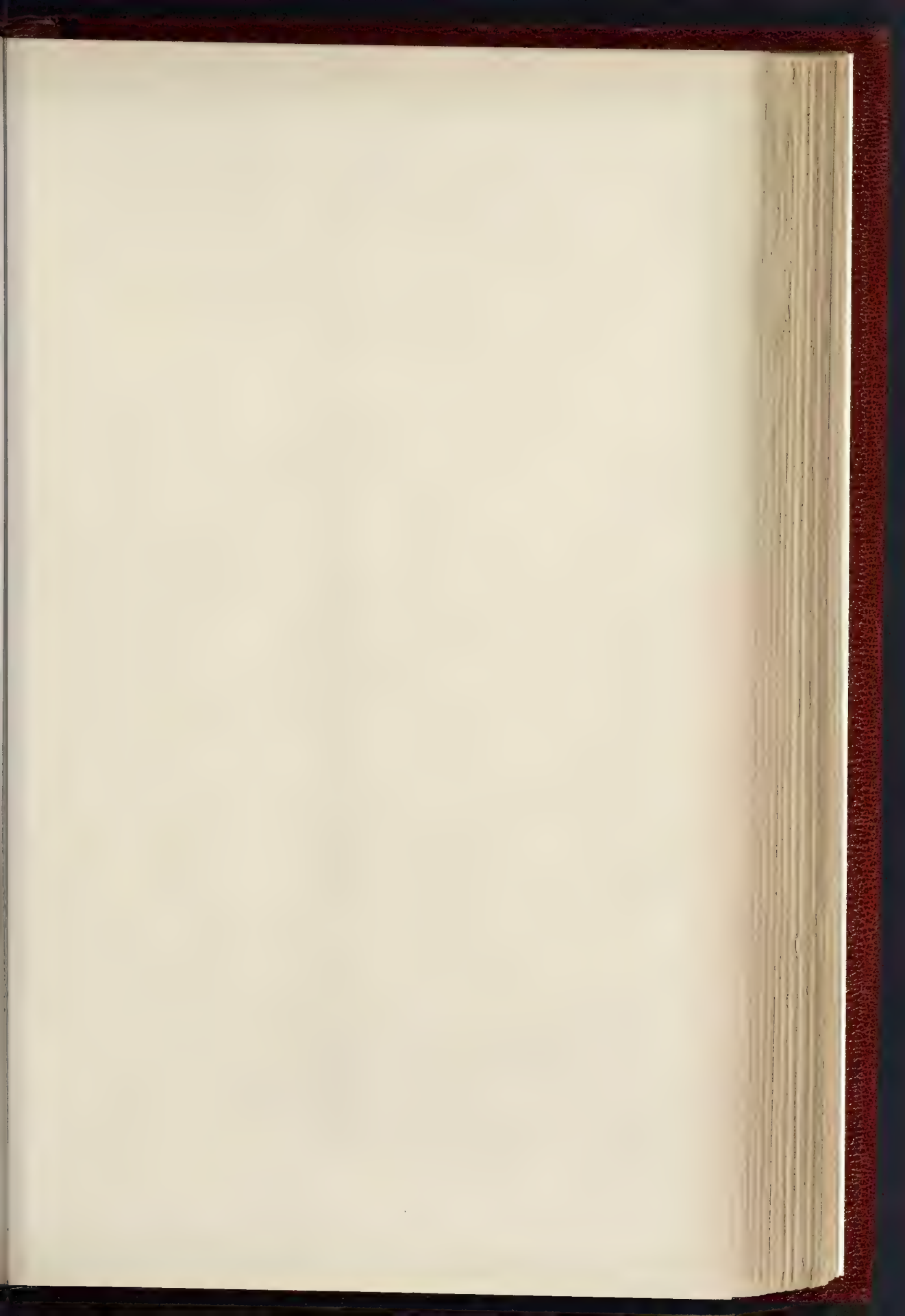


GRAND STAIRCASE, ALBANY CAPITOL, U.S.

W. H. WOOD, SCULPTOR & C. LONDON







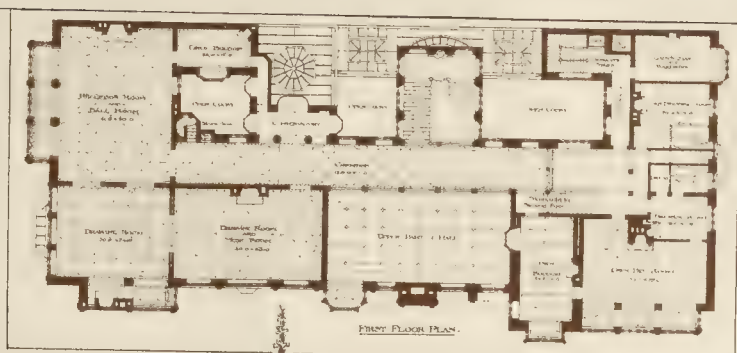




Royal Academy Gold Medal Competition, 1885

DESIGN FOR A TOWN





MR. E. GUY DAWBER

PHOTO SPRAGUE & CO LONDON





quential and representative names of artists, etc., and art amateurs, among whom we find Sir Frederick Leighton, P.R.A., Sir Edward Burton, Sir John Millais, W. Holman Hunt, Alma Tadema, F. J. Shields, William B. Cole, Sir John Gilbert, Sir Noel Paton, V. May, Arthur Hughes, the late Sir Henry Taylor, Robert Browning, Algernon Swinburne, George D. Conway, Lord Aberdare, J. Comyns, Sidney Colvin, Vernon Lushington, Professor J. Marshall, William Linnell, W. de Thomas, Theodore Watts, J. H. Pollen, a Dean of Manchester, and Lord Mount-Edwards.

The Honorary Secretary to the Committee is Mr. F. G. Stephens, of 10, Hammersmith-terrace, W. The Honorary Treasurer is Mr. J. H. Buxton Forman, of 46, Marlborough-hill, W. The Honorary Secretary to the Committee is Mr. F. G. Stephens, of 10, Hammersmith-terrace, W. The Honorary Treasurer is Mr. J. H. Buxton Forman, of 46, Marlborough-hill, W.

In the accompanying illustrations we give the relief portrait, taken from a photograph of the model by Mr. Ford Madox Brown, of a good and life-like likeness of Rossetti, rather with a perspective sketch of the fountain designed by Mr. Seddon, as it will appear when executed and fixed on the proposed site.

# SCULPTURE: "THE REMORSE OF CAIN."

Two groups of sculpture illustrating this subject were submitted to the Royal Academy's Competition of this year; that by Mr. W. Pomeroy being the successful one. The position of this group is exceedingly good, three figures combining into one motive in an expressive manner, and we think it rightly gained the prize. The figure of Cain in Mr. Frampton's group is more powerful in form, but those of the mother and child seem much thrust apart in the composition, which is not the unity of the other group. It is well, however, for the future of English sculpture that even an unsuccessful design in a competition shows such fine qualities.

Mr. Frampton's group, we are asked to inform, is the property of Mr. H. D. Oliver.

# RAINAGE AND SEWERAGE WORKS.

On Friday, the 2nd inst., Mr. Harrison, M. Inst. C.E., one of the Inspectors of the Local Government Board, held an inquiry respecting an application made by the London and Church Joint Sewerage Board for sanction to borrow 30,000l. for outfall works and works of sewage disposal. Mr. E. Miles, C.E., Engineer to the Board, explained the plans. The Board propose to construct 123 yards of 3 ft. barrel sewer; 559 yards of 2 ft. 8 in.; and 630 yards of 6 ft. 8 in., the latter being in tunnel through the sewage. The sewage is intended to be precipitated by lime on the quiescent principle. After passing through a screening-chamber, it is to pass through a building in which the lime is to be mixed with the sewage, thence to pass alternately through one of two large tanks, 100 ft. by 60 ft., and 8 ft. deep. Each of these tanks is capable of holding one day's dry-weather flow, namely, 100 gallons, from a present population of 100,000. The latter tanks are used for final settling, and the sewage will in one be quiescent, while the other two are being filled and run off. The effluent from the tanks will be run upon some portion of the filtration-ground, which, being from the debris of the old quarry will be of nature of a water filter. The river runs directly through the site, and all within the site capable of allowing to be utilised for power which is intended to be put on a turbine. This will be sufficient for all purposes. The works laid out that by an addition of two other tanks of the same size as the last-named (for which room is provided), will be sufficient for a population of 100,000.

The drainage of this port on the coast has long been in a very bad condition, and the present unventilated and badly constructed sewers have poured their sewage by numerous outfalls into the river Ouse. The Local Board, being determined to remove all cause of complaint and to place the town in a thoroughly satisfactory sanitary condition, advertised a competition open to all the sanitary engineers of the country, offering 50l. premium for the best scheme for the drainage and sewage disposal of the town, and agreeing to engage the successful engineer to carry out the works. Eighteen schemes were sent in, accompanied by plans and reports, and the Local Board has accepted the scheme bearing the motto "Gravitation" as being, in their opinion, the best. The author of the successful scheme is Mr. W. H. Radford, Assoc. M. Inst. C.E., sanitary engineer, Nottingham. Mr. Radford's scheme is, briefly, to retain those present sewers which are in good condition, and utilise the remainder of the present sewers for surface-water only. New, well ventilated and flushed sewers, of suitable sizes, will be placed in those streets where they are required. Hassall's patent pipes are proposed to be used. The sewage from the town on the west of the river will be conveyed by a main outfall to a point away from the town, and near the mouth of the river, where it will impound in a specially constructed concrete storage-tank during high tide. The sewage will then be run into the mouth of the tidal river at half ebb, so as to take advantage of the powerful seaward current; the last remnant of the sewage will have entered the river while there is still one hour and a half of the ebb tide left to wash it far out to sea. On the east of the river, the present sewers and outfall at the mouth of the river will be utilised, but the sewage will be prevented from backing up the sewers by the provision of a suitable storage-tank, and the sewers will be well ventilated and flushed. Provision is made to connect this outfall at some future time with the main outfall, on the west, by means of a syphon under the river.

York (City).—At the meeting of the York City Council, on the 5th inst., the Urban Sanitary Committee reported that the resolution of the Council, passed on October 5th last, in reference to the selection of a sanitary engineer for the purpose of advising on the system of drainage of the city, under the provisions of the York Extension and Improvement Act, 1884, having been further considered by the committee, it was resolved that Mr. Mansergh, C.E., be selected as the engineer to be consulted, and that the Town Clerk be directed to communicate with Mr. Mansergh, in order to ascertain the probable amount of his fee for preparing and making his report. A letter from Mr. Mansergh was read, containing the following passages:—

"The question of terms is always a somewhat difficult one, because the cost of preparation of a report depends so much upon the existence or otherwise of reliable plans of the place and neighbourhood, and of sections or other particulars of existing sewers and works. If your committee would be good enough to allow me to come down and make inquiry on the points, and then to talk the matter over with them, I think it would be the most satisfactory way of coming to an arrangement."

This course was agreed to.

York Rural Sanitary Authority.—At a meeting of this Authority, held on the 8th inst., a letter was read from the Local Government Board, asking for further information on the Fulford drainage scheme. The Board pointed out that as regards the proposal of the Sanitary Authority to construct an additional sewer into the River Ouse, this would apparently involve a contravention of the provisions of section 3 of the Rivers Pollution Prevention Act, 1876, and that some other means should be devised for disposing of the sewage. It was decided to remit this communication to the sub-committee having the matter of the Fulford drainage in hand.

Railway Time Tables.—The "Twopenny Alphabetical Monthly Time Table" of the Railways of the United Kingdom\* is very clearly made out, and will prove very useful for those who want the times of through routes at a glance, without hunting through the fuller but more complicated tables of Bradshaw. Small maps of the railway systems of the kingdom are added, and enlargements of the districts round London and Manchester, and one or two other portions of the system. There is a separate detailed guide for the places within a radius of thirty miles round London.

\* 13, York-street, Covent Garden.

# ARCHITECTURAL ASSOCIATION.

## INDOOR ARCHITECTURE.

The twelfth ordinary meeting of this Association for the present session was held on the 9th inst., at 9, Conduit-street, Mr. C. R. Pink (President) in the chair.

Votes of thanks were passed to Mr. J. J. Stevenson for permitting the members to visit the houses now being erected from his designs at Kensington Court, and to the Superintendent of the Law Courts for allowing some of his officers to accompany the members in their visit to that building on the 3rd inst. A special vote of thanks was accorded to Mr. H. D. Appleton (hon. sec.) and others for their services in connection with the members' soiree.

Mr. G. R. Redgrave then read a paper on "Indoor Architecture." He commenced by saying that, strictly speaking, the title he had selected for the paper was a misnomer, for he had really no right to separate external from internal architecture, but as he wished to present a few ideas relating to the arrangement and design of domestic interiors, he had endeavoured by the title he had chosen to show that his remarks would be thus limited in their application. He proposed to deal only with the evolution of domestic interior architecture, and to retrace some of the chief features of interest in the days of the French chateau and the late Tudor dwellings. The excellent paper the Association had recently heard from Mr. Gotch\* went over much of the ground he had proposed to occupy. The art of house-planning, which was inseparably connected with his present observations, had, at any rate in all our large towns, become a question of making the best use of the smallest possible amount of space, and the skill of the architect was largely exerted in contriving to make a very limited area contain the utmost accommodation practicable. In the usual frontage to the street his task was confined to so arranging his plan as to give access to his interior, and to light his front rooms, and we were thus tied down to the narrow passage leading to the front door, with the dwelling-room on one side of it. Where we were less limited in width, it might be possible to introduce a central passage with rooms on each side. It was not possible to say much about the entrance passage; it was, and must always remain, in town houses (to which his remarks were chiefly applicable), a narrow, and generally a rather dark approach to the staircase-well. It was a matter of necessity also that the position of the staircase should be central, or nearly so, in the block, and the proportions of riser and tread, and the length of each flight, were, to a certain extent, dictated to us by their intended use, and left little chance of variation, or of altered modes of construction. Still, he had a great quarrel against the modern staircase, and he regarded most staircases as opportunities missed. He was not prepared to do as they had done in America, namely, abandon the staircase altogether in favour of the lift; though he thought the well-managed lift had everything in its favour. It was most economical of space. It saved a vast amount of muscular wear and tear, and if its mechanical arrangements and details had received as much care and thought from architects and engineers as they deserved, it would long ago have come into far more general use. As to the height of the story from floor to floor, it was a matter of faith with the builders of Mediaeval times to keep their dwelling-rooms low, and apart from their age or from any antiquarian consideration, there was an inexpressible charm, and a certain indefinable sense of ease and comfort in a low room, which he never experienced in a lofty one. Many of the rooms in modern houses were really too lofty. A low room could be warmed, ventilated, furnished, and decorated much more easily than a high one, and he had yet to be convinced that we had done rightly in doubling the height of our rooms since the days of the Stuarts. It might be said that with gas burning in a room it must be made at least 10 ft. or 12 ft. high; but then gas, in the way in which we generally burned it, was one of the most ghastly evils of the nineteenth-century. By common consent the square, or the parallelogram, has been for all time the form usually chosen for the plan of a room. Authorities, from Vitruvius downwards,—the downward authorities mostly quoting, by the bye, from Vitruvius,—had propounded laws and proportions which should regulate the sizes of the

\* See Builder, vol. xlix, p. 861.



rooms, but all founded on the square and its extension. Now, without denying in any way the excellence of these figures, he was quite sure the architect who could contrive to avoid them would get undreamed-of advantages in all rooms, except, perhaps, dining-rooms, and even in them, if he would only keep a free space large enough for the table and the servers. The best shaped room is the L, but all rooms were greatly improved, both for comfort and effect, by frequent departures from the normal type.

With regard to the subject of projection into rooms, i.e., fire-breasts,—we had become the slaves of fashion, and the provision for the 14 in. by 9 in. flue had made a sad mark upon our indoor architecture. Many of our internal arrangements were, of course, guided, or to a certain extent controlled, by the exigencies of the elevation. He could not say that architects had, so far, been bound to place their fireplaces in unsuitable positions because they had felt that a stack of chimneys would look well in that or the other part of the building in the elevation. The position of the fireplace with respect to doors and windows was a very important matter, and one too frequently disregarded. He was inclined to think that, except in the case of large rooms, an angle fireplace was the best for heating of the room, and for the certainty of a good draught. If we could accept this as one of the best positions, we should largely do away with projecting jambs and fire-breasts, and we should emancipate ourselves from some of the tyrannies of planning; but where the projection had to be faced, it should be grappled with boldly, and considered as an architectural feature, just as much as a door or a window. In the olden days, when fireplaces and chimneys were just becoming a part and parcel of our civilisation, the chimney-breast was a very dignified and important feature; it was made much of by the architect; it was the part of the interior on which he bestowed almost the chief share of his attention, and the chimney-corner was a reality and not a sham. Of course, the fireplace was a doomed feature, because we were on the eve of better times in heating and ventilation, and nothing so entirely unscientific and unsatisfactory as the ordinary open fireplace would ever be seen (except as a curiosity in our museums) 100 years hence. Bad as it was, however, in every way, from the sanitarian's point of view, English people would not relinquish the domestic hearth without a struggle. It should be remembered, too, that the heating of the room was not the only mission of the fireplace; it had also, generally speaking, to ventilate the apartment. All these points should be duly studied by the architect, and not be left entirely to tender mercies of the hardware merchant who supplied the grate. Practically, the only feature common both to the exterior and the interior, leaving the door out of account, was the window; and in the matter of windows, speaking on behalf of the internal arrangements, householders were great sufferers. They were virtually slaves to the elevation, for nobody dreamed of placing the windows where they would look best or where they would suit best when seen *inside* the rooms. Windows carried right up to the cornice of the room, with no place for the curtain-poles, bedroom windows only 2 ft. above the floor, long, thin, narrow windows, windows high up, and windows low down, and a host of lop-sided windows of all kinds, should, if possible, be avoided. As he inclined, on the score of comfort, to low rooms, so did he also most strongly prefer windows wider than they were high, also bay-windows and projecting windows of all kinds. He was speaking now only with respect to internal effect. Of all contrivances we now suffered from at the hands of builder, the most abominable and the most utterly unprincipled was the guillotine sash. No thinking man, sitting down to work out a design for a window on true principles, would ever evolve such an abortion, and that vile contrivance plainly showed how entirely the architect was a slave to precedent. That form of sash had of course some small advantages to counterbalance its defects; for one thing, it invariably fitted so badly into the frame that it supplied sufficient draughts of external air to enable the fire to burn; but then it must be remembered that the sashes rattled all night if there were any wind. It was not within his province to attempt to calculate the amount of sash-line the windows of an ordinary household would require in the

course of a year; to set down the number of lives annually sacrificed in attempting to clean such windows, or to estimate the amount of property they enabled the burglar to secure by shifting the fastening with a putty-knife. Of course, he knew that there were patent plans for removing the upper sash from within, and for turning it inside out, for the purpose of cleaning; that there were spring sash-fasteners, and screw-down sash-fasteners, and a host of contrivances, which we generally applied after our houses had been robbed for the first time. A window patiently thought out, with tightly-fitting small casements to open,—we did not want the entire sash to open at once,—with pleasant seats in it, and with room for the blinds and curtains, might become a domestic luxury instead of being a curse, with its weights, and pulleys, and boxings. It only existed as a kind of drawing torture for the architectural pupil. Great care should be exercised in selecting the place for the door when choice was left to the architect in that matter. When it was a question of reaching a bedroom from a small landing, or avoiding a staircase, of course he was often tied down to one place in the room and no other. In the dining-room the door was often so placed as, every time it was opened, to prevent the servant from passing round the guests seated at table, or to render the passage to the sideboard an enterprise of circumnavigation, requiring great courage and ingenuity. It was as well to mark on the plan the position of a dining-table, say 10 ft. by 4 ft. 6 in., and also the plan of the sideboard. With these facts before him the architect was less liable to go astray in placing the door. In an L-shaped room the position of the door could be arranged so as to avoid these difficulties, and there was far less danger of draughts if the door were placed in the recess. There were few subjects of more importance in the in-door architecture of the present day than sanitary arrangements, and these architects had by common consent, until within quite recent times, felt to be wholly unworthy of their attention. In fact, it was not until the "sanitary engineer" came upon the scene and loudly announced that the architect was an ignoramus, and not to be trusted, that the profession awoke to a due sense of its responsibilities. It would, in all cases, be advisable, if possible, to partition off a space in the attics, well lighted, and under lock and key, in which the water-cistern could be placed and frequently examined and cleaned out. The cistern should have a close-fitting cover, and the cistern-room would be kept warm by fixing just below the cold-water cistern the hot-water reservoir tank. For use in the closets the supply should, of course, be wholly distinct from the water used for drinking and cooking. It was quite impossible to estimate or to form any opinion as to the amount of injury inflicted upon ourselves and our dwellings owing to the faulty arrangements made for the burning of gas. It was only by the rarest possible chance that we ever found proper provision made for carrying away the waste products arising from its consumption, and, in the absence of suitable exhausts and outlets for the vitiated air, gas was an unmitigated evil.

The Chairman, in inviting discussion, said, the development of home comforts had been very rapid, as had also been the development of house decoration and the supply of materials. The staircase was doubtless a *crux* to the architectural pupil, and even to those who were much more advanced. The staircase, communicating as it did with the hall, should be always warmed, as the doors of the principal rooms opened upon it. In speaking of the tread and riser, and the various complications of staircase construction, he always rendered a good rule which should be kept in mind, viz., that twice the rise and once the tread should equal 24 in. The stereotyped rectangular room, he agreed, might be modified in many instances. In such palatial structures at Hampton Court, and even in such old houses as could be found in Cheshyre-north, there were some charming L-shaped rooms, and others with angle fireplaces. He was also of opinion that, as a rule, the rooms of the present day were excessive in height. This often rendered the rooms less comfortable, and less easy of proper ventilation and warming. The open fireplace was a very unscientific arrangement, but it would take a long time to kill. The members would do well to study a paper written a short time ago by Dr.

Pridgin Teale, which was printed in the *Builder*,\* referring to his use of the "Economiser," and the various improvements on the fire-basket. Many of these improvements worked very well in practice. There were doubtless great objections to sash windows, but they also had many advantages, and in some positions he would sooner see them than any other form of window. The position of the door of a room, in relation to the fire-place and windows, was the most important thing in the planning. As to fastenings, the Kaye lock was a great improvement on the old forms. Turning to sanitary matters, there was no lack of careful study of the subject on the part of the students of the Association. He only hoped that the action of the Plumbers' Company, and other bodies, would insure a supply of better plumbers than had carried out some of their works in the past.

Mr. Henry Lovegrove proposed a vote of thanks to Mr. Redgrave for his paper. He believed the staircase would continue. Lifts were all very well in public buildings and offices, but a lift in a private house would be extremely dangerous, especially where there were children.† The staircase might also be made a feature, although it was difficult to do so when it rose from a narrow passage. It might be like some of those in Gower-street, very ordinary indeed, or, as in the old houses in the Adelphi and at Chelsea, an attempt to make an artistic staircase. On an ordinary site, the architect should, if possible, make his staircase round a corner, and out of the way of the front door. Somewhere on the first landing, again, a tall window might be introduced, such as Mr. Norman Shaw used in some of his buildings. Then, common-place details might also be done away with.

Mr. J. A. Gotch, in seconding the vote of thanks, said he believed that lifts were a long way yet from general adoption, as architects had always to reckon with the British householder, and more especially with the wife, who was a conservative of the most pronounced type. The reason why an angle fireplace did not find favour in living-rooms was that only a quarter of a circle could sit round it.

Mr. Leonard Stokes thought Mr. Redgrave had been rather hard upon modern staircases. Many of them, no doubt, were atrocious, but that was because they had not been designed, for a well-planned staircase added a deal of artistic value to a house, and made it enjoyable.

Mr. H. D. Appleton believed that lifts could be seen working at Kensington Court by hydraulic power, and with special safety locks. Each lift registered the number of times it was used, and the rent charged per lift was something like 20s. a year.

The vote of thanks was then put, and Mr. Redgrave replied to some of the points raised in the discussion.

#### THE BUILDING TRADES' EXHIBITION.

This exhibition closes this (Saturday) evening, the 17th inst., at ten o'clock. We add to the notice of its contents which we published last week a few paragraphs which were then crowded out for want of space.

Messrs. Broad & Co. (Stand 188), exhibit a good variety of sanitary specialties in white enamelled stoneware, which will repay attention.

Mr. Samuel Elliott, of Newbury (Stand 232), has an admirable display of mouldings in all kinds of woods. They are in a great variety of sections, and are very clean and sharp in execution. This is one of the best displays of the kind we have ever seen, and visitors who see it are sure to linger over it for a few moments.

Messrs. Bower & Florence (Stand 245), exhibit a Celtic monumental cross, 9 ft. high, in polished grey granite, ornamented with interlacing work produced by alternating polished and unpolished surfaces.

Messrs. Wright & Co. (Stand 246) exhibit the applications of their fireproof firing-blocks for securing carpenters' and joiners' work to walls. Their use will be found advantageous.

The Patent Sliding Sash Casement Company (Stand 62) exhibit their patent sash, which affords great facility for cleaning the panes, inside and out, without risk to the life or limb of the cleaner. The invention combines the principle of the sliding-sash with

\* See p. 285, ante.

† We entirely concur with Mr. Lovegrove.—Ed.



**King's College, London.**—The Council have appointed Mr. Hulme, head-master of the Putney School of Art, to the Professorship of Geometrical, Engineering, and Architectural Drawing, vacated by the death of Professor Glenn, who held the appointment since 1864.



## The Student's Column.

OUR BUILDING STONES.—VI.  
ON SPECIFIC GRAVITY AND ITS USES.

**36** It is often found useful to know the weight of stones, because to a certain extent it is an index to their durability. Many published results show the average weight per cubic foot, whilst others give the specific gravity. The trouble of preparing several samples of hard stones, making them of the required size and shape, in order to find their average weight, is a drawback to the former method. The latter method is, perhaps, the preferable one, for not only can the stones be of irregular shape, but when an average piece is carefully selected more accurate results are obtained.

The specific gravity of a substance is its weight compared with that of an equivalent bulk of pure water at a definite temperature and pressure. The density of a rock or mineral depends, to a great extent, on chemical composition and minute structure.

The stone to be weighed must be an average-looking specimen, because two fragments of the same rock may contain different proportions of its constituent minerals.

The most convenient way of finding the specific gravity is by weighing the same specimen first in air, then immersed in water, and dividing the former weight by its excess above the latter.

The weight of the piece of stone must be made with a delicate balance. Now, suppose we have found that its weight in air is 4.32 oz. we then proceed to weigh it in water. To do this a piece of silk or fine thread should be securely fastened round the specimen, which should then be immersed in water, the other end of the thread being attached to the balance. If any air bubbles appear adhering to the stone they should be carefully removed with a brush or the result would be inaccurate.

After due care has been exercised we may find that the specimen weighs only 2.46 oz. in water. We should then find the specific gravity as follows:—

Weight in air ... 4.32 oz.	
" " water 2.46 oz.	
	1.86)4.32(2.32
	3.72
	—600
	558
	—420
	372
	—48

2.32 is therefore the specific gravity of the specimen.

In order to obtain very accurate or reliable results, it is necessary to procure a proper instrument for the purpose.\*

A good machine is that called "Walker's Specific Gravity Balance," invented by Mr. W. N. Walker, F.G.S., and sold by Mr. G. Lowden, optician, Dundee. It is a steelyard in which a

T.—Tumbler of water.

Z.—Object, the specific gravity of which is to be found.

Erect the balance as represented above.

Suspend Z by a fine thread from the lever AB, and move out or in until the weight at EH is balanced by Z,—say at point Y.

Next immerse Z in a tumbler of water (as Z') and move out towards B until balance is again restored, say at point Y'. Then it follows from the properties of a lever that  $\frac{XY'}{XY} = \frac{XZ'}{XZ}$

is the specific gravity of the object. The result may be checked by changing the point of suspension of EH, say to a, and then re-weighing the object.

Instead of XY and XY' the points of equilibrium will now be b and b', and as before,  $\frac{Xb'}{Xb} = \frac{XZ'}{XZ}$  specific gravity of object.

Professor J. W. Judd, F.R.S., speaking of this instrument, says,—“Any one with ordinary care may obtain for the specific gravity of a rock or mineral a result which is absolutely reliable as far as the first place of decimals and approximately true for the second.”

A knowledge of specific gravity is perhaps more useful in selecting stone for marine works than anything else with which we have to deal. For sea-walls and pier harbours, exposed both to heavy breakers and shingles, hardness and durability, with great specific gravity combined should be sought for.

The greater the weight of a given sized sea-wall or pier, all other things being equal, the better will it stand the force of the breakers.

Some years ago Mr. Thomas Stevenson conducted a series of experiments on the force of the breakers on the Atlantic and North Sea coasts of Britain. The average force in summer was found in the Atlantic to be 611 lb. per square foot, while in winter it was 2,086 lb. But on several occasions both in the Atlantic and North Sea the winter breakers were found to exert a pressure of 3 tons per square foot, and at Dunbar as much as 3½ tons.

Besides the continual bombardment of breakwaters and other marine works, caused by waves throwing huge blocks of stone against them, we have to take into consideration, even where this action is less violent, another powerful agent which also does a great deal of damage. It is the alternate expansion and compression of air in crevices made in the masonry, which dislocate large masses of the stone even above the direct reach of the waves.

Engineers know that, even from a vertical and apparently perfectly solid wall of well-built masonry exposed to heavy seas, stones will sometimes be started out of their places, and that when this happens a rapid enlargement of the cavity may be effected.

At the Eddystone Lighthouse during a storm in 1840, a door, which had been securely fastened against the force of the surf from without, was actually driven outward by a pressure acting from within the tower, in spite of the strong bolts and hinges, which were broken. We may infer that by the sudden sinking of a mass of water hurled against the building a partial vacuum was formed, and

We quote these examples to show the influences to which stones selected for lighthouses, sea-walls, &c., are in some instances subjected. There can be no doubt whatever that stones having a high specific gravity, which include some of the compact, medium-grained, heavy varieties of granite, are amongst the best materials for these purposes. Exceedingly heavy and compact limestones have been used for large marine works; but the action of molluscs before alluded to (p. 525) is a serious drawback to them in many instances.

Bearing in mind what we have said as to stones weighing less in water than in air, the student will readily understand that in dealing with submarine structures the relative weight of the stones used is greatly reduced.

The following examples, taken from Mr. T. Stevenson's "Harbours," p. 107, will further illustrate this fact:—

	Specific Gravity.	No. of cubic ft. to a ton in air.	No. of feet to a ton in sea-water of specific gravity 1.025.
Basalt, .....	2.89	11.9	18.26
Red Granite ..	2.71	13.2	21.30
Sandstone ..	2.41	14.8	26.00

Although the care in the selection of stone by specific gravity for rather deep submarine work should by no means be neglected, it is no so important, perhaps, as for that portion of the structure near and just above the surface of the water; for this reason,—waves, which are the principal source of the destruction of the works, only exist at the surface of the water. Underneath, everything is comparatively quiet, and very little or no damage is caused from the motion of the water.

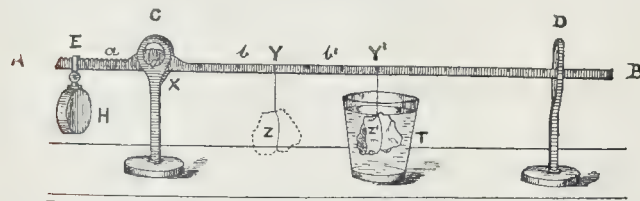
Delessé says that engineering operations have shown that submarine constructions are scarcely disturbed at a greater depth than 5 metres (16.4 ft.) in the Mediterranean, and 8 metres (26.24 ft.) in the Atlantic.\*

As might be expected, there is an intimate connexion between the specific gravity and crushing weight of stones. Information bearing on this point may be found in Barlow's "Treatise on the Strength of Materials" (ed. 1867), p. 111, and the *Builder*, vol. xlviii. (1885), pp. 192-3.

**British Archaeological Association.**—At the meeting of this Association on the 7th inst. Mr. C. H. Compton in the chair, Mr. Cecil Brent, F.S.A., exhibited a fine Merovingian buckle with clasp, having ornamental similarity to some of the objects recently found at Taplow. Mr. Loftus Brock, F.S.A. described a series of coins of Antoninus Pius found in London, with the figure of Britannia on one of these, a new type, the figure represented clearly that of a female, and there is trophy, a human head on a spear, by her side Mr. Roope exhibited a very good double-handled Etruscan vase. The Rev. J. J. Daniell described the prehistoric monument recently discovered at Langley Burrell, and a plan was exhibited showing the extent of the paved oval space which is surrounded by a fosse. Mr. R. Ferguson, F.S.A., spoke of the radiating lines having so much resemblance to the star tumuli of the north of England. Mr. T. Blashill, F.S.A., referred to the length to the proposed restoration of Waltham Cross, and exhibited an elaborate series of plans prepared by Mr. Ponting. The whole of the stone used in the restoration of 1832 is found to be in a loose and crumbling condition, except the upper shaft, and it appears to be expedient in consequence to renew the whole. The original portion of the ancient work are not to be touched.

**Whitechapel.**—Last Sunday Mr. Montague presided at the dedication of the "Poor Jew Shelter," in Leman-street, Whitechapel, altered to suit all the requirements of a casual ward. Special attention has been given to sanitation throughout the building; the drainage and the adjacent fittings are of the most effective and simple kind, and have been executed to suit the rough usage at the hands of the inmates. T. constant action of water on the drains from two distinct automatic flushing-tanks, and the continual ventilation of the whole of the system are what is required in a building of this kind. The disinfecting-chamber for clothing has been carried out by Messrs. Bird. T. heating and bath work have been executed by Mr. F. Brown, engineer. There are two dining lifts by Waygood going from the kitchen down into the large dining-room. The builder was Mr. Triggs, and the architect Mr. Lewis Solomon.

\* "Lithologie des Mers de France" (1872), p. 110.



fixed weight is made to act at different distances on the arms of a lever. Thus,—

AB.—A lever graduated from X in inches and tenths of an inch; hundredths must be guessed.

C.—Upright with rings to receive knife edge of lever.

D.—Upright with slit to steady lever while shifting object.

EH.—Weight which can be moved backwards and forwards, and placed according to the size of the specimen to be weighed.

that the air inside forced out the door in its efforts to restore the equilibrium.

Dr. A. Geikie says that this explanation may partly account for the way in which the stones are started from their places in a solidly-built sea-wall. But, besides this cause, we must also consider a perhaps still more effective one, in the condensation of the air driven before the wave between the joints and crevices of the stones and its subsequent instantaneous expansion when the wave drops.

\* *Geol. Mag.*, vol. x. (1883), p. 110.

† *Rep. on Geol. of Corn.*, Devon, and W. Somerset, by (Sir)

H. T. de la Beche, F.R.S.

‡ *Trans. Roy. Soc.*, Edin., vol. 25.

§ Walker, "Proc. Inst. Civ. Engin.," i., p. 15.

\* Several kinds are treated of by Professor Judd in "Proc. Geol. Assn.," vol. viii., pp. 273-287.



## RECENT PATENTS.

## ABSTRACTS OF SPECIFICATIONS.

16,922, Planing and Dressing Stone. P. OROCRAN.

The stone to be operated upon is fixed upon a table below the cutters. This table is traversed on rollers or pulleys mounted in the bed-plate of the machine by a rack and pinion driven in the ordinary manner, so as to be easily reversed. The tools for working the stone are either steel cutters, or of amonds or other hard material mounted in steel holders, and which are fixed at a suitable angle in a slide on the end of a spindle, the tools being rotated by a worm and wheel. When diamonds or other substances are used, several are set in the steel, so to prevent the steel from wearing away. When required, similar slides and tool-holders may be added on the uprights to plane the sides of the one.

16,952, Disinfecting. J. WATTS.  
This is an apparatus for generating and ejecting mists, smoke, or vapours for disinfecting, deodorizing, or fumigating purposes, or for testing pipes of passages by what is known as the smoke-test, for analogous purposes. The fumes, &c., are produced from any suitable material fed into a generating chamber provided, when a fire is necessary for the production of the fumes, with adjustable inlets for air. A blower or exhauster is also employed, by which a current is raised which is not passed through the generating chamber, but is caused to pass independently to and from the same, where the current meets the fumes, and conveys them along suitable pipes to the place where they are to be utilised.

16,951, Planing Wood. S. S. HAZLELANDS.  
The wood to be planed is fed along a table over a stationary cutter by an elastic feed roller on a shaft actuated by two hand-wheels provided with handles fastened in slotted spindles. Provision is made for bringing up the table towards the roller by weights, also for preserving the knife from contact with the feed roller by bars on the brackets abutting against bosses on the uprights.

16,862, Lavatory. G. PEPPER.  
The service cistern is divided into three compartments. The middle one is supplied by a ball-cock the usual way, and communicates by valves with the other compartments, which conduct water to the basin by pipes. The valves which control the supply to the outer compartments, and also those which regulate the basin supply, are connected to the valves extending from a weighted spindle, which is connected by wire to the free end of a lever foot-board to which the spindle of the outlet valve is connected. When the foot-board is depressed the outlet valve is closed, and the basin is filled from one of the side compartments, when the foot-board is released the discharge-valve is opened the basin is filled from the other side compartment. If required, hot water can be supplied by a separate pipe.

## NEW APPLICATIONS FOR PATENTS.

April 2.—4,603, J. Rawlings, Bench Plugs for Painters' Benches, &c.—4,610, J. Bloomfield, Buildings.—4,646, Z. Danly, Metallic Buildings.

April 3.—4,671, D. Cowan, Cooking Ranges or Stoves.—4,694, C. Toope, Hot-water Apparatus for Conservatories, &c.

April 4.—4,708, E. Caunt, Sash Fastener.—4,721, Lyon, Testing Gas or Air Pipes for Leaks.—4,738, G. Body, Fastening for Casement, Sashes, &c.—4,737, Baron de Liebhafner, Cauldrons for Removing Paint, &c.—4,748, T. Wall, Connecting Trap and Other Drains to Main Drain or Sewers.

April 5.—4,757, W. Swain, Bolt and Fastener for Sliding Doors, &c.—4,765, J. Karpe, Discharge Apparatus for Water-closets, &c.—4,779, J. Bolding, Kitchen Ranges.—4,803, C. Many, Construction and Use of Fire Grates.—4,816, B. Vorty, Ventilating and Warming Buildings.

April 7.—4,847, E. Collier, Exhaust or Ventilating Fans.—4,856, W. Burdock, Lamps or Burners for Painters, Plumbers, and Gasfitters.—4,860, A. Sash Fasteners.—4,866, S. Worsnop, Fixing and Slates to Iron Roofs.—4,887, S. Giles and J. Petrie, Decorating Linoleum Walton, Tyne-castle &c.

April 8.—4,901, T. Whittaker, Hinges for Folding Doors and Screens.—4,915, J. May and G. Ion, Electric Burglar Alarms.

## PROVISIONAL SPECIFICATIONS ACCEPTED.

339, H. Snelgrove, Fireproof Ceilings and Floors.  
340, J. Mazellet, Irons and Hinges for Glazed Buildings, Hothouses, &c.—1,832, H. Owens, Pressing and Moulding Machines.—2,753, J. Self-adjusting Waterproof Louvers for Ventilating Buildings, &c.—2,857, J. Candall, Attaching Knobs to Stairs.—3,044, C. Kite, Ventilating.—3,783, J. Eilam and E. Phillips, Fire Joint.  
381, W. Hill, Alarms for Windows, Doors, or Stairs.—1,917, R. Quinn, Apparatus for Cutting

Mitre Joints.—2,351, G. Pridmore and G. Wake-man, Window Fastenings.—3,285, W. Howie and R. Henderson, Windows.—3,309, G. Potter, Attaching Door Knobs or Handles to Spindles.—3,336, H. H. Kingsbury and A. Puzey, Window Fastener.—3,547, G. Brodie and J. Prior, Fire Grates.—3,560, J. Dyson, Gullies and Drain Draps.—3,712, D. Sutherland and J. McIntosh, Bakers' Ovens.—3,790, G. Brodie and J. Prior, Shifting Bottom Fire Grates.—3,903, J. Knight, Step Ladders.—3,949, F. Humpherson, Forming Sockets on Lead Pipes.

## COMPLETE SPECIFICATIONS ACCEPTED.

## Open to opposition for two months.

6,766, W. Parry, Scaffold Fastener.—7,743, G. Wright, Stove Grates.—12,098, W. Bruer, Drain Bends and Branches, with Traps combined.—12,383, A. Ponton, Artificial Stones and Concretes.—6,157, C. Schlickeysen, Cutting Bricks and Tiles.—6,250, K. Barnes and H. Heath, Water Meters, &c.—6,475, J. Attridge, Cups or Receivers for Dust, Ashes, and Flower Potting.—7,005, T. Messenger, Regulating the Supply of Water to Water-closets and Preventing Waste.—7,339, H. Snelgrove, Fireproof Ceilings and Floors, Blocks, Tiles, &c.—7,775, A. Roberts, Refuse Bins.—7,778, A. Grundy, Venetian Blind Lath.—7,967, A. Stott and Others, Fireproof Flooring.

## RECENT SALES OF PROPERTY.

## ESTATE EXCHANGE REPORT.

## April 5.

By J. POSEY.  
Camberwell—143, 145, and 147, Southampton-street, and stabling, 75 years, ground-rent 21s. 12d. ... £1,050  
South Horseay—48, Spencer-road, 68 years, ground-rent 5s. 6d. ... 185  
Stratford—34, 38, and 38, Gillingham-road, 71 years, ground-rent 12s. ... 385  
Walthamstow—34, Brandon-road, 90 years, ground-rent 2s. 10s. ... 185

## April 8.

By VINTERS & SON.  
Holborn—18, Bartlett's Buildings, freehold ... £2,820  
19, Bartlett's Buildings, an improved rent of 65s. a year, term 17 years ... 450

## April 8.

By C. & H. WHITE.  
Kennington—40, Egham-street, 20 years, ground-rent 2s. 15s. ... 275  
Lambeth—8, 9, 10, Philadelphia-terrace, 18 years, ground-rent 15s. ... 510  
Walworth—3 and 4, Red Lion Mews, 64 years, ground-rent 7s. ... 310  
123, Boyson-road, 65 years, ground-rent 6s. 10s. ... 410  
Gray's Inn-road—14 and 15, Regent-square, 19 years, ground-rent 18s. ... 830  
Baywater—132 to 138 even, Inverness-terrace, improved ground-rents of 88s. term 56 years ... £1,680  
Hammersmith, 2, Southerton-road, 80 years, ground-rent 6s. 10s. ... 345  
Lambeth—5, 7, and 8, Robert-street, and 1, 2, 6, and 8, Robert-place, 23 years, ground-rent, 29s. 14s. and subject to an annuity of 39s. a year, 18, 18, 19 to 23, Little Thomas-street, 23 years, ground-rent 14s. 1s. ... 260  
375

## April 7.

By F. HANDS.  
Forest Hill—3 and 4, Emerson-terrace, freehold ... 900  
By A. J. ROGERS & CO.  
Wapping—3, Sampson's-gardens, freehold ... 350  
By DRYER & PERFECT.  
Holloway—282, Hornsey-road, 94 years, ground-rent 7s. ... 400  
By E. ROBIN & HINCH.  
South Kensington—7, Redcliffe-road, freehold ... 860  
By HANDS & JENKINSON.  
Borough—40, Tabard-street, 45 years, ground-rent 10s. 10s. ... 450  
Charlton—88c, Mayson-road, 83 years, ground-rent 6s. 6s. ... 280

By C. C. & T. MOORE.  
Mile End—29, 30, and 32, Lindley-street, 14 years, ground-rent 12s. ... 250  
Stepney—70, Clark-street, 15 years, ground-rent 8s. 2s. West Arthur-street, 14 years, ground-rent 4s. 10s. Groveson-street, 11 years, ground-rent 2s. 6s. 8d. ... 110  
Mile End—68 and 70, St. Ann's-road, 65 years, ground-rent 7s. 9s. ... 385  
Barnes—43, Maitly-street, and 52, Stanworth-street, 27 years, ground-rent 4s. 10s. ... 320

By POSTER & CRAWFIELD.  
Holloway—31 and 33, Harvest-road, 55 years, ground-rent 13s. ... 665  
Wandsworth—143, Fulham-road, 95 years, ground-rent 3s. 3s. ... 255

By E. STIMSON.  
Clapham-road—28, 30, and 34, Portland-place North; and ground-rents of 10s. a year, 34 years, ground-rent 8s. 10s. 10s. North 16 years, ground-rent 10s. 6s. ... 800  
Peckham—13 to 19, and 33 to 45 odd, Azenby-square, 61 years, ground-rent 5s. 10s. ... 345  
By NEWBORN & HARDING.  
Hornsey—8 and 10, Shaftesbury-road, freehold ... 750  
Finsbury Park—24, Florence-road, 92 years, ground-rent 7s. 10s. ... 360  
Green-lanes—The Residence Stapleton House, 63 years, ground-rent 15s. ... 1,000  
Holloway—39, Windsor-road, 68 years, ground-rent 6s. 5s. ... 290  
Barnesbury—120, Cloudeley-road, 16 years, ground-rent 4s. ... 225  
12 to 21, Victoria-street, freehold ... 1,045  
74, John-street, 69 years, ground-rent 4s. 4s. ... 400

By WYFORD & HAYWARD.  
Dover—18, Church-street, freehold ... 375  
Bewling Green Hill—Freehold house and shop ... 250  
9, Norman-terrace, freehold ... 340

Dover—10, Flavia-court, freehold ... 4117  
25, St. James's-street, freehold ... 300  
16, St. Radegund's-road, freehold ... 275  
116, Clarendon-street, freehold ... 170  
50, 51, and 78, Lincolin-street, 8 years, ground-rent 6s. 14s. ... 263  
51, Oxendon-street, 14 years, ground-rent 15s. ... 10

## April 9.

## Baker &amp; Sons.

Transvaal—Seven Freehold Farms, containing 49,800 acres ... 59  
Burton—The Model Farm, containing 13a. 2r. 27p., freehold ... 2,500  
Freehold Orchard and garden, 14a. 2r. 13p. ... 2,800  
Ground-rent of 8s. reversion ... 160  
Heck, Moor-lane—Orchard House, and 2a. 2r. 1p., freehold ... 510  
Fulham—1 to 7, Gloucester-terrace, freehold ... 820  
Freehold Stabling in rear ... 300  
2, 3, 4, and 6, Colchester-terrace, freehold ... 1,460  
Battersea—43, 45, 47, and 49, Gwynne-road, 83 years, ground-rent 20s. 10s. ... 715  
42 and 44, Urswick-road, 75 years, ground-rent 12s. ... 285  
Kensington—15, Prince of Wales-road, 84 years, ground-rent 7s. ... 360

By C. & D. FIELD.  
Brixton—23, St. Laurence-road, 77 years, ground-rent 6s. ... 290  
Southwark, Tabard-street—The Castle Freehold Public House ... 1,600  
14, Cecil-street, freehold ... 225  
177, Tabard-street, freehold ... 330

## MEETINGS.

## SATURDAY, APRIL 17.

Royal Institution.—Professor Oliver Lodge on "Fuel and Smoke." 11. 3 p.m.  
Edinburgh Architectural Association.—Visit to Niddrie Marshes.

## MONDAY, APRIL 19.

Victoria Institute.—(1) Professor Post on "Syrian Meteorology." (2) Paper by Mr. W. St. Chad Boscarden, 8 p.m.  
Inventors' Institute.—8 p.m.

## TUESDAY, APRIL 20.

Institution of Civil Engineers.—Mr. Henry Ward on "Brickmaking." 8 p.m.  
Statistical Society.—Professor Leone Levi on "The Progress of Joint-Stock Companies with Limited and Unlimited Liability in the United Kingdom during the Fifteen Years, 1869-1884." 7 45 p.m.

## WEDNESDAY, APRIL 21.

British Archaeological Association.—(1) Mr. W. de Gray Birch, F.S.A., "On Two Sculptured Slabs in Chichester Cathedral." (2) Mr. J. T. Irvine on "The Saxon Tower of Barnack Church." 8 p.m.  
Civil and Mechanical Engineers' Society.—Mr. C. T. Walrod on "Some Details of Drainage and Water Supply." 7 p.m.  
Builders' Foremen and Clerks of Works' Institution.—Quarterly Meeting of Members. 8 30 p.m.  
Royal Meteorological Society.—Five papers to be read, 7 p.m.

## SATURDAY, APRIL 24.

Edinburgh Architectural Association.—Visit to the Drum.

## Miscellaneous.

Architectural Association.—The sixth Saturday afternoon visit of the Architectural Association during the present session was made on the 10th inst. to the Constitutional Club, now being built from the design of Mr. R. W. Edis, F.S.A., in Northumberland Avenue, Charing-cross. Mr. Edis kindly met the members, and gave a brief description of the building. The ground-floor contains the morning-room, 110 ft. long by 30 ft. wide; reception-room; and smoking-room. The first floor contains the coffee-room, 139 ft. by 30 ft.; library, 50 ft. by 27 ft. The second floor contains the smoking-room, 100 ft. by 30 ft.; billiard-room; and committee or house dining-room. In addition to these are the service-rooms on each floor. On the upper floors are eighty sets of chambers. The main staircase is being constructed on a plan suggested by Mr. Holloway, the clerk of the works, of coals breeze concrete with a light iron girder just at the back of the riser, the treads and risers being faced with marble. The staircase is 10 ft. wide. The ceilings of the principal rooms, which are just being fixed, are of rich and quaint design, in plaster relief. The electric lights are studded all over the ceiling at numerous points, and are worked into the general design, the ventilating extract openings being connected with these ornaments, in which lights are set. The whole of the heating is to be done by open stoves, Mr. Edis stating his experience of hot-water coils in clubs as being that they made the rooms stuffy, and he had had them taken out in several instances.

Window Blinds.—Messrs. Guyman & Son, of Carburton-street, supplied the blinds throughout the Cambridge Union Society's new buildings, recently mentioned in the Builder. The same firm are now fitting the vertical and horizontal windows of the new Lecture Theatre at the Liverpool University College with dark blinds, which are of a special character.



**Liverpool Engineering Society.**—The usual fortnightly meeting of this society was held on Wednesday, 7th inst., at the Royal Institution, Colquhoun-street, Mr. Coard S. Pain, A.I.C.E., in the chair. A paper was read by Mr. W. E. Mills, entitled, "Notes on the Damage sustained by a large Building from Subsidence and the Means taken for its Support." It was requisite that the front face of the building referred to should be supported, and as much weight as possible taken off the foundations. The authorities required that whatever "shoring" was introduced should not obstruct the footway, and the owners desired that access to the building should not be interrupted. Hence the ordinary methods of "shoring" were inadmissible, but the difficulty was overcome by means of a special arrangement of timber supports or "shores," which the author described in detail. The state of the building continued to become worse, and a portion was at length condemned by the authorities, and ordered to be taken down. It was found that the necessary requirements would be met by removing the main outer walls, but it was stipulated that the use of the building must be preserved while the work was being executed, and the inmates interfered with as little as possible. The author then described the means by which this was accomplished, a timber wall or partition being built up inside the main wall, so that when the latter was pulled down the timber partition took its place, and the work was thus completed without interrupting the ordinary course of business carried on in the building for a single day.

**The Farmer New Schools and Hall, Victoria Park.**—A boys' school with large hall for secondary and high-class educational purposes is now in course of erection in Approach-road, Victoria Park, for the Governors of the Farmer Charity. The building, which has a frontage of 152 ft. to Approach-road, is Domestic Gothic in character, and, including the basement, has four floors. It is faced with red brick and Portland stone. Two prominent features are a tower 100 ft. in height, and a lofty bay-window to the great hall. The general face of the building is 60 ft. in height. The interior is approached by a porch at the head of a flight of steps, leading to the entrance hall. The ground-floor of the building contains the large hall, also the head-master's room and two class-rooms, lecture-theatre, laboratory, &c. The first floor contains three class-rooms, and masters' apartments, and also gives access to the gallery in the large hall. The second floor contains class-rooms, and also one large room for drawing purposes. The basement, in addition to a covered playground, contains a dining-room for the use of the students, with the kitchen and culinary departments, and also the caretaker's apartments. The heating of the building will be effected by hot-water pipes and radiators, this portion of the work being carried out by Mr. W. P. Phipson, engineer, of Salisbury-street, Strand. Messrs. T. Chatfield Clarke & Son are the architects; and Mr. Charles Cox is the contractor, the contract having been taken at the sum of nearly 9,000l.

**Sanitary Assurance Association.**—At a meeting of the Council, on the 12th inst., General Sir Peter S. Lumsden, C.B., C.S.I., was elected a member of the Executive Council, on the motion of Sir Joseph Fayrer, F.R.S. Mr. Mark H. Judge submitted a draft Bill for the better sanitation of dwellings. This draft was referred, for consideration and report, to a committee consisting of Professor Rogers Smith, F.R.I.B.A., Dr. James Stevenson, Mr. Andrew Stirling, Mr. H. Rutherford, Barrister-at-Law, Mr. M. H. Judge, A.R.I.B.A., Members of the Council; and Dr. R. Farquharson, M.P., Member of the Honorary Council. One of the provisions of the proposed Bill is as follows:—"After January 1st, 1888, it shall not be lawful for any dwelling-house, school, hotel, or other public building, used, or intended to be used as such, to be so used unless and until a certificate has been deposited with the local authority in accordance with the provisions of this Act."

**Proposed New Municipal Buildings for Edinburgh.**—The Edinburgh Town Council, at a meeting held on Monday last, adopted by twenty-six votes to ten a report by the Lord Provost's Committee recommending the erection of new municipal buildings on the site of the present buildings and adjoining property, and craving a remit with powers to obtain competitive plans, and offer premiums for the first and second designs.

**Colonial and Indian Exhibition.**—A meeting of the Reception Committee was held a few days since, at the Society of Arts; the Duke of Abercorn, C.B., in the chair. The Committee considered a report from the Sub-committee as to the arrangements which could be made for excursions for Colonial and Indian visitors. Mr. Somers Vane, the Official Agent of the Exhibition, attended, and reported to the Committee the arrangements which had been made with the railway companies with the view of affording extended facilities for railway travelling to all Colonial and Indian visitors coming to the Exhibition. The Chairman reported that, in accordance with the wishes of the Committee, and with the approval of H.R.H. the Prince of Wales, he had communicated with the mayors of some of the chief principal cities, asking if they would arrange for visits of parties of distinguished visitors.

**National Smoke-abatement Institution.** A meeting of the committee of this Institution was held at the Parkes Museum on the 6th inst., Mr. Ernest Hart in the chair. A letter was read from the Home Secretary saying that from correspondence with the Commissioners he is satisfied that the police have taken proceedings in all cases of smoke nuisance in which they could properly do so, and exercise due supervision over the steamers on the river, adding that the extension of the area to which the Smoke Nuisance Acts apply is a matter for the consideration of the legislature. A sub-committee was appointed to correspond further with the Home Secretary, and to urge upon the Government the necessity for the extension of the area embraced by the Acts. The secretary reported that the furnace of a steam-launch on the Thames at Hampton had been tested by the engineer of the Institution, who, in his report, stated that during a run of thirteen miles no smoke was visible at the top of the chimney throughout the trip, an improvement of great importance to all owners of launches. Several descriptions of new appliances for smoke abatement were reported and discussed, and it was resolved to publish shortly a selection of the numerous tests of apparatus made by the Institution since the publication of the report on the Smoke Abatement Exhibition in 1881-82.

**Archæology.**—Professor Newton will deliver at University College a course of three lectures on Greek Inscriptions, followed by three on Greek Myths, illustrated by fictive vases and other monuments, on the following dates:—May 7, 14, 21, and 28; June 4, 11. Dittenberger, Sylloge Inscriptionum Græcarum, Lips. 1883, and Hicks, Manual of Greek Inscriptions, will be used as text-books in the lectures on Inscriptions.

**Mr. Holman Hunt's Pictures.**—Mr. Wm. Reeves will issue early next week "Notes on the Pictures of the Holman Hunt Collection" (now on view at New Bond-street), with criticisms by John Ruskin, and other critical notes. The work will be issued at 1s., with a few large-paper copies, and will be uniform with the recent "Notes on the Millais Collection," with preface and criticisms to date by John Ruskin.

#### PRICES CURRENT OF MATERIALS.

TIMBER.	£. s. d.	£. s. d.
Greenheart, B.G. ....ton	6 5 0	7 0 0
Teak, E.I. ....load	12 10 0	15 0 0
Sequoia, U.S. ....foot cube	0 2 4	0 2 8
Ast, Canada ....load	3 0 4	4 10 0
Birch " ....do	3 0 4	4 10 0
Elm " ....do	3 10 0	4 15 0
Fr. Dantic, &c. ....do	3 10 0	4 15 0
Oak " ....do	3 0 0	0 0 0
Canada " ....do	5 10 0	6 10 0
Pine, Canada red ....do	3 0 4	4 0 0
" yellow ....do	3 0 4	4 0 0
Lath, Dantic ....fathom	3 10 0	5 0 0
St. Petersburg ....do	4 0 0	6 0 0
Waincoat, Rugs ....log	2 15 0	4 10 0
St. Petersburg, 1st yellow ....do	3 0 4	4 0 0
Doals, Finland, 2nd and 1st, std. ....do	7 10 0	8 10 0
" 4th and 3rd ....do	6 0 0	7 10 0
Rice " ....do	6 0 0	8 0 0
St. Petersburg, 1st yellow ....do	3 0 4	4 0 0
" 2nd " ....do	7 0 0	8 15 0
" white " ....do	7 0 0	10 0 0
Swedish " ....do	7 0 0	15 0 0
White Sea " ....do	7 0 0	17 10 0
Canada, Pine 1st ....do	17 0 0	30 0 0
" 2nd " ....do	12 0 0	17 0 0
" 3rd &c. ....do	8 0 0	10 0 0
" Spruce 1st ....do	8 0 0	11 0 0
" 3rd and 2nd ....do	5 0 0	7 10 0
New Brunswick, &c. ....do	5 0 0	7 0 0
Battens, all kinds ....do	4 0 0	12 0 0
Flooring Boards, sq. 1 in.-Pre- pared, first ....do	0 9 0	0 13 0
Second " ....do	0 7 8	0 8 0
Other qualities " ....do	0 6 0	0 7 0

TIMBER (continued).	£. s. d.	£. s. d.
Cedar, Cuba. ....foot	0 0 3	0 0 0
Honduras, &c. ....do	0 0 3	0 0 4
Australia " ....do	0 0 3	0 0 4
Mapogany, Cuba " ....do	0 0 5	0 0 7
St. Domingo, cargo average ....do	0 0 5	0 0 7
Mexican " ....do	0 0 3	0 0 4
Salvador " ....do	0 0 3	0 0 4
Honduras " ....do	0 0 4	0 0 6
Maple, Bird's-eye. ....do	0 0 6	0 0 8
Rose, Rio " ....do	7 0 0	10 0 0
Balsa " ....do	0 0 4	0 0 6
Box, Turkey " ....do	5 0 0	18 0 0
Satin, St. Domingo " ....foot	0 0 7	0 0 11
Porto Rico " ....do	0 0 8	0 0 13
Walnut, Italian " ....do	0 0 4	0 0 5

METALS.	£. s. d.	£. s. d.
Iron—Pig in Scotland ....ton	0 0 0	0 0 0
Bar, Welsh, in London ....do	4 10 0	4 17 6
" " in Wales ....do	4 5 0	4 10 0
" Staffordshire, London ....do	5 15 0	6 10 0
Sheets, single, in London ....do	6 10 0	8 10 0
Hoops " ....do	6 0 0	7 0 0
Nail-roads " ....do	5 15 0	6 10 0
Copper—		
British, cake and ingot ....ton	44 10 0	45 0 0
Best selected " ....do	45 0 0	46 0 0
Sheets, strong " ....do	63 0 0	0 0 0
" India " ....do	48 0 0	50 0 0
Australian " ....do	47 0 0	47 10 0
Chili, bars " ....do	41 12 6	42 0 0
YELLOW METAL—		
Bullet, Spain " ....lb.	0 0 4	0 0 4
Lead—Pig, Spain " ....do	25 10 0	25 15 0
English, common brands " ....do	13 15 0	13 17 6
Sheet, English " ....do	14 10 0	14 14 0

SEALERS—	£. s. d.	£. s. d.
American, special " ....ton	14 10 0	0 0 0
Ordinary brands " ....do	14 5 0	14 7 6
TRY—		
Bacon " ....ton	0 0 0	0 0 0
American, in casks " ....do	0 0 0	0 0 0
Strait " ....do	22 15 0	23 2 6
Australian " ....do	23 0 0	24 0 0
English ingots " ....do	27 0 0	0 0 0

ZINC—	£. s. d.	£. s. d.
English sheet " ....ton	0 0 0	0 0 0
OILS.		
Linseed " ....ton	19 17 6	22 3 6
Cocunut, Cochin " ....do	29 0 0	0 0 0
Bullet " ....do	25 10 0	25 15 0
Copa " ....do	0 0 0	0 0 0
Palm, Lagos " ....do	22 10 0	0 0 0
Palm-nut kernel " ....do	0 0 0	0 0 0
Beneed, English, bar " ....do	22 15 0	0 0 0
" brown " ....do	29 15 0	0 0 0
Cottonseed, refined " ....do	16 15 0	17 15 0
Tallow and Oleins " ....do	28 0 0	45 0 0
Lubricating, U.S. " ....do	6 0 0	10 0 0
" Refined " ....do	8 0 0	13 0 0

TURBENTINE—	£. s. d.	£. s. d.
American, in casks " ....cwt.	1 9 6	1 10 6
Tar Stockholm " ....barrel	0 13 0	0 19 6
Archangel " ....do	0 10 6	0 11 6

#### TENDERS.

**BECKENHAM.**—For the completion of residences at Beckenham, Kent. Mr. St. Pierre Harris, architect. Messrs. Baxter, Payne, & Lepper, surveyors:—  
W. Jones ..... £2,156 0 0  
F. Cooper ..... 1,110 0 0  
T. Cruseley ..... 1,070 0 0  
H. Somerset & Son (accepted) ..... 938 0 0

**BRISTOL.**—For alterations and additions to Fir-Cliff Porthead, for Mr. J. F. R. Daniel. Mr. J. C. M. Keith, architect, Porthead. Quantities by Mr. A. Barnard, surveyor, Corn-street, Bristol:—  
W. L. Thomas, Porthead ..... £293 0 0  
G. Biss & Son, Porthead (accepted) ..... 280 10 0

**CARDIFF.**—For new Police Station at Cathays, for the Council of the Borough of Cardiff. Mr. William Harpur, Borough Engineer, architect. Quantities by Mr. Norman Wright, Cardiff:—  
Small & Co., Cardiff ..... £3,888 0 0  
O. Shepherd & Son, Cardiff ..... 3,368 0 0  
D. Davies, Cardiff ..... 3,140 0 0  
D. J. Davies, Cardiff ..... 1,127 0 0  
S. Shepton & Son, Cardiff ..... 3,105 0 0  
E. C. Howell & Son, Bristol and London ..... 3,100 0 0  
C. Burton, Cardiff ..... 2,865 15 2  
H. Brown, Cardiff ..... 2,948 0 0  
J. Allan, Cardiff ..... 2,805 14 8  
T. Evans, Cardiff (accepted) ..... 2,800 0 0  
E. Turner & Sons, Cardiff (accepted) ..... 2,538 0 0

**CHILWELL (Notts).**—For the erection of a new wing to Messrs. W. & C. Neville's lace factory, Chilwell, road, Chilwell. Mr. J. Bindon Carter, architect, Nottingham:—  
Wool Bros., Nottingham ..... £1,840 0 0  
Foster & Pearson, Boston ..... 1,610 15 0  
Lynan & Kidd, Nottingham ..... 1,901 0 0  
Wheatley & Masle, Nottingham ..... 1,451 0 0  
G. Pillat, Nottingham ..... 1,448 0 0  
R. L. & Son, Nottingham ..... 1,444 0 0  
Henry Vickers, Nottingham ..... 1,420 0 0  
Bailey Bros., Nottingham ..... 1,414 0 0  
S. & L. Cargill, New Bedford ..... 1,390 0 0  
Enoch Hind, Nottingham ..... 1,387 0 0  
Frank Jay, Nottingham ..... 1,266 12 6  
Frederick Shaw, Ilkeston ..... 1,216 0 0  
J. F. Price, Nottingham ..... 1,200 0 0  
H. Atwell, Radford ..... 1,294 16 0  
S. Ingham & Sons, Arnold-road, Basford, Nottingham (accepted) ..... 1,295 0 0

[From this last the value of the old bricks on the site has to be deducted.]

**CHINGFORD (Essex).**—For alterations to Chingford Infant School. Walter Smith, architect:—  
Egan, Buckhurst Hill ..... £202 0 0  
Wells, Woodford ..... 388 0 0  
Newman, Chingford ..... 370 0 0

**DARTMOUTH.**—For the erection of villa-residence at Blackpool, Dartmouth, for Captain Cleland. Mr. B. L. Back, architect and surveyor, Dartmouth:—  
Edgcombe & Harvey-Sire (accepted) ..... £278 0 0



## COMPETITIONS, CONTRACTS, &amp; PUBLIC APPOINTMENTS.

Epitomes of Advertisements in this Number.

## COMPETITIONS.

Nature of Work.	By whom required.	Premium.	Designs to be delivered.	Page.
Infirmary Hospital .....	Belper Union .....	Not stated .....	Not stated .....	i.

## CONTRACTS.

Nature of Work, or Materials.	By whom required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Stone .....	Chelsea Vestry .....	G. R. Strachan .....	April 20th .....	ii.
ing and Paving, Drainage, Oak Fencing, Tar-paving, &c. ....	do. ....	do. ....	do. ....	ii.
Concrete Breakwater .....	Tottenham Local Board .....	do. ....	do. ....	ii.
ght-iron Girder and other Ironwork .....	Lewisham Board of Works .....	Official .....	do. ....	ii.
ing Chelsea and Regent's Park Barracks .....	Owner, Clovelly Estate .....	A. C. Chapman .....	April 21st .....	xviii.
ing Channel to Sway Church .....	St. G. les's (Cambridge) Par .....	W. Berrian .....	do. ....	xviii.
Paving Blocks .....	Bolton Corporation .....	Official .....	April 22nd .....	ii.
ing and Alterations .....	War Department .....	Official .....	April 24th .....	i.
ration of St. Mary's Church, Newmarket .....	Rochdale Corporation .....	A. Waterhouse .....	April 27th .....	i.
Police Station, Upper Holloway .....	Wandsworth Bd. of Wks .....	Official .....	do. ....	ii.
ision of Outfall Sewer .....	The Committee .....	do. ....	April 28th .....	ii.
rigade Station, Woolwich .....	St. Marylebone Vestry .....	do. ....	April 30th .....	ii.
Materials .....	Com. of H.M. Works .....	do. ....	do. ....	ii.
ing Premises for Telegraph Factory .....	Holland & Beesley .....	do. ....	May 1st .....	ii.
on New Bridge .....	Gott and Son .....	do. ....	do. ....	xviii.
Vealeyan Chapel, Spalding .....	The Receiver, Met. .....	Official .....	do. ....	ii.
on of Houses, Villas, and Residences ..	Police District .....	do. ....	do. ....	ii.
	Yewell Corporation .....	T. & C. Hawksley .....	May 3rd .....	ii.
	Met. Board of Works .....	do. ....	May 4th .....	ii.
	Lewisham Bd. of Wks .....	do. ....	do. ....	ii.
	Edmonton Union .....	T. E. Knightley .....	May 7th .....	ii.
	Met. Board of Works .....	Official .....	do. ....	ii.
	The Committee .....	do. ....	May 14th .....	ii.
	F. Boreham .....	do. ....	Not stated .....	xviii.
	J. B. Wotton .....	do. ....		

## PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page.
Clark of Works .....	Hammermill Vestry .....	3l. 3s. per week ..	April 28th .....	xvi.
Surveyorship, Ireland .....	Civil Service Com. ..	Not stated .....	Not stated .....	xvi.

RMOUTH.—For works of water supply, for the Council. Mr. E. H. Back, C.E., Borough Surveyor, supplied:—  
 nith, Dartmouth ..... £127 0 0  
 elling, Dawlish ..... 114 0 0  
 illar, Dartmouth ..... 113 10 0  
 eath, Totnes ..... 112 15 0  
 His, Dartmouth (accepted) ..... 107 0 0

PFORD.—For re-building the Royal George, 18th Hill, Bedford, for Mr. B. Avery. Mr. W. T. J. Jerrard ..... £2,375 0 0  
 L. Holloway ..... 2,143 0 0  
 D. J. ..... 2,138 0 0  
 ark Redman (accepted) ..... 2,105 0 0

MONTON.—For the erection of chapels, mortuary, or the Edmonton Local Board:—  
 orton ..... £2,649 0 0  
 orton ..... 2,637 0 0  
 orton ..... 2,625 0 0  
 orton ..... 2,469 0 0  
 orton ..... 2,397 0 0  
 orton ..... 2,248 0 0  
 orton ..... 2,190 0 0  
 orton ..... 2,187 0 0  
 orton ..... 2,089 0 0  
 orton ..... 2,067 0 0  
 orton ..... 2,063 0 0  
 orton ..... 2,060 0 0  
 orton ..... 1,987 0 0  
 orton ..... 1,975 0 0

ING.—For making new roads and laying down pipe and other works connected therewith at Epsing:—  
 eble, Regent's Park ..... £2,335 0 0  
 eble, Loughton ..... 3,122 0 0  
 eble, Kilburn ..... 2,890 0 0  
 eble, Hornsey ..... 2,805 0 0  
 eble, Hornsey ..... 2,608 0 0  
 eble, Tower Chambers, London ..... 2,607 0 0

ESHAM, Kent.—For new house and shop, corn and bake-house, East-street, Faversham, for Mr. A. mer. Mr. Benjamin Adkin, architect, Faver-  
 sham ..... £1,879 0 0  
 sham ..... 1,863 0 0  
 sham ..... 1,828 0 0  
 sham ..... 1,769 0 0  
 sham ..... 1,755 0 0  
 sham ..... 1,749 0 0  
 sham ..... 1,656 0 0  
 sham (accepted) ..... 1,600 0 0

LEY.—For five houses and shops, High-street, y, for Mr. Thomas Maib:—  
 e & Twicken, Bow Common-lane £2,565 0 0  
 \* Accepted.

BLEDON (Hants).—For a billiard-room and other s to West-end House, near Hambleton, Hants, for Alex. Wilson. Mr. James W. Stroud, architect, Quantities by Mr. W. Yeardley, Gosport and  
 ick, Southsea ..... £1,337 0 0  
 ick, Landport ..... 1,300 0 0  
 ick, Portsea ..... 1,291 0 0  
 ick, Farnham ..... 1,237 0 0  
 ick, Havant ..... 1,167 0 0  
 ick, Landport ..... 1,055 0 0  
 ick, Southsea ..... 890 0 0  
 ick, Southsea (accepted) ..... 827 0 0

HAMMERSMITH.—For alterations and improvements at the Swan Hotel, Broadway, for Mr. F. Bailey Strange. Mr. C. Young, architect, Strood Hill, Rochester. Quantities not supplied:—  
 A. Barton ..... £1,511 0 0  
 J. Beale ..... 807 0 0  
 Chamberlain Bros. .... 999 0 0  
 Turle & Appleton ..... 965 0 0  
 J. Higge, Dorset-square (accepted) ..... 927 0 0  
 [Architect's estimate, £950.]

HAMPSTEAD.—For sanitary works at 72, Fellows-road, South Hampstead, for Mr. E. C. Hirsch. Mr. T. Durran, architect, Upper Baker-street:—  
 W. H. Back (accepted) ..... £150 0 0

HASTINGS.—For alterations and additions to Emmanuel Schools, West Hill, Hastings. Messrs. G. & W. A. Murray, architects, Hastings:—  
 T. Burden ..... £237 0 0  
 S. & P. Phillips ..... 207 0 0  
 W. E. Warman ..... 975 0 0  
 W. Elliott ..... 490 0 0

HASTINGS.—For building of new porch to Emmanuel Church, West Hill, Messrs. G. & W. A. Murray, architects, Hastings:—  
 T. Burden ..... £184 0 0  
 W. E. Warman ..... 144 0 0  
 W. Elliott ..... 163 10 0  
 S. & P. Phillips ..... 153 0 0

HASTINGS.—For finishing No. 133, Queen's-road, for the executors of the late Mr. J. Catt. Mr. H. Ward, architect, Hastings:—  
 H. Morris ..... £230 0 0  
 T. Lester ..... 295 0 0  
 C. & E. Harman ..... 285 0 0  
 W. E. Warman ..... 265 0 0

HAVERHILL (Suffolk).—For the erection of a County Police Station at Haverhill. Mr. J. Whitmore, architect and County Surveyor, Chelmsford:—  
 Walters & Sons, Bristol ..... £2,046 9 8  
 H. F. Shake, Haverhill ..... 1,703 13 8  
 G. Kenney, Ipswich ..... 1,689 0 0  
 W. G. Jarvis, Clare ..... 1,685 0 0  
 Glascock & Son, Bishops Cleeve ..... 1,599 0 0  
 G. Thackeray, Huntingdon ..... 1,528 0 0  
 Everett & Son, Colchester ..... 1,525 0 0  
 W. Wood, Chelmsford ..... 1,520 0 0  
 M. Brown, Haverhill ..... 1,500 0 0  
 A. Brown, Brantree ..... 1,418 0 0  
 Saunders, Dedham ..... 1,410 0 0  
 G. E. Mills, Cambridge ..... 1,407 0 0  
 Mason & Son, Haverhill ..... 1,400 0 0  
 A. Bunting, St. Ives, Hunts ..... 1,390 0 0  
 Bell & Son, Saffron Walden ..... 1,385 0 0  
 Bennett, Downham Market ..... 1,379 0 0  
 J. Willmott & Sons, Royston ..... 1,375 0 0  
 O. Gibbons, Ipswich ..... 1,375 0 0  
 A. Dies, Colchester (accepted) ..... 1,350 0 0  
 B. Walker, London ..... 1,350 0 0

HEMEL HEMPSTEAD.—For the erection of four houses with shop fronts in the Alexandra-road, Hemel Hempstead. Mr. W. A. Fisher, architect and surveyor, Marlborough, Hemel Hempstead:—  
 Minkin, St. Alban's ..... £2,268 0 0  
 W. L. Sear, Piccadilly ..... 2,149 0 0  
 G. & J. Waterman, Watford ..... 1,917 0 0  
 E. Horn, Hemel Hempstead ..... 1,865 0 0  
 W. Sear, Hemel Hempstead ..... 1,800 0 0  
 Batson, Luton (withdrawn) ..... 1,535 0 0  
 \* Accepted, subject to modifications.

HORNSEY.—For making new roads and laying down pipe sewers and other works connected therewith, on the Harrington Park Estate, Hornsey, for the British Land Company, 25, Moorgate-street, London:—  
 Keeble, Regent's Park ..... £1,238 0 0  
 Nowell & Co., Kensington ..... 1,230 0 0  
 Harris, Camberwell ..... 1,199 0 0  
 Jackson, Leyton ..... 1,111 0 0  
 Killingback, Camden Town ..... 1,050 0 0  
 Wilson, Walthamstow ..... 988 0 0  
 Peill, Bromley ..... 982 0 0  
 Bloomfield, Tottenham ..... 985 0 0  
 Pizzey, Hornsey (accepted) ..... 950 0 0

HORNSEY.—For making new road and laying down pipe sewer on the Hornsey Station Estate, for the British Land Company:—  
 Nowell & Robson, Kensington ..... £1,808 0 0  
 Keeble, Regent's Park ..... 1,702 0 0  
 Harris, Camberwell ..... 1,683 0 0  
 Killingback, Camden Town ..... 1,628 0 0  
 Wilson, Walthamstow ..... 1,498 0 0  
 Peill, Bromley ..... 1,460 0 0  
 Bloomfield, Tottenham ..... 1,355 0 0  
 Jackson, Leyton ..... 1,333 0 0  
 Pizzey, Hornsey (accepted) ..... 1,332 0 0

KINGSWEAR.—For two residences at Kingwear, Devon, for Mr. James Fairweather. Mr. E. H. Back, architect and surveyor, Dartmouth. Quantities supplied:—  
 F. Maunder, Dartmouth ..... £293 0 0  
 H. Winsor, Dartmouth ..... 813 0 0  
 B. Williams, Dartmouth (accepted) ..... 796 0 0

LEICESTER.—For new stables, warehouse, and bakery, Union-street and Prescot-lane, Leicester, for the Leicester Co-operative Society, Limited, Mr. Thomas Hind, architect, Leicester:—  
 N. Elliott ..... £14,330 0 0  
 J. Kellert ..... 13,667 0 0  
 T. & H. Herbert ..... 13,586 0 0  
 G. Hewitt ..... 13,434 0 0  
 H. O. Jewsbury ..... 13,409 0 0  
 Clarke & Garrett ..... 13,223 0 0  
 W. Gimson & Sons ..... 13,208 17 0  
 J. Stevens ..... 12,988 0 0  
 F. Major (accepted) ..... 12,908 10 0

LEICESTER.—For the erection of wrought-iron hurdle fencing, gates, &c., at the East End Recreation Ground, Spinney Hill Park, near Leicester. Mr. J. Gordon, M. Inst. C.E., Borough Surveyor:—  
 R. Forde & Co., Leicester ..... £361 0 0  
 W. T. Burbridge, Leicester ..... 447 0 0  
 W. Miller & Sons, Wolverhampton ..... 400 5 0  
 Stablesford & Co., Coalville ..... 393 8 9  
 Curt & Paul, Leicester ..... 337 0 0  
 Hull & Smith, Brierly Hill, Staffordshire ..... 327 16 2  
 Wright Bros., Leicester ..... 324 15 0  
 Hyden & Wigfall, Sheffield ..... 310 3 3  
 E. C. & J. Keay, Birmingham ..... 276 1 3  
 Brooks & Co., Wolverhampton ..... 272 16 3  
 \* Accepted.

LONDON.—For the erection of the eastern portion of St. Augustine's Church, Grove Park. Mr. C. Bell, architect. Quantities by Mr. H. Lovegrove:—  
 T. Rider & Son ..... £3,508 0 0  
 Dove Bros. .... 3,375 0 0  
 Staines & Son ..... 3,223 0 0  
 T. Crossley ..... 3,166 0 0  
 F. Lowe ..... 3,157 0 0  
 D. & R. Rennard ..... 3,125 0 0  
 Samuel Chafen ..... 3,125 0 0  
 Holliday & Greenwood ..... 3,077 0 0  
 James Smith & Son ..... 2,993 0 0  
 John Allen & Son ..... 2,800 0 0

LONDON.—For rebuilding Nos. 126-129, Mount-street, Grosvenor-square, W. Mr. W. H. Powell, architect. Messrs. Burgess & Co., Quantities by Mr. Thomas Ladds:—  
 Hall, Biddall, & Co. .... £23,233 0 0  
 J. Simpson & Son ..... 22,266 10 8  
 W. Smith ..... 21,602 0 0  
 G. H. & A. Brywaters ..... 21,399 0 0  
 Patman & Potheringham ..... 21,165 0 0  
 Rider & Son ..... 21,040 0 0  
 Colls & Son ..... 20,683 0 0  
 Stephens & Baskov ..... 20,877 0 0  
 W. Downs ..... 20,584 0 0  
 Kirk & Randall ..... 20,747 0 0  
 Brass & Son ..... 19,977 0 0  
 G. Shaw (accepted) ..... 19,965 0 0

LONDON.—For alterations and repairs to No. 19, Catherine-street, Strand, W.C., for The Savoy Publishing Company, Limited. Mr. Edward Clark, Strand, architect:—  
 Jackson & Todd ..... £247 0 0  
 Wilkinson Bros. .... 236 0 0  
 Quirk ..... 235 0 0  
 Crabtree ..... 221 0 0  
 T. L. Green (accepted) ..... 217 0 0

LONDON.—For making new road and laying down pipe sewer, with gullies and other works connected therewith, at Surrey-square, Old Kent-road, for Mr. Reed:—  
 Mayo, Brixton ..... £225 0 0  
 Pickett, Old Kent-road ..... 784 0 0  
 Pizzey, Hornsey (accepted) ..... 789 0 0

LONDON.—For repairs and decorative work at No. 24, Balize Park Gardens, N.W. Mr. E. Leuchars, architect:—  
 Tarrant & Son ..... £507 10 0  
 \* Reduced estimate accepted.

LONDON.—For alterations and decorating at the Regent's Hall, Oxford Circus, W., for "General" Booth. Mr. E. J. Sherwood, architect, 111, Queen Victoria-street, E.C.:—  
 Morrill & Beaton ..... £110 0 0  
 E. J. Sherwood ..... 410 0 0  
 F. J. Coxhead, Leytonstone ..... 253 15 0  
 \* Accepted.



**LONGTON (Lancashire).**—For new church at Longton, Lancashire. Mr. J. E. K. Cutts, architect, Southampton-street, Strand:—

	Faced externally, York stone.	Faced externally, red brick.
D. Tullis & Son, Preston.....	£4,902 3 0	£4,518 13 0
K. Saul, Preston.....	4,779 15 9	4,723 2 9
J. Walmsley, Preston.....	4,774 9 6	4,383 12 8
W. Winstanley, Wigan.....	4,504 10 0	4,327 10 0
W. Hotherall, Preston.....	4,398 5 0	4,211 17 0
H. Alty, Preston.....	4,263 3 5	4,198 19 1
W. Clegg, Accrington.....	4,237	3,938 18 4
J. Fecit, Blackburn.....	4,666 0 0	3,772 8 4

**MARDEN (Kent).**—First for alterations and additions to Spring-grove, Marden, Kent, for Mr. Andrew Campbell. Mr. J. T. Newman, architect, Fen-court, E.C. No quantities supplied:—

	House.	Lodge.	Total.
F. Piper.....	£3,167	£333	£2,519
Marshall & Sons.....	1,340	361	2,181
T. Reeves.....	1,779	279	2,018
Wallis & Clements.....	1,696	274	1,970
Davis & Leaney.....	1,380	231	1,612
T. Tulley.....	1,327	240	1,567

\* Accepted.

**MARDEN (Kent).**—For the erection of stabling, cow-bye, and pigsties, Spring-grove, Marden, Kent, for Mr. Andrew Campbell. Mr. J. T. Newman, architect. No quantities:—

Marshall & Sons.....	£1,081 0 0
Wallis & Clements.....	891 0 0
J. Wratten (accepted).....	

**ROCHESTER.**—For re-erecting and renovating the Wesleyan Chapel, for the trustees. Mr. James W. Nash, architect. Quantities supplied by architect:—

H. & J. Bathurst.....	£868 14 0
Naylor & Son.....	755 0 0
G. Gates.....	710 0 0
Calland & Son.....	691 0 0
C. E. Skinner.....	689 0 0

**SILVERTOWN (Essex).**—For the erection of a block of school buildings and apartments forming the infant's department to the West Silvertown Schools, Silvertown, E., for the West Ham School Board. Mr. J. T. Newman, architect, Fen-court, E.C. Quantities by Messrs. R. L. Curtis & Son:—

G. J. Hoekings.....	£2,637 0 0
T. Catley.....	2,649 0 0
B. E. Nightingale.....	2,643 0 0
Wall Bros.....	2,634 0 0
F. F. & J. Wood.....	2,612 0 0
Knight & Duxton.....	2,623 0 0
T. Boyce.....	2,600 0 0
W. Greer.....	2,484 0 0
T. Morter.....	2,443 0 0
C. Cox.....	2,440 0 0
Stimpson & Co.....	2,280 0 0
A. Reed.....	2,197 0 0
Hearle & Son..... (accepted)	2,168 0 0

**STROUD (Gloucestershire).**—For the erection of a clothing factory for Messrs. Williamson, Dunn, & Co. Mr. Henry A. Cheers, architect, Teddington:—

W. Fram, Gloucester.....	£5,679 0 0
F. Parsons, Battersea.....	5,661 0 0
English & Son, Stroud.....	5,465 0 0
E. Meredith, Gloucester.....	5,386 0 0
A. King, Gloucester.....	5,188 0 0
A. Estcourt, Gloucester.....	5,186 0 0
G. Drew, Chalford.....	5,186 0 0
A. Kimberley, Banbury.....	5,140 0 0
W. Jones, Gloucester.....	5,100 0 0
W. Church, Bristol.....	5,094 0 0
Wall & Hook, Brimscombe.....	5,045 0 0
Stephens & Baxton, Bristol.....	4,990 0 0
T. R. Turtle, London.....	4,900 0 0
S. Grist, Aylesbury.....	4,884 0 0
D. Ireson, Northampton.....	4,860 0 0
J. Clutterbuck, Gloucester.....	4,876 0 0
D. C. Jones & Co, Gloucester.....	4,869 0 0
J. Bridges, Cirencester.....	4,800 0 0
J. Greenslade, Stroud.....	4,800 0 0
W. H. Harper, Stroud.....	4,850 0 0
J. Groome, London.....	4,780 0 0
W. H. Simonds, Reading.....	4,777 0 0
J. Piller, Teddington.....	4,768 0 0
P. Hornsman & Co., Wolverhampton.....	4,675 0 0
W. Hickinbotham, Teddington.....	4,675 0 0
C. Claridge, Banbury.....	4,639 0 0
J. Newton, Clapham.....	4,623 0 0
J. Martin, Maidenhead.....	4,621 0 0
W. Bowers & Co., Hereford.....	4,423 0 0

**SOUTHAMPTON.**—For erecting engine-house and other buildings for the Southampton Town Council. M. Wm. Matthews, C.E., Waterworks Engineer, Municipal Office, Southampton:—

Stevens & Sons, Southampton.....	£9,387 0 0
Cook & Sons, Southampton.....	8,789 17 0
H. J. Sanders, Southampton.....	8,450 0 0
Bull & Co., Southampton.....	8,346 0 0
J. W. Pickthall, Southampton.....	8,100 0 0
W. H. Simonds, Reading (accepted).....	7,991 0 0

[Engineer's estimate, £48,800.]

**STEPNEY.**—For the erection of a mission-hall, Sunday schools, &c., Dongola-street, Stepney, for the Rev. J. F. Kitto, M.A. Mr. J. T. Newman, Fen-court, E.C., architect. No quantities:—

	Foundation.	Structure.	Total.
F. F. & J. Wood.....	£186	£2,070	£2,256
F. Wood.....	120	2,049	2,179
Hoole & Son.....	183	1,983	2,168

**SWANLEY (Kent).**—For the erection of a detached residence near Swanley Junction, Kent, for Mr. St. Pierre Harris, architect, Messrs. Baxter, Payne, & Lepper, surveyors:—

H. Someford & Son.....	£1,790 0 0
F. Wood.....	1,787 0 0
D. Payne.....	1,734 0 0
W. & F. Croaker.....	1,698 0 0

**SPECIAL NOTICE FOR NEXT WEEK.**—As we publish a day earlier than usual next week, Lists of Tenders for insertion in our next must reach us not later than 4 p.m. on WEDNESDAY, April 21.

### TO CORRESPONDENTS.

Registered Telegraphic Address, "THE BUILDER, LONDON."

C. L. Paris (thanks).—T. P. M.—J. E. H.—A. L.—F. & G. H. (plan received). Thanks.—F. H. T.—E. H. B.—A. Reader of "The Builder."—R. F.—J. B.—H. & C.—J. B. M.—L. & D. (below our mark). H. H. (below our mark). All communications relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

We are compelled to decline putting out books and giving addresses.

Note.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters for communications (beyond mere news items) which have been duplicated for other journals, are NOT DESIRED.

All communications regarding literary and artistic matters should be addressed to THE EDITOR, not to the Editor.

All statements of facts, lists of tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication.

### PUBLISHER'S NOTICES.

Registered Telegraphic Address, "THE BUILDER, LONDON."

**GOOD FRIDAY.**—"THE BUILDER" for the week ending FRIDAY, the 21st. Advertisements for insertion in that issue must therefore reach the Office before THREE p.m. on WEDNESDAY, the 21st. Alterations in Standing Advertisements, or ORDERS TO DISCONTINUE the same, must be at the Office by TEN o'clock on THURSDAY Morning.

**CHARGES FOR ADVERTISEMENTS.** SITUATIONS VACANT, PARTNERSHIPS, APPRENTICESHIPS, TRADE, AND GENERAL ADVERTISEMENTS.

Six lines (about fifty words) or under ..... 6d. Each additional line (about ten words) ..... 6d. Terms for Sale of Trade Advertisements, also for special Advertisements on front page, Competitions, Contracts, Rules by Auction, &c., may be obtained on application to the Publisher.

**FOUR LINES (about THIRTY words) or under ..... 3d. 6d.** Each additional line (about ten words) ..... 6d. 6d. PREPAYMENT IS ABSOLUTELY NECESSARY.

\*\* Stamps must not be sent, but all small sums should be remitted by Cash in Registered Letters or by Money Order, payable at the Post-office, Covent Garden, W.C. to

DOUGLAS FOURDRINER, Publisher.

Addressed to No. 46, Catherine-street, W.C.

Advertisements for the current week's issue must reach the Office before THREE o'clock p.m. on THURSDAY.

The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c. left at the Office in reply to advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

**SPECIAL ALTERATIONS IN STANDING ADVERTISEMENTS OR ORDERS TO DISCONTINUE THE SAME,** must reach the Office before TEN o'clock on WEDNESDAY mornings.

PERSONS Advertising in "The Builder," may have Copies addressed to the Office, 46, Catherine-street, Covent Garden, W.C. free of charge. Letters will be forwarded if addressed envelopes are sent, together with sufficient stamps to cover the postage.

### TERMS OF SUBSCRIPTION.

"THE BUILDER" is supplied gratis from the Office to residents in any part of the United Kingdom at the rate of 10s. per annum. For the rest of Europe, America, Australia, and New Zealand, 25s. per annum. To India, China, Ceylon, &c. 30s. per annum. Remittances payable to DOUGLAS FOURDRINER, Publisher, No. 46, Catherine-street, W.C.

### Best Bath Stone for Winter use.

WESTWOOD GROUND, Box Ground, Combe Down, and Farleigh Down. { Summer Dried. }  
**RANDELL, SAUNDERS, & CO., Limited,** Corsham, Wilts. [ADVT.]

### Box Ground Stone

is the best for use in all exposed positions being a well-known and tried Weather Stone. 50,000 ft. cube in stock.  
**PICOT & SONS,** BOX, S.O., WILTS. [ADVT.]

### Doubling Freestone and Ham Hill Stone

of best quality, in blocks, or prepared ready for fixing. An inspection of the Doubling Quarries is respectfully solicited; and Architects and others are CAUTIONED against inferior stones. Prices, delivered to any part of the United Kingdom, given on application to **CHARLES TRASK & SONS,** Norton-sub-Hamdon, Ilminster, Somerset.—Agent, Mr. E. WILLIAMS, No. 16, Craven-street, Strand, W.C. [ADVT.]

### Doubling Free Stone

For prices, &c., address S. & J. STAPLE, Quarry Owners, Stone and Lime Merchants, Stoke - under - Ham, Ilminster. [ADVT.]

### Asphalte.—The Seyssel and Metallic Lava

Asphalte Company (Mr. H. Glenn), Office, 38, Ponty, E.C.—The best and cheapest materials for damp courses, railway arches, warehouse floors, flat roofs, stables, cow-sheds, and milk-rooms, granaries, tun-rooms, and terraces. [ADVT.]

### Asphalte.

Seyssel, Patent Metallic Lava, and White Asphaltes.  
**M. STODART & CO.** Office: No. 90, Cannon-street, E.C. [ADVT.]

EVERY DESCRIPTION OF SEASONED WOODS AND VENEERS IN EXTENSIVE QUANTITIES.

### B. J. HUDSON & SONS,

Millbank Sawmills, Grosvenor-road, S.W.; Whitfield-street, W.1.  
 And Store-street, London, W.C.  
 Telephone No. 3,152, and Private Wire connecting Business Premises.

### MICHELMORE & REAP,

Manufacturers of

CHARLES COLLINGS'S PATENT.

**COLLINGS'S PATENT HINGES** LEVER, SCREW, & BARREL BOLTS and IMPROVED GATE FITTINGS of every description

36A, BOROUGH ROAD, LONDON, S.E.

DISCOUNT TO BUILDERS.

GOLD AND SILVER MEDALS AT AMSTERDAM EXHIBITION.

# IRON CISTERNS.

## F. BRABY & CO.

LONDON, LIVERPOOL, GLASGOW.

VERY PROMPT SUPPLY.

LARGE STOCK READY.

CYLINDERS FOR HOT-WATER CIRCULATION.

Particulars on application.

Chief Office: 360, EUSTON ROAD, LONDON.



## ILLUSTRATIONS.

Monument to the Late Archbishop Tait, Canterbury Cathedral.—Mr. J. E. Boehm, R.A., Sculptor; Mr. J. Oldrid Scott, Architect ...	678
Kemble Memorial Screen, Bath Abbey Church.—Executed by Mr. Harry Hems, from the Design of Mr. J. Oldrid Scott, Architect ...	690
Elevations, Sections, and Details of St. Magnus's Church, London Bridge.—Drawn by Mr. E. H. Sedding ...	612-613, 616
New Public Buildings, Newcastle-under-Lyme: Front Elevation; Plan and Elevation of Baths.—Messrs. Sugden & Son, John Blood, W. H. Sugden, and Chapman & Snape, Joint-Architects ...	617, 621
Designs for Stained Glass at Easthamstead Church; Christ and Mary Magdalen in the Garden; Mary Magdalen at the Sepulchre. By Mr. E. Burne Jones, A.R.A. ...	620

## CONTENTS.

Royal Scottish Academy ...	590	Drawings of St. Magnus, London Bridge ...	605	Stained Glass ...	625
Magnus the Martyr, London Bridge ...	609	Newcastle-under-Lyme Public Buildings ...	609	The Student's Column: Our Building Stones.—VII. ...	625
Recent Excavations in Bonito: Discovery of Statue of Apollo ...	602	Windows at Easthamstead Church ...	606	Books: The American Journal of Archaeology; Collinson's Manual of Greek Archaeology (Cassell & Co.); Rees's Digest of the Law of Light (Reeves & Turner); Bevis's Builders and Contractor's Price Book; Standage's Artists' Manual of Pigments (Lockwood & Co.); Gawthrop's Hints on Reposed Work ...	625
Building of Stables ...	603	Staircase, Fireplaces, &c., Old House, 74, Lower Thames street (Illustrated) ...	608	Recent Patents ...	627
Torrian Patents ...	604	Designs for Wall Papers (Illustrated) ...	623	Recent Sales of Property ...	627
Enamelling: The Institution of Civil Engineers ...	604	Craydon Palace School of Engineering ...	623	Meetings ...	627
Society for the Encouragement of the Fine Arts ...	604	Architectural Societies ...	623	Miscellaneous ...	627
Parsons Museum ...	604	A Builder's Claim: Haskell v. Bradbeer ...	624	Prices Current of Building Materials ...	628
Tilbury Docks ...	605	So-called Municipal Building Competition ...	624		
Monument to the Late Archbishop Tait, Canterbury Cathedral ...	605	Stone-Sawing Machinery ...	624		
Kemble Screen, Bath Abbey Church ...	605	A Question of Cement Patents ...	624		
		Provincial News ...	624		

### The Royal Scottish Academy.



THE first recognition of art by any public body in Scotland proceeded from what is now known as "The Board of Manufactures." The Board of Trustees for the improvement of Fisheries and Manufactures Scotland owes its origin to the fifteenth article of the Treaty of Union in 1706, but the Board was not actually constituted until 1707, under Letters Patent of George II. Its functions in regard to fisheries ceased in 1809, on the establishment of a special Board constituted to attend to that matter, and the functions of the Trustees are now confined entirely to the encouragement of manufactures with a special view, however, to the industrial application of its principles. Accordingly, their chief work consists in the maintenance of a National Gallery, and the management of a School of Art and Design.\* The funds at the disposal of the Board consist of a sum of 2,000*l.* annually voted by Parliament. The Trustees, in furtherance of the purposes of their constitution, offered premiums for the best designs or drawings for textile fabrics, and in 1760 a drawing-master was appointed to teach both sexes the art of drawing, thus laying the foundation of the School of Design. In 1819 was founded the "Institution for the Encouragement of the Fine Arts," on the same principle as the British Institution. By its constitution the management of the Institution was vested exclusively in directors chosen from among the subscribers, and one of its objects was to the effect that "No artist was eligible of being elected on any committee, or voting as a governor, while he continued a professional artist." The function of the directors, therefore, was restricted to the production of works which the Institution consented to receive and exhibit along with those by the old masters. The first exhibition by the Institution took place in 1819, and it had no rival; for, although, during the five years from 1809 to 1813 a number of artists had combined their works, so as to form an annual exhibition, the combination broke up at the expiry of the exhibition of 1813. It appears that a sum of 8*l.* had accumulated from the proceeds of five exhibitions, and, as there was no rule to the contrary, the existing members resolved to divide the amount. This resolution rang the death-knell of the society.

\*Report of Sir J. G. S. Lefevre, of December 13, 1847.

In 1826 the Institution had 131 ordinary members, thirteen honorary members (five of whom were artists), and twelve associate members (all of whom were artists). The Board of Manufactures had accumulated a fund from the money entrusted to their management, and this accumulation was sufficient to enable them to build the Royal Institution on the Mound. In this building sufficient accommodation was afforded, not only for the Board itself, but for the Royal Society, and for exhibitions of works of art. The spacious galleries in the centre of the building, provided for the latter purpose, were let to the Institution for the Encouragement of the Fine Arts, at an annual rent of 380*l.* Ample accommodation having thus been provided for the exhibition of pictures, in well-lighted galleries, specially constructed for the purpose, rendered the annual exhibitions more attractive, and contributed materially to the prosperity of the Institution. In these circumstances the associate members made advances to the directors of the Institution with a view to their having a share in the management of the exhibitions, but these advances were repelled in a manner which so thoroughly disgusted the associates that they resolved to make arrangements for founding a Scottish Academy. Twenty-four artists affixed their signatures to the document, in which it was proposed to found the Academy, and these consisted of thirteen Academicians, nine Associates, and two Associate Engravers. Thus were laid the foundations of what ultimately appeared as the Royal Scottish Academy.

The Board of Manufactures and the Institution were composed of gentlemen of high social position, who could brook no opposition, and they set themselves deliberately to endeavour to quash the new organisation. Their influence was such as to cause nine of the twenty-four original members of the Academy to resign, leaving only fifteen to carry on the work. This they did with resolute determination to persevere, and in this course they were mainly sustained by the late Mr. Thomas Hamilton, architect, whom they had elected to be their treasurer.

Early in 1827 it was announced that the first exhibition of the Scottish Academy would be held in two large galleries which had been engaged for the purpose. A counter announcement was published by "The Royal Institution, under the immediate patronage of His Majesty," in which it is stated that "The Directors of the Royal Institution have observed in the *Scotsman* of the 3rd of January current, a paragraph under the title of 'Associated Artists,' stating,—'It will be observed that the Associated Artists are to have an

exhibition of their own early in February distinct from that of the Royal Institution.' As this might lead to the supposition that the exhibition of the works of modern artists to be opened at the Institution Rooms on the Earthen Mound next month was not supported by the Associated Artists of the Institution, the Directors think it right to mention that at a late meeting of these gentlemen they were informed by the following eminent artists, namely, Messrs. William Allan, A. Nasmyth, J. W. Thomson, J. Watson Gordon, H. W. Williams, J. F. Williams, and W. Simson, being the whole Associated Artists present, that it was their intention to send their works to the exhibition in the rooms of the Institution and to make the utmost exertions to give it every support in their power. The directors may add to the above list the names of Mr. Playfair and Mr. Andrew Wilson, the latter of whom, when leaving the country for Italy, promised to contribute to the approaching exhibition. Messrs. George Watson, Samuel Joseph, and William Nicholson, the remaining Associated Artists, did not attend the above meeting, and, therefore, the directors had no means of learning their views on the subject."

By way of recognising their adherence to the Institution the directors gave commissions of 50*l.* and upwards to each of the Associates who attended the meeting, while the three who did not attend received no share of their patronage. The two exhibitions were opened simultaneously, and it was conceded that the Institution had the best of it as regards the excellence of the works exhibited. Still, however, it was found that the newly-formed Society had made a fair start, the gross proceeds amounting to 317*l.* 13*s.* 11*d.* The second exhibition in 1828 was more successful, and the third so much so as to supersede entirely that of the Institution.

The infant Academy, with the view of establishing its position upon a firm basis, made application to the Home Secretary, Mr. Peel, for a Charter of Incorporation, who, in reply, stated that he had referred the matter to the king's law officers, and that "the Scottish Royal Academy will have my warmest wishes for its prosperity." The application was supported by Sir Thomas Lawrence, President of the Royal Academy, and other "men of light and leading." But the old enemy was at work, and the Institution, which had for itself secured the distinction of "Royal," could ill brook any rival, and from time to time the application was set aside, and ultimately refused; upon what grounds could not be ascertained; for, though a request was made for permission to peruse the report of the Lord Advocate, such permission was not granted. Keeping an undaunted front, and



under the able leadership of Mr. Hamilton (whose much-admired classical structure, the High School, was then in course of erection), the Academy used every exertion to secure the favour of the public, and, as already stated, their third exhibition proved eminently successful. Amongst the contributors were Sir Francis Grant, P.R.A., John Linnell, John Martin, and others who subsequently distinguished themselves.

The exhibition was not, however, confined to the works of living artists, for one of its chief attractions was the "Adoration of the Shepherds," by Rubens, lent for exhibition by Lord Hoptoun. This picture was so large that it could not be admitted to the exhibition-room by the ordinary entrance, and it was found necessary to remove the cupola, and swing it down through the roof, an operation which was successfully carried out under the superintendence of Mr. Hamilton. What ultimately secured for the Academy the high approval of the public was the purchase of Etty's great picture of "Judith and Holofernes," a step which, although considered by some to be rash, was the means of consolidating the Academy. The wisdom of the proceeding became manifest when it was found that at the close of the exhibition there was a surplus sufficient to meet the purchase-price, which, according to the arrangement entered into with Mr. Etty, was remarkably moderate. At a subsequent period the Academy secured other important works by Etty, amongst them, "The Combat: Woman pleading for the Vanquished," which was purchased from Mr. Martin for 300*l.*, and for which ten times that sum has since then been offered and refused. The artists who had adhered to the Institution, finding that they were left in the lurch, made an attempt to organise another Academy, but the folly of such a proceeding becoming apparent they came to the resolution of placing their case in the hands of Mr. Henry Cockburn, advocate (afterwards Lord Cockburn), with a view to their being admitted members of the Scottish Academy. Mr. Cockburn suggested that the Academy should appoint some one to act for them in the proposed negotiation, and in his communication to the President he says, "Some of the gentlemen for whom I act belong to the Royal Institution, others do not. But this circumstance is immaterial, because the only footing on which they wish to treat, or to be treated with, in this proposal is that of their professional character, apart from all consideration of any other establishment here or elsewhere, to which they may happen to belong. In proposing to join the Academy, they of course subject themselves to all the rules of that Institution; and the only condition on which the proposal is made is that they are all received together as Academicians." The gentlemen making this proposition were twenty-four in number, and to have admitted them would virtually have been to deliver over an institution which had cost much time, labour, and expense into other hands, "since, from the constitution of the Academy every member is entitled to an equal share in the management of its concerns." The Academy, however, considering the importance of securing unity, resolved to meet the applicants in a fair and candid manner, and appointed Mr. Hope, the Scottish Solicitor-General, to represent them. In their award the referees, after minutely detailing the circumstances of the case, came to the conclusion that "a general and complete union of the artists was an object of such vast importance that no temporary difficulties ought to be allowed to interfere with its attainment."

The result of these negotiations was that the applicants were, by the unanimous vote of the Academy, admitted to the full privileges of that body.

In their award the arbiters "earnestly, strongly, and respectfully recommend to the general body of the Academy to continue in office the intelligent, active, and public-spirited gentleman" then in office, notwithstanding which, on the first general meeting of the Academy after the admission of the twenty-four new members, a resolution was carried depriving Mr. Hamilton of his office as

treasurer, and appointing Mr. J. Watson Gordon in his place. Some of the new members, it is said, were heard to express a determination that "they would not be ruled by an architect."

Sir George Harvey in his notes on the Early History of the Academy says,— "The remarkable sort of management in relation to art existing at this period in Scotland is shown in the fact that the Royal Institution, a society of amateurs, received a Charter of Incorporation, while the Academy of Painting, Sculpture, and Architecture, consisting solely of professors of those arts, had been hitherto refused one; and then also a yearly grant of 500*l.* was given to the former, while the Academy got nothing, but, on the contrary, had for above twenty years to pay 100 guineas annually for the use of galleries for three months in the year to hold their exhibitions, forming a strange contrast with the manner in which Government dealt with the kindred Academies in London and Dublin; the former having apartments free of charge in Somerset House, and the latter an annual grant of 300*l.*"

On August 13th, 1838, a charter of incorporation was granted to the "Royal Scottish Academy of Painting, Sculpture, and Architecture," which was "to consist of artists by profession, being men of fair moral character and of high reputation, resident in Scotland."

It is bound to arrange an annual exhibition, and, so far as it can, to give instruction in art. The only assistance afforded to the Academy by Government consists in the accommodation given to it, rent free, in the National Gallery.

#### NOTES.

**S**OME disappointment has been expressed that so little is said about canals in the Railway and Canal Traffic Bill. The deputation which waited upon Mr. Mundella on the 16th inst. from the British Iron Trades Association drew attention to this, and elicited from the right hon. gentleman that the Government are preparing clauses with a view to rendering the canals more useful. He is of opinion that through rates should be adopted, and that the canals should be kept in better repair, but that it is a difficult matter to decide by whom and how this should be enforced. However natural it may have been for railways to supersede waterways for the conveyance of general merchandise, it is certainly a pity that the latter should, through neglect, be practically unavailable for the traffic for which they are still adapted. Mr. Mundella took occasion to remark that there was no desire on the part of the Government to injure the railway companies. This might tend to reassure the frightened shareholders, but their directors have worked upon their fears to such an extent that this Bill is regarded by some with as much alarm as Mr. Gladstone's Irish scheme,—to which it was seriously compared at some of the meetings. With regard to preferential rates for foreign produce, Mr. Mundella says that such rates generally should be strictly prohibited. It seems probable that he contemplates altering the clauses dealing with this subject, for they do not, as they stand, impose sufficiently severe restrictions upon the system to satisfy the home producer. The deputation was assured that the points brought forward should receive Mr. Mundella's careful attention, and that he considered it very evident that the manufacturers of this country required a cheap outlet for their products to enable them to compete successfully with others.

**T**HE final Report of the Royal Commission on Mines, which occupies 110 pages of a large Blue Book, was issued on the 10th inst. The results of an elaborate series of scientific experiments, made with the object of establishing the best guarantees against accidents in mines, are stated with much clearness. Various methods and appliances are discussed. Particular stress, however, is placed upon the advantages offered by electrical exploding appliances for firing shots in mines, as opposed to the most im-

proved kind of fuse which has to be ignited by the application of flame to its exposed extremity. Several reasons are advanced in support of the electrical method of firing; very little instruction is necessary to ensure its efficient employment by men of average intelligence; the firing is under complete control up to the last moment, and it is accomplished out of contact with air; and finally, its cost, simplicity, and certainty of action, are all in its favour.

**T**HE case of Raper v. Fortescue, which was before the Court of Appeal last week, so far as the actual decision went, did not decide any important question; for the Court refused an interlocutory injunction in regard to a claim of light, on the ground that no substantial injury had been shown. That some substantial injury must be proved is an elementary proposition in regard to the law of light. But Mr. Justice Pearson, from whose Court the appeal came, seems, from the report of his judgment with which we have been supplied, to doubt whether a man can claim relief in consequence of the infringement of an ancient light when the building in respect of which it is claimed is a new one. He says that the building has been so much altered "that it is no longer the same building," and further on he says, "there is really no case to refer to, as I should have desired." But Lord Justice Cotton says, though it was not necessary for the Court of Appeal to decide the point, that he could not agree with Mr. Justice Pearson that the light must be in the same building as that in regard to which the right had accrued. As a matter of fact, there is a clear decision that the light need not be to the same building. In the case of the Ecclesiastical Commissioners v. Kino (Roscoe's "Digest of the Law of Light," 2nd edition, p. 30), a church had been pulled down, the site was vacant, it was intended to erect in place of the church some secular building, and for the purpose of the action a hoarding was put up with apertures in it. It was decided by the Court of Appeal that relief could be granted. It is obvious that a warehouse is not the same building as a church. Therefore, if we may say so without disrespect, Mr. Justice Pearson discovered a legal mare's nest. In the interests of the profession it is desirable to notice Lord Justice Cotton's observation, otherwise the statement of Mr. Justice Pearson may be apt to mislead those who are not lawyers.

**I**NDUSTRIAL undertakings at the present day are certainly under a cloud, no matter in what country they are carried on. In the history of civilisation, there has probably never been such a universal outbreak of discontent as is now prevalent throughout Europe and America. For many years past, strikes have unfortunately become the familiar attendants of English industry; but it has been reserved for 1886 to show a world-wide series of strikes, accompanied, moreover, by a lamentable amount of unreasonable violence and ferocity. The most notorious English riots have usually been marked by some supposed political grievance, such as those of the Chartists, the Lord George Gordon riots at Bristol, and the London riots of the other day, although the Luddite riots, in which so much machinery was broken in the Midland factory districts, were the result of combined ignorance and starvation. Just now, the area of disturbances is unusually extensive, capital and labour being paralysed simultaneously in the United States, many parts of France, and all Belgium. Sweden also is beginning to feel the throes of trade disputes, while an outbreak has taken place in Milan, and even quiet Switzerland is contributing to the general trouble by strikes at Basle and other places. The singular part of it all is that, although trade depression is an unusual factor throughout the world, the prices of labour generally are still remunerative; and one would have thought that the spread of education would at least have enabled workmen to understand how utterly useless it is for them to kick against the inevitable recurrence of bad times. There is,



leed, but little encouragement for those who open to have money to invest it in new undertakings, at all events those which depend for success on the tolerance and co-operation of labour.

THE following extract from a recent number of the *Revue Scientifique* is of interest as showing the very tangible improvement in sanitary matters that has resulted since the abolition in many towns of the fixed cesspool system. At Brussels it was in vogue until 170-1, when the mortality from typhoid averaged 105 per 100,000 inhabitants; but on the disappearance of the fosse or cesspool, the mortality at once fell to 40, while, within the last ten years, it has not exceeded 30. At Frankfurt the number was 89 per 100,000 up to 1870, when water-closets with direct outflow made pretty general, resulting in a fall of 10 to 29. At Berlin the old system was abandoned in 1875, with the effect that the mortality per 1,000 was reduced from 38 to 29, from typhoid declining from 50 to 28 per 100,000 inhabitants. In London the suppression of cesspools was commenced about 1819 and was completed in 1848, and at the present time the mortality from typhoid is about 26, and that of diphtheria 18 per 100,000, while at Paris these are still 70 and 75 respectively. There are something like 70,000 cesspools even in Paris, most of them situated in the slums of the houses, and productive of the most sanitary evils. The matter ferments in months or even years, exhaling noxious fumes which fill not only the dwellings but whole quarters, while the periods at which *viduance*, or emptying, is performing unsavoury rites is but too evident over a large area. This is especially the case in the poorer and most populous districts in the north and north-east, where the greatest number of the cesspools are to be found. On the other hand, it must not be forgotten that improvements on a large scale are taking place in Paris. There are at present about 700 kilometres of sewers, terminating in great holders on each side of the Seine, which unite their contents at Clichy, below the city, whilst a third at St. Denis sewers the quarters of Belleville, Menilmontant, La Chapelle, and Montmartre. The system which, now finished, will be 1,040 kilometres in length, carries into the Seine a daily flow of 1,000 cubic metres of liquid sewage per day, 131 millions per annum, including rainwater.

THE publications of the German Imperial Archaeological Institute, which from time to time we have reviewed, enter, with the year 1886, on a new epoch, and are to be fundamentally reorganised to meet the enlarged wants of archaeological discovery. It will be remembered that this Institute has hitherto published: 1, for Berlin, the *Archäologische Zeitung*; 2, for Rome, the *Annali del Museo di Storia e di Arte*; 3, for Athens, the *Mittheilungen*. Of these periodicals, the *Archäologische Zeitung* for Berlin, and for Rome the *Annali del Museo di Storia e di Arte* are to cease entirely, and in each department the following additions and modifications are to be made:—At Berlin, at the end of each year, a folio volume is to appear under the title of "Antikenkatalog"; it is to consist, as a rule, of three plates and a brief accompanying text, which will confine itself to a terse statement of the scientific facts of the monuments published. The "Denkmäler" are to be taken impartially in the whole field of classical archaeology, including, it is expressly stated, the department of architecture. The editorship of the "Denkmäler" will be in the able hands of Max Frankel, with whom the heads of the branch Institutes at Rome and Athens will operate. Further, in quarterly numbers, I appear the *Jahrbuch* of the Institute, also published at Berlin, and edited by Dr. Frankel. It will appear in octavo form, with illustrations in the text and supplementary plates. A section of the periodicals will be largely devoted to the bibliography of the subject, and *résumés* of excavations. Passing to Rome, in place of the usual *Annali*, there will

appear each quarter an octavo volume, under the title of *Mittheilungen Römische Abteilung*; the text will be accompanied annually by twelve plates and woodcuts. The articles will be written in German, Italian, Latin, or French (English, it appears, is to be excluded). This is a distinct gain for foreigners, as the *Annali* were uniformly Italian; naturally, these *Mittheilungen* will have Italy and the adjacent islands for their field. At Athens (3), a quarterly volume will appear under the title of *Mittheilungen, Athenische Abteilung*, with yearly twelve plates and text illustrative interspersed. It will appear in German or modern Greek. This last alternative we regret. Its special field will be Greece proper, and all countries to the east of Greece proper. This notice is issued by the central direction at Berlin at the beginning of April, and the first instalments of the new periodicals may shortly be expected.

A CHANGE of considerable archaeological and architectural interest is impending in the city of Florence, which, like most Italian cities, is feeling in a marked manner the somewhat sweeping tendency to obliterate old landmarks, and to improve antiquities off the face of the earth. It may be said, however, of the present project, which is that of pulling down the ancient Ghetto or Jewish quarter, that it is at least utilitarian, the ultimate intention being to erect poorer-class habitations in one of the most crowded parts of the town. Florence possesses its quota of poverty, but to nothing like the extent seen in other European cities; and there are certainly quarters which, from their overcrowding, loudly call for remedial measures. The Ghetto was (for the Jews have been emptied out of it) one of these; and although its historic associations are numerous and interesting, one cannot but concur in the feeling that it has played its part and is now better away. Situated in the very heart of the city, it was, up to the fifteenth century, the site of the castellated houses of the first families of the time,—a time in which every man's hand was against his neighbour. The Jews had been allowed to reside in Florence about 1430, although, as usual in the Mediaeval days, under considerable restrictions both of place and occupation; but when Cosmo di Medici came to power he determined that the Jews should be all shut up in one enormous building, and this was carried out in 1571. This building, which can now be seen to greater advantage when empty, than when it was a human rabbit-warren, consists of a huge square of some eight stories, with walls of enormous thickness; and is a miniature town of itself, with several courts (of which one, the Piazza del Fonte, is extremely picturesque), and various streets and alleys radiating from it. A large synagogue is a striking feature in the arrangement; and although a few of the apartments are tolerably roomy, the majority are no better than cellars, in which two or three families found shelter. When we consider that for the last three centuries this gloomy hive has been constantly inhabited by at least 2,000 people, who lived with the minimum of light and air, and with no drainage whatever, it is marvellous that the Ghetto and surrounding neighbourhood has not been decimated by pestilence over and over again.

WE are glad to hear that the Corporation of Sunderland have appointed Mr. Waterhouse as assessor in the competition for the new Municipal Buildings. This will put matters on a right basis, and put an end to the rumours about favouritism.

THE Edinburgh Town Council have, as was briefly mentioned in our last, adopted a resolution to build new municipal buildings on the site of the present buildings and adjoining property, competitive plans to be received and premiums given for the first and second designs. Objection was made that a town-hall did not form an integral portion of the scheme, but it was conceded that, were such resolved upon, another site would have to be fixed upon, and considerable extra expense incurred. The retention of a portion of the

present buildings was suggested, as they are considered by many to possess characteristic features worthy of preservation; the great mass of unadorned wall (ten stories high) to the north, which forms a striking feature in the view of the old town as seen from Princes-street, being not the least remarkable. The Architectural Association have addressed the Municipal authorities with a view to urging the adoption of the suggestions for the conduct of architectural competitions sanctioned by the Royal Institute of British Architects. The new buildings, if carried out in a worthy manner, should form the centre point in a panorama which is considered one of the finest in Europe; ornamental detail should form a minor consideration, and a dignified and massive picturesqueness should be aimed at.

THE *Δελτίον της Έστιας* (No. 479) reports that at Gortyna, in Crete, a colossal female statue has been discovered, made of Pentelic marble. The head is missing, one arm is preserved entire, another remains of the other to make the position of it certain. The statue is of a draped figure of somewhat late date, two metres high. The great interest of it lies in the fact that it is inscribed with the name of the sculptor. *Εἰσιδότης Ἀθηναῖος ἱεροὺς*. "Eisidotos, the Athenian, made it." This sculptor, Eisidotos, is till the present moment unknown either to literary or monumental tradition.

DR. HELBIG, in the *Bullettino di Correspondenza Arch.*, No. 10, reports an interesting discovery made not far from Siena. Deep down below the ancient fortification known as La Mula, a dome-shaped chamber has been discovered, arched over with a roof, constructed on just the same principle as the Mycenaean "Treasure-house" of Atreus, i.e., in the primitive fashion of horizontally-placed layers of stone projecting over each other till they meet at the top. Dr. Helbig thinks the structure is Etruscan, and dates it as anterior to the sixth century B.C. Here, too, popular tradition supposes a buried treasure: the peasants of the neighbourhood say, "Fra Quinto, Sesto e Colonnato giace una mulo d'oro dissotterrato."

A MAN who is his own lawyer is said to have a fool for his client. This adage may perhaps apply to a man who, when he builds a house, is his own builder. At least, the recent case of Devey v. Drummond seems to point to this conclusion. Mr. Drummond, who was going to alter a country-house, finding the tenders were higher than he liked, determined to be his own builder, and contract with the various artificers and others himself. Mr. Drummond seems to have wished to keep his name out of the contracts, and so they were made in that of the clerk of the works, but afterwards in Mr. Drummond's name. This way of going to work finally resulted in law-suits. The joiner brought an action against him, and it was referred to arbitration, as something was due on the accounts. The architect did the same; it also was referred to an arbitrator, who held thirty-six sittings; the award came before the Court on the question as to whether he was right in finding that Mr. Drummond had authorised the architect to make certain contracts, and they found that he was. So in addition to being his own builder, Mr. Drummond has had the satisfaction of having had two law-suits, and if the report in the *Times* is correct, instead of having paid 9,000*l.*, the amount of the tender, he has had to pay 20,000*l.* One may be pretty sure that the ordinary practice of society is, as a rule, the best for ordinary people to follow. This case shows, at any rate, that for a man to be his own builder is not economical; we believe also,—pace Lord Grimthorpe,—that it is not peculiarly advantageous for a man to be his own architect.

COMPLAINTS arise rather too frequently, in the case of acceptance of tenders, of the lowest tender being refused without apparent reason,—a procedure which is hardly fair to competent and responsible firms which have



gone to the expense of estimating on the understanding of the acceptance of the lowest tender. Our attention has been called to a case in connexion with the Great Eau Improvement Works at Saltfleet Haven, to be carried out under the Louth Court of Sewers. Here the amounts of eight tenders ranged from 4,594l. 6s. 4d. up to 5,870l.; not an abnormally wide divergence; the engineers' estimate having been 5,253l. 19s. 8d. The second lowest tender, 4,814l., from Messrs. Hibbitt & Desforges, of Louth, was accepted in preference to the lowest (as above) by Mr. Goddard, of Grimsby. Local authorities state that the latter is "a competent and experienced contractor for works of this character"; and unless there is any explanation which does not appear on the face of the published reports, it certainly seems that the lowest estimator has some cause of complaint.

WE understand that the Council of the Sanitary Assurance Association is getting into shape a Bill to be presented to Parliament for amending the condition of sanitary legislation. The main objects of the Bill, which has been sketched out by Mr. Mark H. Judge, are to simplify and include in one measure the regulations relating to the powers and responsibilities of public authorities, and to increase the responsibility of owners and occupiers in respect of the sanitary condition of their own buildings.

AT the Art Exhibition at Folkestone, which will be opened about the middle of May, there will be one section devoted, among other things, to the exhibition of examples of Medieval decorative art, and Mr. Alfred Newman, of 19, Maddox-street, who has undertaken to arrange this department, would be glad to hear from architects and others who are in possession of old examples of wood and stone carving, metal-work, &c., which they would be willing to lend for the occasion. All objects lent will be insured, and the cost of carriage paid.

MR. CHAS. LUCAS, of Paris, has published, in a separate pamphlet, the very sympathetic notice which he read before the "Société Centrale des Architectes" last year, on the works of the late Mr. Burges and of Mr. R. P. Pullan. He speaks with great admiration of the series of illustrations of Burges's house which Mr. Pullan is bringing out.

THE Annual Report of the Council of the Institute of Architects gives a good account of the position and recent work of the Institute. To adopt a phrase frequently used in the "Queen's Speech" in Parliament, the Institute may say, "My relations with foreign powers continue to be satisfactory," especially in reference to the communications which have been received from provincial and colonial societies. In the matter of examinations, thirty-two candidates presented themselves for the last examination held in London, of whom twenty-five passed, six were recommended another year's study, and one was rejected. Six candidates passed at the Examination held in Leeds. The next examination is to be held in November, in London, for which applications to be examined may be made at once. The question of facilitating the admission of students into public edifices at home and abroad, for the purposes of study, has had the attention of a Committee of the Council, and the idea has been entertained of furnishing a form of credential to members, stating the object of their study; such credentials to bear the insignia of the Institute, and to be made out in French, German, and Italian, as well as in English. It may be noted that the Owen Jones Travelling Studentship is, for the years 1887 and 1888 at all events, to be thrown open to all comers without restriction as to age. The *Transactions* commenced a new series in October last, in a quarto volume of 172 pages of text and 93 pages of illustrations, copies of which have been accepted by the Queen and the Prince of Wales, who have, in reply to an offer by the Council, expressed a

wish to be furnished regularly with the *Transactions* as they appear. The practical interest taken by the Institute in the matter of great public works, and their method of treatment, is a good feature in the record of the past year.

#### ST. MAGNUS THE MARTYR, LONDON BRIDGE.

In a paper which he read twelve months ago to the St. Paul's Ecclesiological Society,\* Mr. E. P. Loftus Brock, F.S.A., appositely showed how remarkable a group of City churches occupied a small space eastwards of St. Paul's. Setting out what is practically a semicircle,—for the river may be neglected,—with a quarter-mile radius from King William IV.'s statue as a centre, we should encompass as many as 35 of the 109 parish churches that were standing in the seventeenth century. Taking of this group those churches which were rebuilt after the Great Fire, one of the most conspicuous is that of St. Magnus the Martyr, just eastwards of New London Bridge. There was more than one saint of that name. He to whom this church is dedicated is supposed to be the martyr who suffered at Cosarea, in Cappadocia, during the reign of Marcus Aurelius Probus, A.D. 276. It is not mentioned in Ralph de Diceto's survey; whilst the earliest rector of whom we know is one Robert de St. Albano, who, according to Newcourt, resigned the living in 1323. But we do know that a chantry was founded on this spot by Hugh Pourte, who was sheriff in 1302; and that here was buried John de Blount,—the first mayor to be actually knighted, though Stow gives that style to many before him,—who filled the chief civic chair during the interval 1301–1308. Another chantry in an attached chapel of St. Mary was founded towards the close of the fourteenth century by Henry Zenely. Zenely, or Yevele, as he is otherwise called, officiated as "Free-Mason" to three sovereigns,—Edward III., Richard II., and Henry IV. He is distinguished for having prepared the designs for King Richard's extensive alterations of Westminster Hall, as well as for his share in making that monarch's tomb in the Minster hard by. About this period the patronage of the church vested in the abbots of West Minster and Bermondsey alternately. Having passed to the Crown at the Dissolution, it was bestowed by Queen Mary, in 1553, upon the Bishop of London and his successors in the see. The original church, together with what we take for its tower, and the neighbouring churches of St. Margaret, New Fish-street (Fish-street-hill), and St. Leonard, Eastcheap, are scarcely manifest in Wyngeard's view,—*circa* 1550. But our subject makes no great figure in Agass's map, though its position would seem to be marked by a cross that stands on a raised platform *in situ*. It appears, indeed, to have fallen into decay, and not to have recovered from the untoward condition of affairs both in respect of its fabric and conduct, whereof a graphic account is to be found in Arnold's Chronicle, drawn up about the end of the fifteenth century. He describes, *inter alia*, how the church and chapel alike stood in great need of repair, and how the priests and clerks neglected divine service for the less seemly attraction of taverns and alehouses, fishing, and other trifles.

St. Magnus was one of the first churches to fall a prey to the conflagration which is commemorated by the monument that dominates this quarter of the town. Nothing remained thereof excepting, as we gather from Mr. Loftus Brock's paper, the portion which forms the eastern wall of the existing structure. This relic, he says, used to extend above the height of the now northern aisle, where the old masonry was visible, but was cemented over a few years since. Wren rebuilt the body of the new church in 1676; and this was declared by statute to serve for the united parishes of St. Margaret and St. Magnus.† In 1705 was added its noblest feature,—the steeple,—whose extreme altitude of 185 ft. is only 17 ft. less than that of the Monument. The whole fabric cost 9,579l. 19s. 10d. On the 18th of April, 1760, it suffered considerably from a fire which broke out in an oil-shop against the south-eastern corner. The story goes that a workman had left some oil boiling while he ran off to see Earl Ferrers return from his trial and conviction. Nearly

all the roof was consumed, the organ damaged, and the vestry-room quite destroyed. At an expense of 1,200l. the parishioners made good their losses, rebuilding the vestry-room by the north-western end. But very shortly afterwards the two western angles of the church together with the new vestry-room, were taken down for the widening of Fish-street-hill, which had at last proved too narrow for the increasing traffic across old London Bridge. At that time the only entrance-way through the lower part from the west, where the steps, in descent now are. But hereupon the architect's presence came to light. Foreseeing the extending requirements of a later age, Wren had constructed the base of the tower in such a manner that the necessary passages might be made without impeding the stability of his work. For in the tower walls, north and south, they found two arches already embodied in the masonry, and these are the arches of the present day. In this respect the tower should be compared with that of Wren's Christ Church, Newgate-street, completed in 1704. It is to be observed, nevertheless, that the two openings no longer serve for their adopted purpose, since the space eastwards is now thrown into the churchyard, and the wharfs beyond are approached by a *détour* opening out of Lower Thames-street. In 1825 the church was repaired and beautified, its east window opened up, and the interior restored to the state in which Wren had left it.\* Ionic columns separate the nave and aisles; the columns are slighter, and the intercolumniations wider than usual. They give an air of insecurity of support for the nave ceiling above. The organ is noteworthy as being the first to be fitted with a Venetian swell in lieu of the old echo organ. The gift of Sir Charles Duncombe in 1712, and originally built by the Jordans father and son, this fine instrument has been successively altered and renovated at the hands of Parsons (1825), Gray & Davison (1852), and Hill. The *Spectator* for February 8th, 1712, contains an announcement of its first use upon the following Sunday. The projecting dial-piece is a gift, too, of Sir Charles Duncombe, Alderman of the Ward, in the year of his mayoralty 1709. Made by Langley Bradley for 485l. 5s. 4d.—but shorn of much of its ornamentation, it now bears the date 1833. Duncombe is said to have presented the clock in fulfilment of a vow taken when, as a boy, he missed his master through not knowing the hour, and lost his time waiting on the Bridge.

The beautifully carved foliage and flowers beneath Thomas Collet's monument (1733), but apparently of somewhat later date, should not be overlooked; whilst against the eastern wall, by the altar-table, is fixed a Gothic panel (1837), bearing an open Bible, in memory of him under whose direction was published on October 4th, 1535, the first complete printed English version of the Bible. This was dedicated to King Henry VIII. and "his dearest just wife and most virtuous Princesse Queen Anne." The title ran "Biblia, the Bible, that is, the Holy Scripture of the Olde and New Testament, faithfully and truly translated out of Douche and Latyn into Englishe, MDCXXXV." Miles Coverdale, bishop of Exeter, had been rector of the parish, and thither his remains were removed from St. Bartholomew-by-the-Exchange at the destruction of that church fifty years ago.

St. Magnus's stone tower, in three stories; with its octagonal composite lantern, also in stone, capped by a wooden and leaden lantern and spire, form together one of Wren's best designs. Mr. Andrew T. Taylor points out in his "Towers and Steeples designed by Sir Christopher Wren" (1881) that the entire Ionic portico on the western face of the ground story "interferes with what is so pleasing in most of his towers, the rising straight from the ground. One cannot get rid of the feeling that it is standing on the top of a pediment." He also remarks that the plate tracery balustrade over the tower cornice has rather a thin and weak appearance, hardly consoling with the solid-looking tower, the compact lantern, and the full-swelling cupola. These blemishes are not so evident, however, to a spectator looking at it from the south. There, from a river landing-stage, and seen through the opening between Adelaide and Fresh wharfs, this composition stands out in all its beauty against the clear sky over the rise of Fish-street-hill.

\* See the *Builder*, April 25th and May 2nd, 1885.

† With them was incorporated that of St. Michael, Crooked-lane, at the re-construction of London Bridge.

\* The exterior stonework of the tower has been lately put into thorough repair. Vide the *Builder*, February 29, 1885.



This portion of London is so intimately associated with the memory of Wren and of the labours that we may revive a tradition thereof Mr. Riddell makes signal use in her "Mitre Court." Scarcely 100 yards distant from St. Magnus Church, and standing between Botolph-lane and Love-lane, is a house whose venerable aspect does not belie the fact that it once formed a home of the great architect. Having served for many years past the Billingsgate and Tower Ward Schools, the house has been somewhat changed internally; the spacious hall and noble staircase, the carved doorways, the decorated ceilings, the painted panels (1696) of the parlour, and other valuable features are preserved. The first landing is the date 1670. The other landing is now thrown into the boys' school. The main entrance, facing a private road, locally known as Fenn's Gateway, is remarkable for its massive side-post and equally massive coved canopy.

#### RECENT EXCAVATIONS IN BEOTIA.

DISCOVERY OF STATUE OF APOLLO PTOOS.

IN the last issue of the *Bulletin de Correspondance Hellénique* (January, 1886), M. Maurice Holleaux gives the long-looked-for report of his important work, carried on last year at the village of Perdicovyris, in Beotia. He has already briefly noted that his efforts, with a speedy reward. The excavations were but fairly begun when the workmen came upon a life-sized statue in whitish grey marble, very early archaic style, to which M. Holleaux does not hesitate to give the name of god Apollo Ptoos. This statue he now publishes in heliogravure, together with a fine archaic head, and the lower part of a still more archaic "Xoanon," inscribed with a dedication. A glance at the plate which accompanies the statue will show the special importance of its discovery; the new archaic figure is obviously a cousin to that long series of archaic statues which have till recently borne the name of Apollo, and which recent criticism has preferred to call by some less august name, seeing them not the representation of a god, but of dead mortal, athlete or otherwise. We refer to the "Apollons" of Orchomenos, of Thera, of Delos, of Delos, of Naxos, of Tenea, and of the British Museum. Dr. Milchoffier has seen the "Apollo" of Tenea a funeral statue, and Dr. Loeschke attributes the same motive to the "Apollo" of Thera. M. Holleaux at once says that he has no intention of reopening the debate, which he rightly thinks merits no categorical solution, but he distinctly states that in this new individual instance the place of "providence" does coincide with exceptional precision the right attribution of the statue. It was found a few paces only from an undoubted sanctuary of Apollo, of high repute in ancient days. The altar around it was thickly strewn with fragments of pottery bearing inscribed dedications to the god. We can scarcely, therefore, avoid the conclusion that the statue itself is the image, votive or otherwise, of Apollo Ptoos himself. The supposition that it may have been the votive statue of a victor in the games at the Ptoia falls to the ground for lack of proof that at the manifestly early date of this statue the games existed. Equally untenable is the theory that it may have been a funeral statue, as we know for certain that a sanctuary reserved as a burial-ground. We think, then, that this particular statue is undoubtedly Apollo, but we repeat, with M. Holleaux, that it by no means follows that all the rest of the analogous series are also Apollos. A juster criticism is struck by Michaelis when he says that in the archaic period, whatever was the subject intended, god, hero, or athlete, the sculptor expressed it in the same terms; and in its beginnings was not concerned to try its modes of expression in precise relation the thought to be expressed. The long series of "Apollo" statues, though forming a close general analogy, yet fall into two main divisions, according to the type of feature and limb. Dr. Furtwängler has clearly shown that we have to group together on the one hand the "Apollons" of Thera and Tenea, on the other the "Apollons" of Orchomenos, Actium, and the British Museum. The question, of course, arises which of these broad divisions our new Apollo belongs. A long and detailed analysis brings M. Holleaux to a distinctly satisfactory conclusion.

Found in Beotia, the new Apollo ought to rank with the already Beotian specimen the "Apollo" of Orchomenos. In style he distinctly does, only in execution he is far superior. He now stands at the head of a series that enables us to mark step by step the advance of archaic art in modelling the human figure. The series is as follows,—the "Apollo" of Orchomenos, those of Actium, the Apollo of the British Museum, and lastly, the new Apollo Ptoos. The temple and oracle of Apollo Ptoos had its origin in Thebes; we may rightly, therefore, regard these statues as a chronological series of the archaic Theban school.

The inscribed fragment of a xoanon, also published by M. Holleaux, is scarcely of less importance,—its form recalls the famous Nikandre of Delos; it is little more than a board with indications of feet. The form of the letters of the inscription recall those of the Tanagra monument to Demys and Kilylos. Unhappily, the inscription is incomplete,—

... ον ἀνέθεκε τοῖς Ἀπο  
λοι τοῖς Πτοῖσι  
... ορος ἱεροῖσι

unkind fate has left from us the name of this early sculptor, and literary record gives us no sculptor's name ending in "oros" to supply the deficiency. By order of the new director of antiquities, M. Kabbadias, both these statues, together with a head of archaic type, have been brought to the Central Museum at Athens, where the Apollo Ptoos stands side by side with his kinsman the Apollo of Orchomenos.

#### THE BUILDING OF STABLES.

It may be well to preface this article by saying that the following remarks are a brief summary of the *desiderata* in stable-building, as regarded from the point of view of the owner of the horses to be provided for. The subject is sufficiently important to make a non-professional opinion of some value.

It is surprising to observe how careful many persons are as to the construction and fitting-up of their houses,—how careless they are in regard to their stables. It is true that more intelligence is now shown in the management of horses than was visible even a few years ago, but that progress is still of a comparative character; so that the carelessness about the stables arises from a kind of popular ignorance in regard to the management of horses. Continually those who take a personal interest in everything which concerns their houses will be found to leave the stable management entirely to itself. Hence the construction and fitting of stables are often left altogether to the architect and builder. The former has quite enough to do with looking after the house without troubling much about stables, and in all probability he has seldom studied this question from a practical point of view. He will plan a picturesque and pleasing exterior, and then his task is over. But too often the owner of the premises does not give him free scope, even in regard to this. If he interferes, it is on the stables where the money is to be saved, and over and over again stables may be seen wholly inferior in architectural character to the house, simply because the owner, while feeling it necessary to erect stables, has thought it advisable to spend as little money upon them as possible. Badly-constructed stables are never economical, and in many cases a little extra money spent on them will repay itself in the better condition of the horses which will have to inhabit them.

A cardinal principle in the erection of stables is the selection of a site. Stables are too often put up in any back region, but they should always be built in the warmest and sunniest aspect which is obtainable. Not warmed, as are houses, artificially, the warmth of the sun is most necessary to keep them as dry and warm as possible. Dryness is very essential for good stables, and, therefore, a site where drainage is easy and good should be selected. Damp stables will cause disease not only in the lungs and bronchial tubes of a horse, but also in his feet, and may cost the owner not only anxiety, but money. It has to be borne in mind also that both sunny and dry stables are requisite for keeping carriages in proper condition. Hence, no one should build a stable or coachhouse except on a dry site and with a warm aspect.

Another element in regard to the construction of stables of the highest importance is that

they should be built as substantially as possible. Warm stables in winter are absolutely necessary for horses if they are to look well and do their work well, and equally in summer they should be cool.

The aim of the builder of stables should in fact be to erect them so that they may be kept internally at a moderate and equal temperature throughout the year so far as that is possible. Horses come warm into a stable, and they cannot, as we can, stand with their backs to the fire. Hence, it is most necessary that in winter time they should not be received into stables which will chill them. On the other hand, too much care cannot be taken in regard to ventilation.

Many horses are lost every year owing to insufficient ventilation. The stables get hot and close, and a horse is stripped of his clothing and brought into the cold air. The human being, with much the same constitution, puts on an overcoat when he turns out. It is not surprising, therefore, that horses get colds, coughs, and sometimes die, sometimes become permanently injured in their wind. While, therefore, a stable should be temperate, it should not be hot, and accordingly the ventilating apparatus should be as effectual and as easily worked as possible. Barely one stable in ten is properly ventilated, and artificial warmth is never supplied, though most stables might obtain it from the harness-room fires by means of hot flues or hot-water pipes connected with the boiler, to be used according to the external atmosphere.

The fitting-up of the stable will hardly, perhaps, be considered as within the province of an architect, but it is a matter with which every architect should be acquainted. The great point to bear in mind is that loose boxes should be put up and not stalls. The common practice is to have about three stalls to one loose box, whereas the proportion should be reversed. The freedom which a horse has in a loose box is of vital importance. To point out the reasons for this would be to go into matters scarcely fitted for this journal, but, whether for actual general health or for keeping a horse sound in his legs a loose box is very necessary. There is no need to have them large, but loose boxes should be sufficiently roomy for a horse to turn in with comfort. There are many stalls which, with an extra foot of breadth, would make reasonably good loose boxes.

We may shortly summarise a few more hints. The harness-room should never be a passage-room, though, on the other hand, it should be directly connected with the stables. Where the stables are large it should be double, in the nature of a scullery and a kitchen, the outer harness-room for rough work, the inner for keeping saddles, &c., and for doing lighter and cleaner work. Large coach-houses are to be avoided; several smaller ones are better. To have several carriages packed in one coach-house causes them to be constantly knocked and bruised, whereas when one or at most two carriages occupy one house they are not so likely to receive damage. When stables are of any size there should always be one or more large loose boxes at a distance from the general range of stabling for the use of young horses, or mares with a foal, or for the purpose of summering hunters. If possible the stables should be planned so as to be connected with a small grass paddock; a mere plot of grass is sufficient. This serves as a place for a horse to be turned into in spring or summer for an hour or two occasionally, and as an exercising ground when a track is laid down with straw in hard winters. Again, every stable should be provided with one or two sleeping-rooms, which should be over the harness-room. As to the drainage, it goes without saying that it should be as perfect as possible. It may be said that the stables we have described are small, but the same principles are applicable to large ones, and, in all respects, the latter are but the small ones multiplied. Having regard to the great value of horses, to the carelessness, economical views, or ignorance of so many if not most horse-owners, architects should always do their best to insist on stables being erected on intelligent principles and in the best possible manner.

**Alhambra Theatre.**—Messrs. Archibald Smith & Stevens have received instructions to put in one of their improved hydraulic lifts at the Alhambra Theatre, London. This will be supplied by water from a tank at the top of the building, and will be available for use at all hours.



## VICTORIAN PATENTS.

The Registrar-General of the Colony of Victoria, Mr. Richard Gibbs, issues a yearly list or index of the patents applied for. It is a most useful publication, in which a short abstract of each specification is given together with the necessary drawings. It is neatly got up, is of convenient size, and cannot fail to be of value to inventors, engineers, and others of the colony. Volume XV., which refers to the year 1880, has recently reached us, bearing date 1885. This seems a trifle late, a fact which somewhat detracts from the importance of the work as a book of reference.

During the year in question 176 patents were applied for. Of these 132 were granted, 39 lapsed owing to the absence of necessary procedure, four were refused, and one was withdrawn. In looking through the list of subjects we find electricity and railways occupy the greatest space. In the former section Mr. T. A. Edison has taken out no less than seven patents, and is, in fact, the largest customer to the Patent Office during the year, if we except Mr. E. Waters, a patent agent of the colony. In looking through the specifications we find that 92 patents were taken out by Victorians. Next in order come Great Britain and the United States, which make a tie for second place with 25 patents each, although, perhaps, our Trans-Atlantic kinsmen should have the preference, as two of the English patents are taken out jointly with inhabitants of France and Italy respectively. Next in order comes the neighbouring colony of New South Wales with 16 patents, while next on the list follow France, Germany, New Zealand, and South Australia with from five to two patents each; and, finally, Italy, Canada, Queensland, and Tasmania, each having a single patent credited to it. We do not find in the subject-matter of the specifications anything particularly distinctive of the colony, unless it is a "Portable Rabbit Sucker"; in fact, the list might be supposed to be taken hap-hazard from our own Patent Office Journal. There is the usual wide range of subjects, ranging from a brick-kiln down to an "improved candle-extinguisher." Agricultural machines of various types seem to have occupied a good deal of attention, although some of the most important patents are the result of foreign ingenuity. There are four patents for ice-making machinery, two from England and two from the United States. Mr. Beaumont, of Westminster, protects his compressed-air engine, and Sir John Coode an ingenious hopper-barge for delivering spoil by streams of water. We find no patent for a steam-engine on the list, neither is protection claimed for any new type of steam-boiler, although Mr. Wavish, of this country, receives a patent for what appears to be a form of his well-known "Economiser." Two patents for extracting precious metals are taken out by Americans, and one by a Parisian. An ingenious deep-lift pump is contributed by Mr. W. Watson, Ballarat, and a new form of rock-drill by Mr. John Mitchell, of Bendigo. A toggle arrangement applied to a stone-breaking machine, is considered a sufficient departure from previous applications of this device to the same purpose to merit protection. There are many other patents, doubtless, equally worthy of notice, but it would manifestly be impossible for us to go through the whole list. The illustrations are excellently lithographed, the printing is good, and, on the whole, the publication does credit to the office from which it is issued.

## BRICKMAKING.

## THE INSTITUTION OF CIVIL ENGINEERS.

At the ordinary meeting on Tuesday last, Sir Frederick Bramwell, F.R.S., President, in the chair, a paper on "Brickmaking," by Mr. Henry Ward, Assoc. M. Inst. C.E., was read. The author showed that many different systems of brickmaking were carried on in England. In some cases machinery was largely employed, while in others all the operations were done by hand. Similarly, many descriptions of fuel and many kinds of kilns were used. It was impossible to lay down any general rule which would suit all places. Probably the system of manufacture in each locality was less open to improvement than manufacturers in other places were inclined to believe. Doubtless there was much that was open to criticism, but generally the plan adopted appeared to have

been gradually adapted to the kind of clay and fuel, and to the labour and transport-conditions obtaining in each district. The process of brickmaking by hand consisted in working the clay to a plastic condition, moulding it, drying the bricks in the open air, and finally burning them in clamps or kilns. When burned in clamps, the fuel was generally house-ashes mixed with the brick itself, but with kilns coal was employed. In hand-brickmaking as at present practised, machinery was utilised for the preparation of the clay. In the Home Counties the clay was first brought into a thin liquid in a wash-mill, where a certain proportion of chalk was added. This thin liquid was pumped into "backs" or pits, adjoining the pug-mills, during the winter. The water gradually drained away (often to be used again), while the clay settled and became sufficiently stiff to be worked in the pug-mills in the succeeding summer. In nearly all cases the wash-mills, pumps, and pug-mills were driven by steam-power. When the fields had a tolerably uniform surface, it was found best to use long lines of shafting to convey the power from point to point. Where, however, the surface, or the shape of the fields on plan, was irregular, it was preferable to drive the wash-mills and pug-mills by endless chains, running overhead, and supported by small pulleys or posts at intervals. Probably the most important of the applications of steam-power was that of driving powerful force-pumps, to force the liquid "slurry" through pipes, up and down hill, sometimes to a distance of two miles. In this way bricks could be made alongside a railway, canal, or river, while the clay could be pumped from a distance. In many brickfields all the clay had been worked out; but now that clay could be brought from a distance so economically, the old plant could be utilised.

Brickmaking by machinery might be roughly divided into two classes, namely, the plastic, and the dry or semi-dry. In the plastic process the usual plan was to mix the clay and bring it to a soft state in a pug-mill, from which it was forced through a die, or opening, in the form of a column, the section of which was the same as that of a brick, viz., 9 in. wide by 4½ in. high, with a due allowance for shrinkage. This column of clay was divided into bricks by wires cutting through it transversely. The bricks were subsequently dried in the open air, or in sheds heated by fuel or steam. There had not been any great alteration in the process of manufacturing wire-cut bricks. The machines were now made stronger and more complete, with further crushing rollers, to enable them to deal with almost any kind of clay. The die, or mouth through which the stream of clay issued, required constant adaptation to particular clays to enable it to form a perfect column of clay. The difficulty was, that as the stream of clay flowed quicker in the centre and slower at the sides, similarly to a glacier or a stream of water, the sides and corners were apt to become ragged. This could be overcome either by putting friction on the centre of the stream of clay to retard its flow, or by helping the travel of the sides and corners, either by lubricating them or by forming the sides of large rollers. These rollers were either rotated by the issuing stream, or they might be driven by power faster so as to help the stream. The use of the exhaust steam under hollow floors, covered with brick, flag-stone, or metal plates, had become general. By these means plastic brickmaking could be carried on to a moderate extent through the winter, as the bricks could be dried in sheds.

In the semi-dry process the clay was ground in a perforated pan-mill to fine particles without any admixture of water. This fine-ground clay was subsequently pressed into a brick, which was so hard and dry that it might be taken direct to the kiln without being previously dried.

Plans of works laid out by the author were shown, and also drawings of the various types of the machinery referred to. The Hoffmann-kiln, the gas-kiln, and the railway-kiln were described and illustrated. The Hoffmann-kiln remained much as it was when first introduced. Probably, as regarded economy of fuel, Mr. Hoffmann reached finality at one stride. The whole of the heat of the bricks that were cooling was carried forward by the current of air which supported combustion; and again, the heat of the products of combustion was absorbed

by the bricks which were being warmed and dried until there was not more heat left than was sufficient to cause the necessary draught. It had been attempted to abstract still more of the heat by passing the products of combustion through a greater number of bricks, and to obtain the necessary draught by a fan; this also saved the expense of building a chimney, but the plan had not been successful. Gas had been used as a fuel in these kilns in Germany and in France, not with view to further economy, but mainly to improve the colour of the bricks. In order to save the cost of loading and unloading the kiln, Mr. Dueberg had introduced a method by which the green bricks were loaded on to a railway truck, which was run into the kiln, the bricks being burned while on the truck. The truck was formed without sides or ends, and the floor was covered with firebrick. The wheels and axles were kept cool by a current of air continually travelling under the floor of the truck. Communication was cut off between the space above and below the floor by lips of iron travelling in a sand trough. In this system the fire travelled round the kiln, as in a Hoffmann kiln, and, therefore, the trucks were not moved while they were hot. In another type of railway-kiln the combustion-chamber was stationary, while the trucks of bricks were gradually pushed through it. This had not been a success.

## THE SOCIETY FOR THE ENCOURAGEMENT OF THE FINE ARTS.

On Thursday, April 15th, at the rooms of this society, 9, Conduit-street, W., a lecture on "Old Engravings of the Italian Schools" was delivered by Mr. E. P. Loftus Brock, F.S.A. The chair was taken by Mr. H. H. Statham, who said that the lecturer, being the honorary secretary of the Society and a well-known archaeologist, needed no introduction. The walls were hung with a large and representative collection of engravings dating from 1500's down to the present century, and containing specimens of the works of Guido, the brothers Caracci, Diana of Mantua, Marc Antonio, and of Bartolozzi's early works. The lecturer said that the art of line-engraving in Italy sprang into vigorous life in the period of the Renaissance, and was greatly helped by the invention of the printing-press, to which, however, it was not indebted for its existence,—engravings in the form of wood blocks having existed anterior to the use of the press. The principal schools of engraving in Italy were those of Florence, Rome, Bologna, Parma, Padua, and Venice, which, on the whole, preserved their distinctive features to a comparatively recent date. The value of engravings as historical records of events, costume, contemporary life and manners, architecture, sculpture, and paintings, was strongly insisted on. Specimens of various schools and periods were compared and contrasted, and attention called to the gradual change from the hard, sturdy, well-defined outline of early art to a graceful artistic style.

An interesting discussion, in which the Chairman, Mr. Louis Fagan, Mr. Forbes Robertson, Mr. T. H. Maguire, Mr. G. A. Storey, A.R.A., and Mr. James Edmondston took part, gave additional force to the very able lecture, Mr. Fagan urging upon all the duty of giving attention to the magnificent collection of engravings in the British Museum, a collection unequalled in Europe.

**The Parkes Museum.**—An Extraordinary General Meeting of the members of the Parkes Museum was held on Friday, April 16th, Professor Berkeley Hill in the chair. The meeting was called to consider the desirability of amalgamating with the Sanitary Institute, and it was unanimously resolved, on the motion of Dr. G. V. Poore, seconded by Mr. Mark H. Judge, "That it is desirable that the objects for which the Parkes Museum and Sanitary Institute respectively were established, should, if practicable, be prosecuted in the future by one corporate body." Further resolutions for bringing about this amalgamation and for applying for a Royal Charter were considered, but it was decided to adjourn the meeting in order that amendments to the resolutions might be sent to the whole of the members.



## THE TILBURY DOCKS.

THESE extensive deep-water docks, which have been constructed by the East and West India Dock Company at an expenditure of about 3,000,000*l.*, were opened on Saturday. The principal works consist of a tidal basin and six and branch docks. The tidal basin, with a water area of nineteen acres, has at low-water spring tides a depth of 26 ft., while at ordinary high-water springs the depth is 45 ft., thus enabling the largest steamships to enter and leave irrespective of conditions of tide. In the basin there are two arrival and departure quays (each 600 ft. long) for discharging and loading in all states of the tide. The north-western quay of the basin, named the transhipment quay, is over 300 ft. in length, and is chiefly intended for transhipments to and from Continental steamers. The coaling jetty at the north-western quay of the tidal basin is fitted with four 30-cwt. movable hydraulic cranes, the weighing apparatus, constructed by Sir G. Armstrong, Mitchell, & Co. (Limited), of Newcastle-on-Tyne, for discharging coal from steam colliers into barges, and by means of bridges connecting the jetty with the land, the same can also be tipped into railway trucks. The south quay of the tidal basin has had been erected for the accommodation of passengers and their baggage, comprising a waiting-room, Customs examination room, and two baggage warehouses, necessary baggage offices, and a booking office. The south side of this shed opens on to railway platform, from which special trains will be run to Fenchurch-street and Liverpool-street stations. The hydraulic and other machinery for loading and unloading the vessels, and for opening and closing the docks, is very complete. The electric light has been employed throughout the whole dock system. The work has been done under the direction of Messrs. R. E. Crompton & Co., of London and Chelmsford, and the general arrangement of the lights has been such that a total of eighty or more lamps of 3,000-candle power each have been placed in various positions on masts or other convenient posts of stage in the outdoor part of the docks. The works have occupied four years. The engineers are Messrs. Manning & Baynes, and contractors who have completed the works Messrs. Lucas & Aird.

The Times, in its account of the opening of the docks, stated "that the real commencement of operations only dates from October 27, 1884, when the undertaking was taken over by Messrs. Lucas & Aird from the previous contractors, and that the total quantities of the principal works carried out from October 27, 1884, to April 17, 1886, were as follows:—Excavation, 3,275,000 cubic yards; concrete, 640,000 cubic yards; brickwork, 46,000 cubic yards; masonry, 260,000 cubic feet; shedding, 20 acres; permanent road laid, 22 miles. The materials used consisting of the following items:—Gravel, 700,000 cubic yards; bricks, 19 millions; cement, 65,000 tons; stone, 280,000 cubic feet; iron, 1,056,000 square feet; ironwork, 4,100 tons; galvanised sheeting, 300,000 square feet; timber (balk), 1,530,000 cubic feet; ditto (planks and boarding), 13,200,000 linear feet; coal and coke, 40,500 tons; and the machinery and plant employed, as follows:—locomotives, 54; portable engines, 35; steam engines, 46; steam cranes, pile engines, 120; steam excavators, 6; dredgers, 5; engines in steam, 250; wagons, 1,650; trucks, 4,000 tons; sleepers, 76,000; temporary rails laid, 38 miles; timber, 2,000,000 cubic feet; sea, 80. The average number of men employed was 4,500, and the water pumped was (minimum quantity) 13,000 gallons per minute."

In reference to these particulars, however, Messrs. Kirk & Randall, the contractors who commenced the works, write:—"Whereas the site was put into our hands in July, 1882, situated marsh, if not a bog, it was forcibly, as we allege, wrongfully taken out of our hands two years afterwards as a well-drained, from which we had removed considerably more than two millions of cubic yards of excavation, in or upon which we had built a large amount of the most difficult portion of the quaying and other permanent works, and further, in putting in concrete at the rate of 2,000 cubic yards per day, or say 600,000 cubic yards per annum. The organisation of the plant, the merit of which is so complacently ascribed by the present contractors, had been

completed, and upon this we had expended upwards of 200,000*l.* Of the thirty-eight miles of temporary road claimed by Messrs. Lucas & Aird, thirty-five miles were provided and laid by us. Of the total of 250 steam engines of all sorts, over 200 were put on the ground by us. To our pumping arrangements practically no additions were made. In short, of the total plant utilised in completing the docks we supplied, perhaps, 90 per cent., and Messrs. Lucas & Aird the remaining 10 per cent. Speaking generally, it may be said that when Messrs. Lucas & Aird went to Tilbury the chief difficulties of the work had been overcome."

## Illustrations.

MONUMENT TO THE LATE  
ARCHBISHOP TAIT, CANTERBURY  
CATHEDRAL.

THIS monument was put up as a memorial to the late Archbishop, in Canterbury Cathedral, some months ago, as mentioned in our columns at the time. The figure is by Mr. Boehm; the architectural portion was executed by Mr. Brindley, from the design of Mr. J. Oldrid Scott, at a cost of 825*l.* The inscription is in gilt letters on a ground of deep red Rosso marble; the side panels being of a dark green porphyry. The other marbles used are mostly pavonazzo and breccia. The work is very richly inlaid and carved.

This engraving, and that of the Kemble memorial screen in the present number, are executed by Mr. J. D. Cooper, from photographs, assisted by the architect's drawings.

MEMORIAL SCREEN, BATH ABBEY  
CHURCH.

THE screen, which was erected as a memorial to a former Vicar, the Rev. Charles Kemble, divides off the eastern part of the south choir aisle, which will be used as a vestry. It has two brass plates on the lower part, with inscriptions, and the screen is surmounted by a shield bearing the Kemble arms, carried by two figures of angels. The cost of the whole was about 200*l.* The work was executed by Mr. Harry Hems, from the designs of Mr. J. Oldrid Scott.

It may be mentioned that Mr. Gill, an old inhabitant of Bath, has offered to give one of the side screens of the choir if the congregation will agree to give the remaining three.

DRAWINGS OF ST. MAGNUS, LONDON  
BRIDGE.

THESE admirably-executed measured drawings of Wren's steeple near London Bridge obtained for their author, Mr. E. H. Sedding, the first silver medal for architectural work of this class in the last Royal Academy Students' competition.

For some historical particulars in regard to the church and its site, see article in another column.

NEWCASTLE-UNDER-LYME PUBLIC  
BUILDINGS.

We illustrate this week Messrs. Sugden's and Mr. Blood's design, to which the first premium was awarded by the professional referee in the competition which took place last year for this undertaking.

After some consideration, the Town Council decided to ask Messrs. Sugden and Mr. Blood to co-operate in the carrying out of the work with Messrs. Chapman & Snape, a local firm, whose designs, though unpremiered in the competition, contained features which commended themselves to the Town Council.

This arrangement having been agreed to, the further plans, which we also illustrate, have been jointly prepared by the architects named, after repeated consultations with the committee of the Town Council, whereas the practical advice of Mr. Thomas Lewis, architect, one of its members, has been of great value.\*

These final plans show a very considerable development of the original scheme (as embodied in the instructions to competing architects), several features of public utility having been added, such as the large Council-chamber,

\* It thus appears that this building has practically six architects. "In the multitude of councillors there is safety."

school of art, refreshment-room, clock-tower, &c. The extent to which the outlay will have been thereby increased will be definitely known when the tenders are opened, after the 29th inst.

The scheme divides itself into two parts, viz., the public baths (and caretaker's house) block in March-street, and the Ironmarket block.

The Ironmarket block consists of four departments,—the School of Art, the Free Library, the Council-chamber or Banqueting-hall and adjuncts, and the large Assembly-room, available for picture exhibitions, floral and horticultural shows, and other purposes.

The School of Art comprises elementary school, 25 ft. by 30 ft.; antique room, 25 ft. by 30 ft.; lecture-hall (and model-drawing room), with art-master's stores, 24 ft. by 44 ft. These are approached by a spacious corridor from which access is also obtained to the various students' cloak-rooms, conveniences, the modelling-room, storage, &c.

The Free Library has library proper, or book-rooms, 24 ft. by 40 ft., divided into 8 ft. heights by open iron galleries round the walls, connected by spiral iron staircases, thus dispensing entirely with ladders. The reference, reading, and general news rooms are each 25 ft. by 30 ft., approached by an ample corridor, and with the necessary conveniences. These rooms are divided by lofty glazed screens, which denote at all times the extent of the apartments in this connexion, whilst affording facilities for oversight. The librarian has a capacious basement for the storage of useful but seldom studied literature; and his other requirements are fully provided for.

The Council-chamber is 50 ft. in length by 38 ft., formed into three embayed recesses, divided by columns and pilasters, and fitted up with window-seats on the street side. It has an ante-room on the same level, and in the basement, kitchen, scullery and larder, &c., from whence lifts ascend to the ante-room and to the assembly-room refreshment-room respectively.

The Assembly-room is 50 ft. in width by 90 ft. in length, exclusive of stage. It is lighted from the ceiling by clearstory lights in the ceiling cove, leaving the walls below clear for the hanging of pictures, &c. The ceiling is coffered by plastered moulded beams. This room is approached by a double staircase rising from a crush-hall, having exits both into the Ironmarket and the carriage-way from the Ironmarket to March-street. There is a further staircase from the Ironmarket and separate stairs to the stage, all fireproof. The cloak-rooms, &c., for ladies and gentlemen are large and commodious, and the stage has ample retiring and dressing rooms. The refreshment-room opens upon a colonnade, which contributes very much to the effect of the front elevation.

Our reproductions of the plans clearly explain the extent of the baths accommodation, which it will be observed, has been so devised as to allow of ladies using the swimming and Turkish baths, on the days set apart for them, from their own entrance, without crossing other corridors, &c.

The materials proposed for the building are thin dark-fired bricks for external facing. The stone dressings will be of mottled "Beggar's Well" stone from Mrs. Mellor's quarries near Uttoxeter, and the roof tiling the best Broseley. The floors are all specified of iron and concrete, laid thereon with wood blocks in bitumen,—ensuring security against fire, dry-rot, the presence of vermin, the transmission of sound, and other evils.

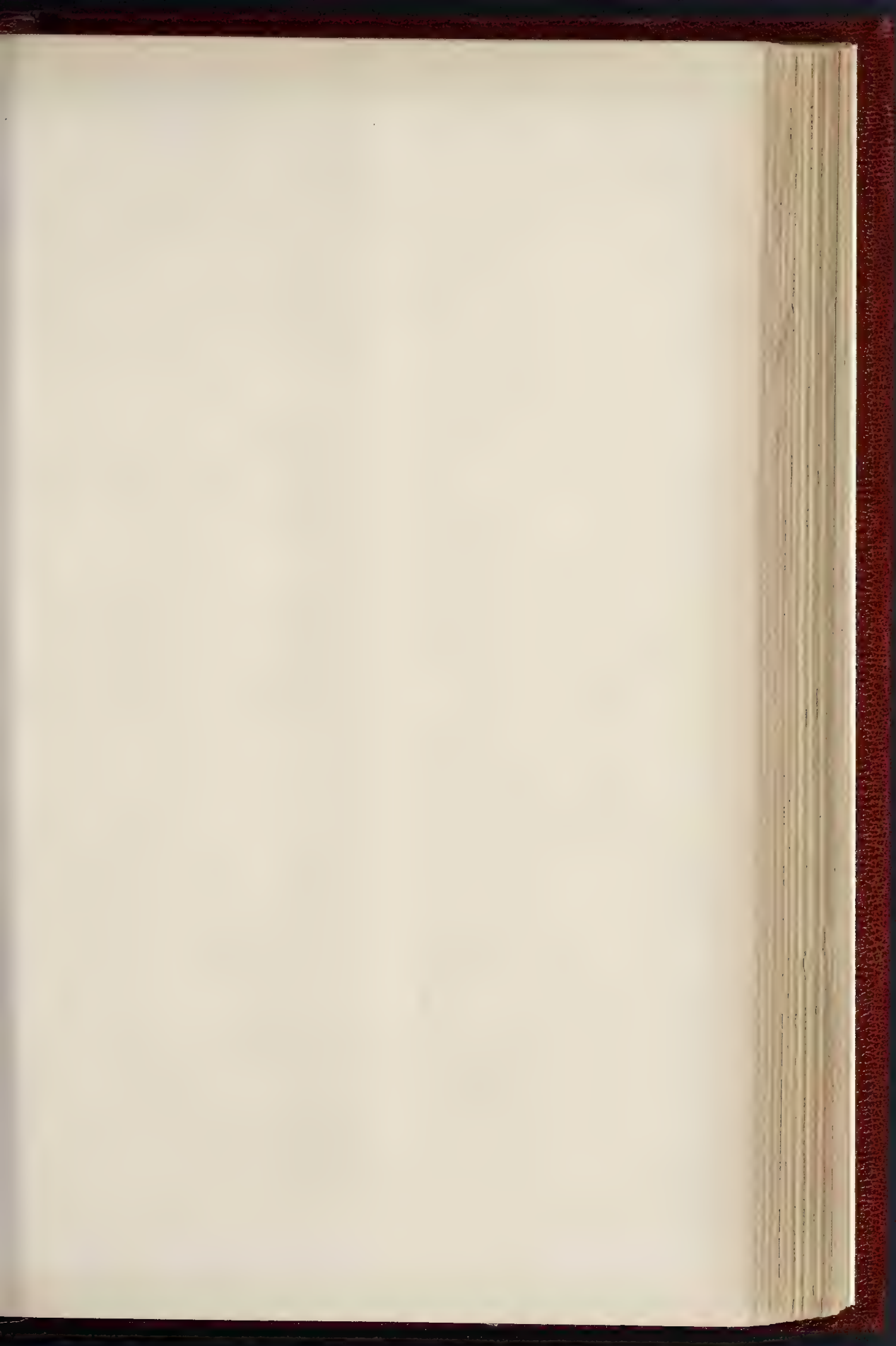
WINDOWS AT EASTHAMPTSTEAD  
CHURCH.

THESE windows, representing "Mary Magdalen at the Sepulchre," and "Christ and Mary Magdalen in the Garden," are placed in Easthamptstead Church, and are the design of Mr. Burne Jones, A.R.A. In the free yet strictly decorative treatment of the figures and drapery they afford an admirable example of stained glass style, equally free from archaic stiffness and from any unsuitable degree of realism.

**Railway Benevolent Institution.**—The annual dinner in connexion with this Institution will take place at the Freemasons' Tavern, London, on Wednesday evening, the 12th of May, under the presidency of Mr. John Dent Dent, chairman of the North-Eastern Railway Company. The Institution has been established to provide for the necessities of members, orphans, children, and widows of the railway officers and servants in the United Kingdom.

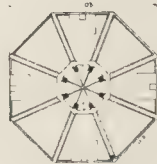
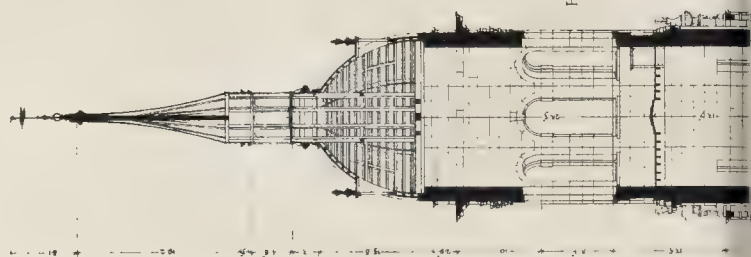




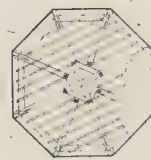




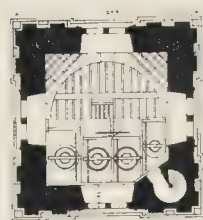
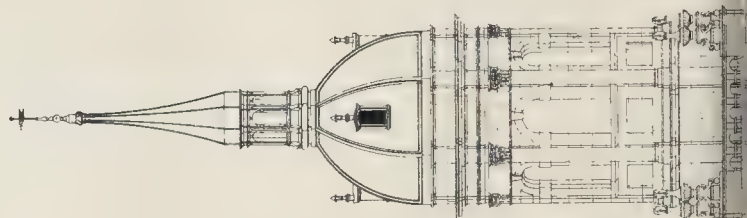
THE BUILDER, APRIL 24, 1886



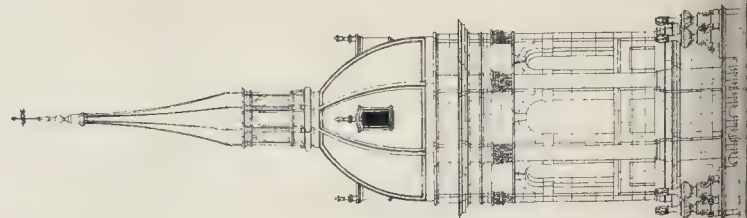
Plan of Tower

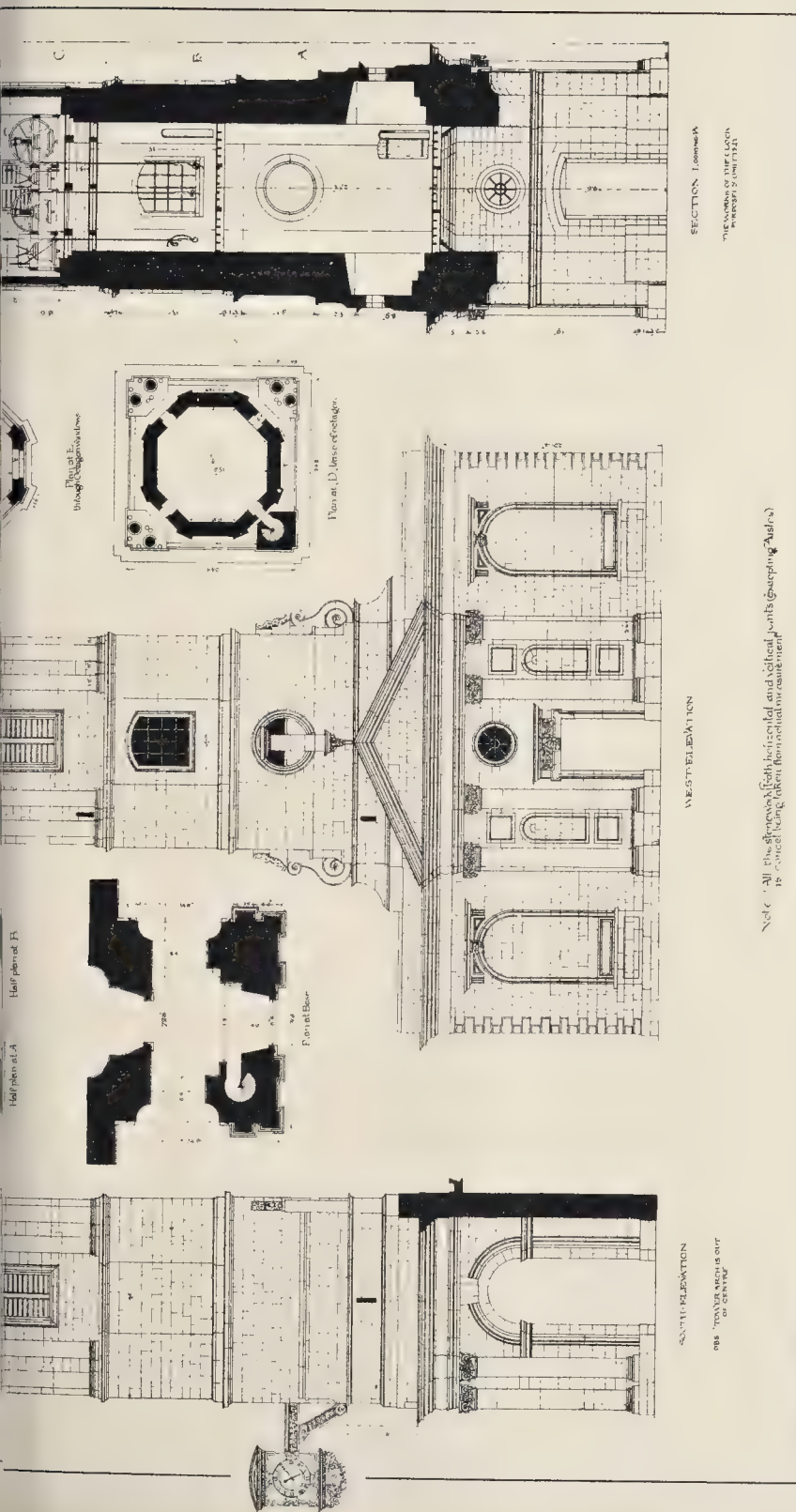


Plan of Tower



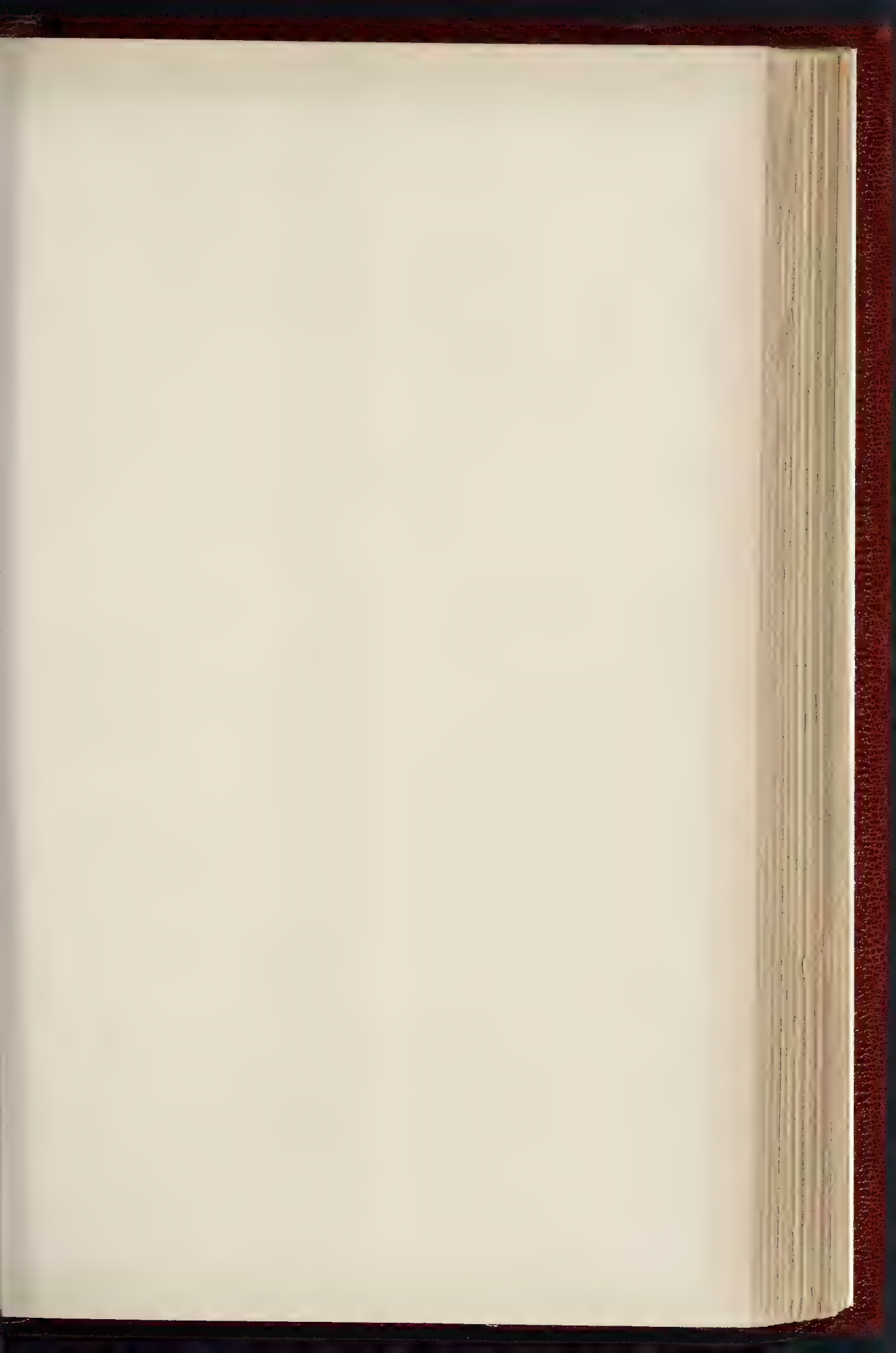
Plan of Tower





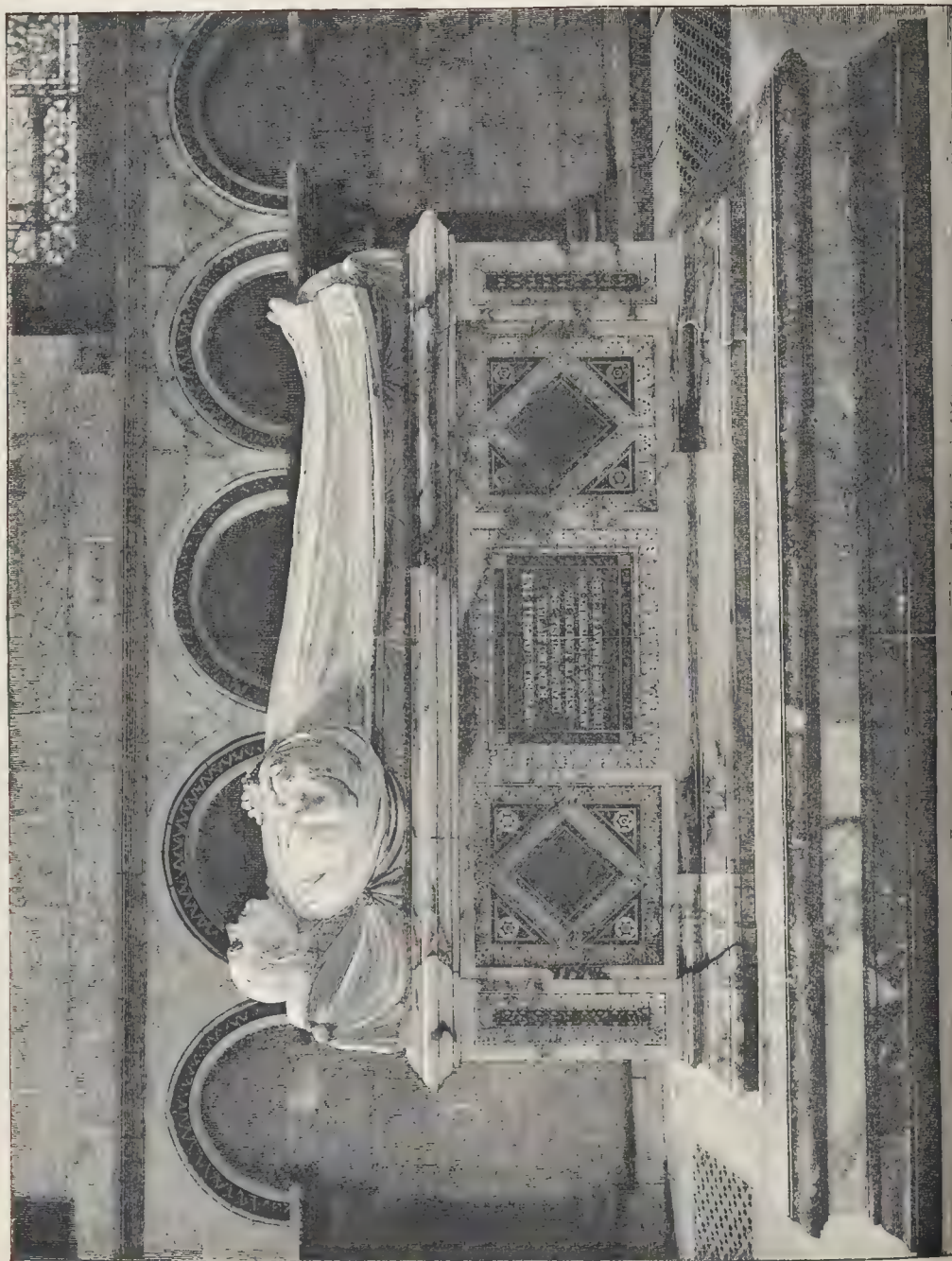


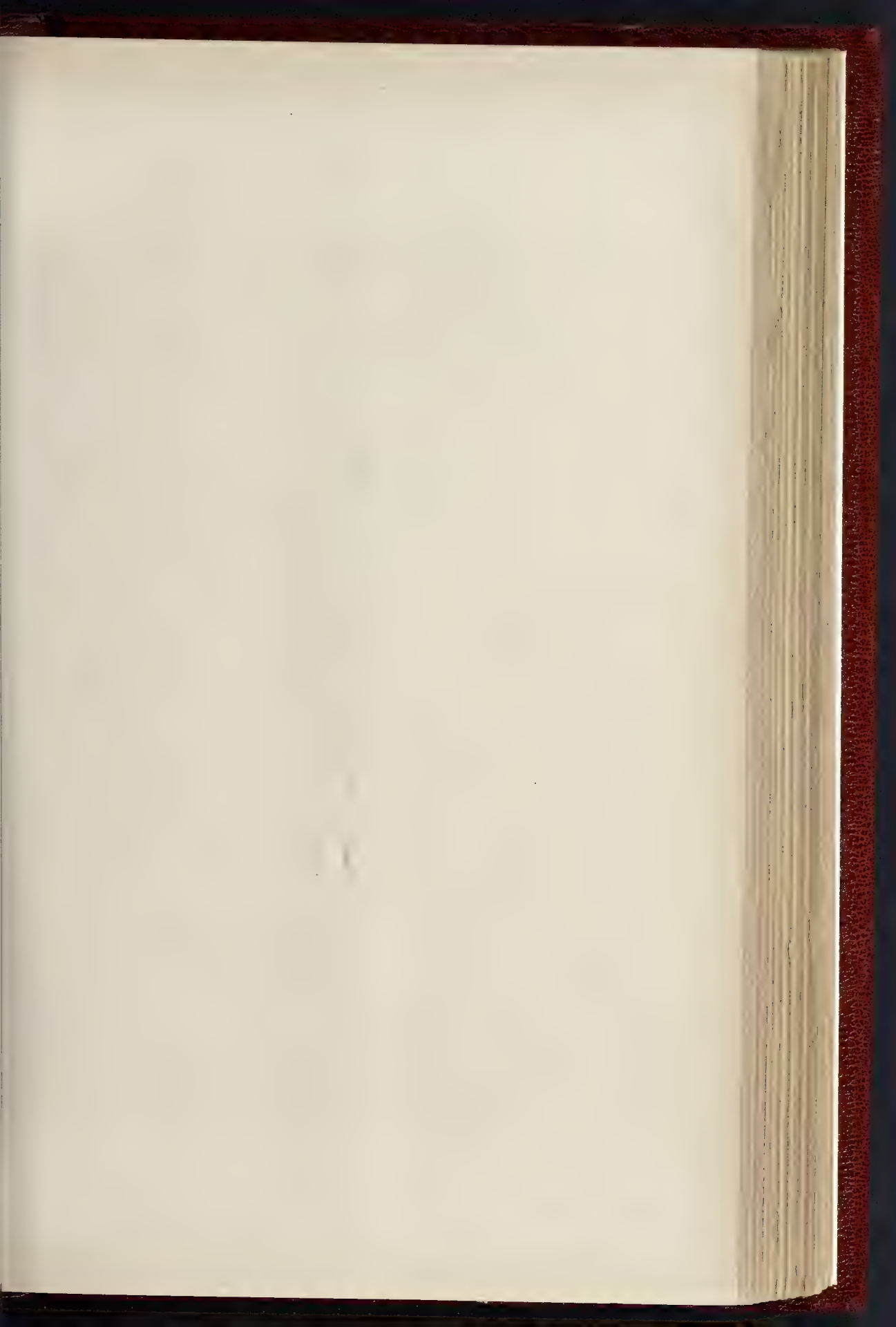




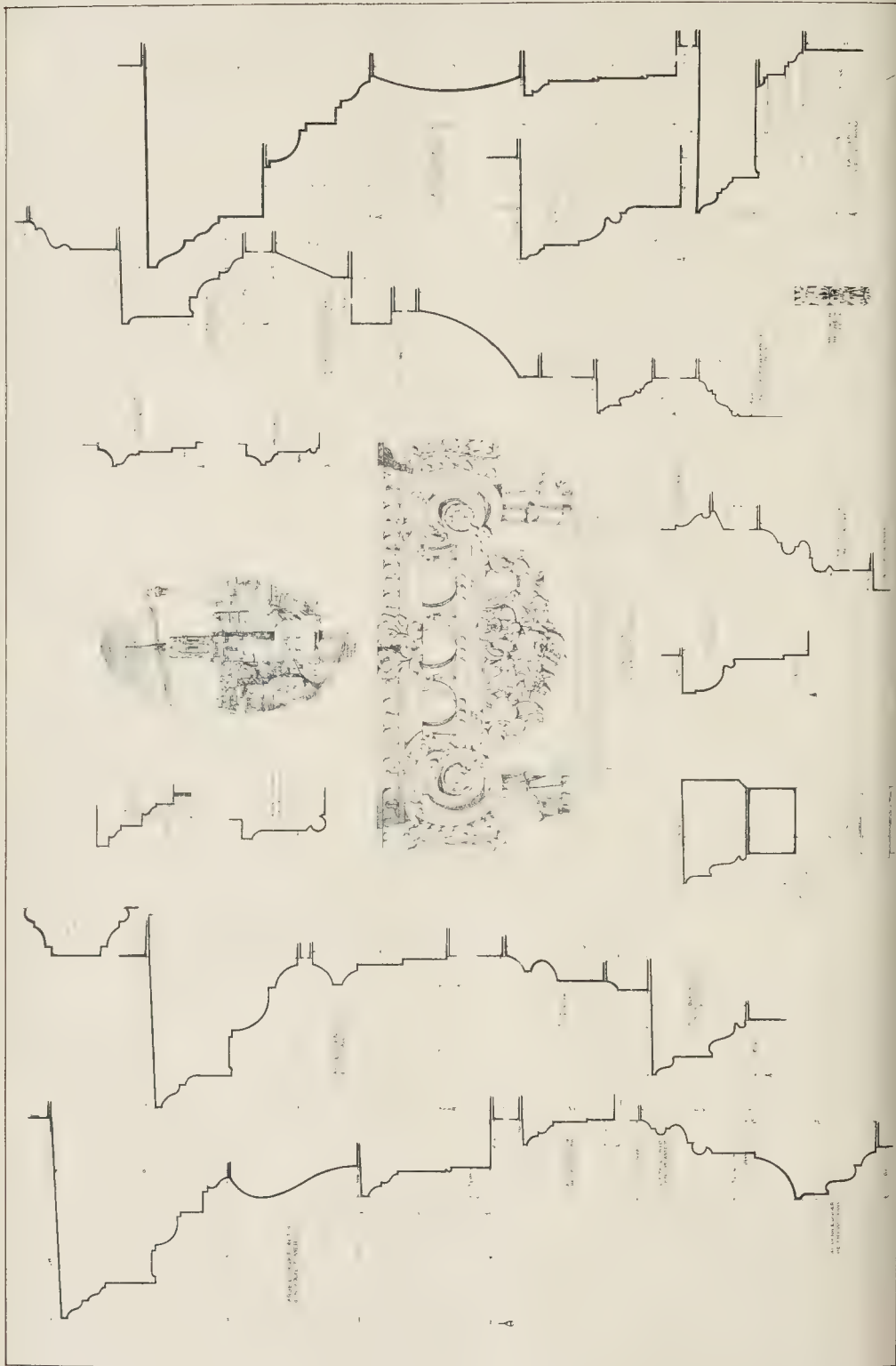


THE BUILDER, APRIL 24, 1886.















Wymark & Sons Photo litho



Queen St. London, W.C.

CHRIST AND MARY MAGDALEN IN THE GARDEN.

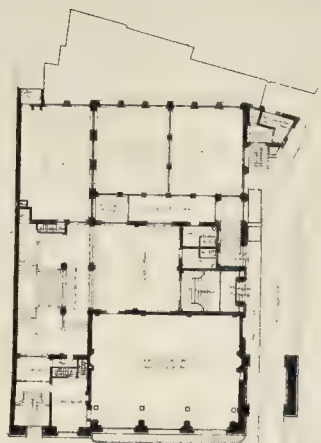
MARY MAGDALEN AT THE SEPULCHRE.

DESIGN FOR STAINED GLASS AT EASTHAMPTON CHURCH. — By MR. E. BURNE JONES, A.R.A.

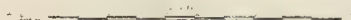








Town Hall.  
The Market Place.



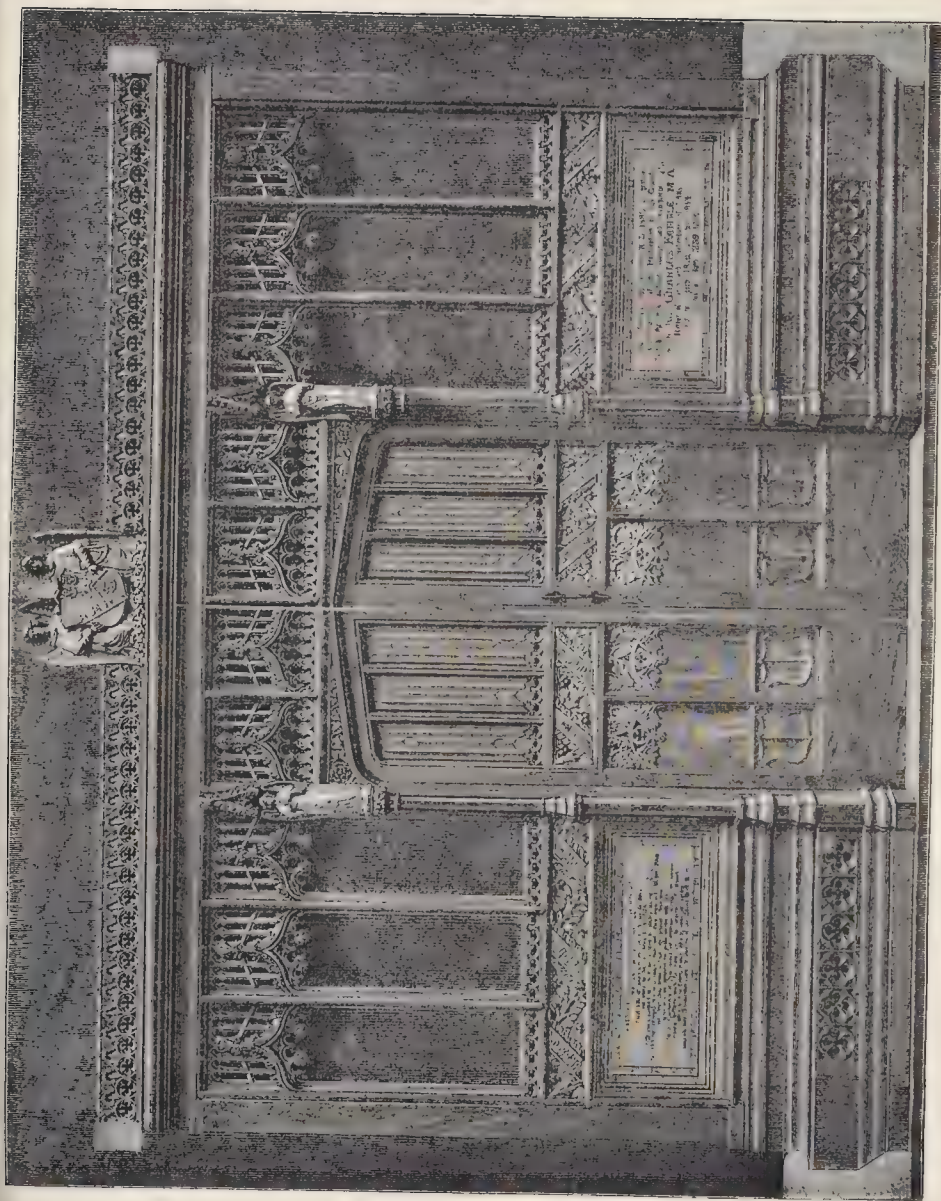
Front Elevation.  
Town Hall Block.

NEW PUBLIC BUILDINGS, NEWCASTLE-UNDER-LYME.

MESSRS. SUGDEN AND SON, JOHN BLOOD, W. H. SUGDEN, AND CHAPMAN, AND SNAPE, JOINT ARCHITECTS.







KENBLE MEMORIAL SCREEN BATH ABBEY CHURCH.  
EXECUTED BY MR. HARRY HEMS, FROM THE DESIGN OF MR. J. OLDRIED SCOTT, F.R.I.B.A.







Wall-Papers founded on Natural Forms.—Designed by Mr. C. F. A. Voysey, for Messrs. Woollams & Co.

DESIGNS FOR WALL PAPERS.

The accompanying cuts show two out of a series of designs for wall-papers exhibited by Messrs. Woollams & Co. at the recent Building Trades' Exhibition, and designed for them by Mr. C. F. A. Voysey, employing suggestions from natural forms of vegetation. The one on the right, if we mistake not, is based on some seaweed forms, a type of vegetation which may be found to supply some new suggestions in decorative detail.

CRYSTAL PALACE SCHOOL OF ENGINEERING.

The Easter term was brought to a close on Saturday last by presentation to the students of the certificates awarded by the Examiners. Mr. W. H. Barlow, C.E., F.R.S., presided, and addressed the students in an interesting practical address. From Mr. Barlow's address, and the reports of the Examiners, Messrs. R. Fogg, M.E., and W. B. Lewis, C.E., with the supplementary speech of Mr. Fogg, it appears that the efficiency of the school is fully sustained, each of these experts bearing strong testimony to the value and thoroughness of the course of instruction given when taken fully, and its capabilities of usefulness if even taken for a single year. We notice that there has been a further expansion of the curriculum by the addition of a fourth term in the Civil Engineering Section, which is devoted to designing special and original engineering work. The students of the third term were, during the last term, exercised in "Design and Construction of Railway Dock." The creditable circumstance was mentioned by Mr. Wilson, Principal of the school, that of thirty-eight students who had attended during the term his course of lectures, which were on "Steam" for this term, all had earned a sufficient number of marks to make them eligible for examination except one, and had unfortunately been prevented by illness. Mr. Wilson also stated that of 600 students who had passed through the school, 75 per cent. were now to be in good positions as civil, naval, military, and mechanical engineers, at different

places at home and abroad. Forty past students were now also Associate-Members of the Institution of Civil Engineers.

Of twenty-five students who received certificates for passing successfully the lecture examination, W. Boeman and F. Stewart were equal firsts, with 239 marks out of 273 marks attainable. E. J. Frew was first for work in the drawing office; F. B. Candwell, for work in the pattern-shop; F. B. Dixon, in the fitting-shop. For students of the second year's course: Civil Engineering,—the firsts were, for first term, J. F. Harrison; second term, M. Mawson; third term, equal firsts, B. Marsland and C. H. D. Pettigrew; fourth term (third year), J. J. Croyle. Six certificates were awarded to students in the Colonial section.

ARCHITECTURAL SOCIETIES.

*Birmingham Architectural Association.*—The annual dinner of this Association was held at the Grand Hotel, Colmore-row, Mr. F. B. Osborn (President) in the chair. Mr. J. Cotton occupied the vice-chair, and among those present were Messrs. Victor Scruton (Hon. Sec.), Hughes, Wood, Newton, E. R. Taylor, T. Tonks, Jonathan Pratt, Hart, Churchill, and Hale. Mr. E. Wood proposed "The Profession," and, in speaking of the profession, said he was of opinion that they stood in a better position to-day than they had done for many years past from an artistic point of view, and also in the estimation of the public. Although pecuniary considerations could not be altogether overlooked, he thought it was to the advantage of every individual member of the Association to foster the love of art and the appreciation of the public foremost. Mr. Cotton, who responded, said, as a local body they might congratulate themselves that at least two practitioners out of five had their designs selected in the final competition for the Assize Courts, and it would be still more gratifying if a Birmingham man pulled off the prize. "The Association" was proposed by the President, who said, at the present time they had a greater number of members than at any previous

period of the Association, which deserved all they could do to advance it in every way. They numbered now something like sixty-five members. The classes of the society were eminently successful, and well attended. As they knew, the Royal Institute in London had now closed its doors unless applicants passed certain examinations, and the best way to gain the knowledge for those examinations was to belong to an Association like theirs.

*Edinburgh Architectural Association.*—The usual fortnightly meeting of this Association was held in the Professional Hall on the 15th inst. The President, Mr. G. Washington Browne, occupied the chair. After the usual preliminary business had been disposed of, the Chairman called on Mr. James Sellars, President of the Glasgow Institute of Architects, to read his paper on the "General Building and Sanitary Regulations for Scotland." Mr. Sellars began by stating that the Glasgow Institute had long held the opinion that such regulations should be eliminated from the various Police Acts, and embodied in a separate Act, in which all matters relating to the construction and sanitary arrangement of buildings would be dealt with, and which Bill should, in his opinion, be applicable to the whole of Scotland. His audience were aware that a Burgh Police and Health (Scotland) Bill had been before Parliament for some time, and it had now passed the House of Lords. He thought the Bill a very excellent one in respect of its sanitary regulations, but it was not, in his view, satisfactory as regards building regulations. Indeed, in his opinion, it might be said that the Bill did not contain building regulations at all in the proper sense. The details of building construction which could be clearly defined, and were so defined in the Metropolitan Building Act, were left indefinite and general. A building, according to this Act, was to be "of sufficient strength and stability," a phrase which would probably not be interpreted in the same way by any two persons. A similar indefiniteness ran through all the regulations relating to sanitary and building matters, and the probable unsatisfactory working of the Act was made all the more likely, as there was no proper provision made for the administration of



the regulations especially in very small burghs where the commissioners, who were to administer them, could not be expected to be properly qualified to judge of such matters themselves or able to afford to have properly qualified officials to advise them. Mr. Sellars described at some length the regulations as to drainage, widths of streets, heights of buildings in streets, and free space areas, construction of buildings, &c., contained in the Police Acts of the chief Burghs in Scotland, and the corresponding regulations in the Burgh Police and Health (Scotland) Bill, and also the existing provisions and those proposed in the new Bill for the administration of the regulations. He was of opinion that such matters were not in their proper place in a Police Bill which fittingly ought to deal with the regulation of hackney-coaches, pawnbrokers, fireworks, gunpowder, &c., and that the time had come when a separate Building Act was required. Mr. Sellars concluded by urging the Association to co-operate with the Glasgow Institute and probably other Architectural Associations in Scotland with a view to obtain a separate Building Act. If the Burgh Police and Health Bill passed in its present condition it would probably hamper legislation on the subject for many years to come.

*Glasgow Architectural Association.*—The Secretary's report for the eighth session (1885-86) says that the roll now shows a membership of fifty-one (this exclusive of hon. members), an increase of nine over last year; nineteen new members having joined and ten resigned. There have been seventeen meetings, with an average attendance of twenty. Eight papers were read and discussed at the general monthly meetings, and, as formerly, a series of lectures has been delivered during the latter months of the session, attended by architectural assistants outside of the Association and those professionally interested, as well as by members. The subjects were:—"Marbles, Mosaics, and Tiles," by Mr. William Gilliland; "An Architectural Excursion," Mr. Thomas Gildard, architect; "Heraldry," Mr. John Baird, F.R.I.B.A., I.A.; "Foundations," Mr. David Barclay, F.R.I.B.A.; and "Architectural Detail," Mr. T. L. Watson, F.R.I.B.A., I.A. Interesting visits were paid to the following buildings:—Conservative Club, New Medical Schools, and Drumshough Baths, Edinburgh; Mount Stuart House, Rothesay; Greenock Municipal Buildings; Linnithgow Palace, Kent-road School, and Hillhead Public School. Honorary President's prize,—subject, Design for Memorial Chapel,—was gained by Mr. William James Anderson. Prizes presented by Mr. John Burnet, hon. member, F.R.I.B.A., I.A.:—Subjects, Measured Drawings of Atrium, gained by Mr. M. Gibbon and Mr. Peacock; Measured Drawings of Old College, gained by Mr. Shanks; Best Collection of Sketches, gained by Mr. Charles Gourlay. The chief novelty of the session was the publication, in May, of the first Sketch-book.

#### A BUILDER'S CLAIM. HASKELL V. BRADBEE.

This case was tried before Judge Eddis, at the Clerkowell County Court, on Thursday the 15th inst. Mr. Wills, barrister (instructed by Mr. Lowe), appeared for the plaintiff, and Mr. Popham, solicitor, for the defendant.

Mr. Wills stated that the plaintiff, Mr. W. J. Haskell, was a builder, of 38, Coldbath-square, and that this was a claim of 27l. 13s. for work and repairs done at the defendant's shop, 6, Great Bath-street, Clerkenwell.

Plaintiff stated that when the conversation first took place about the matter, defendant asked him how much it would cost to paint and grain his shop, inside and out, and he said about 20l., but that he had better prepare him an estimate; the work was, however, commenced, and some extras beyond the work spoken of were done, and he sent in his claim for 27l. 13s.

Mr. W. F. Potter, architect, and Mr. C. R. Griffiths, architect and surveyor, gave evidence that they had measured and valued the work, and estimated it at 32l. 16s. 11d.

For the defence it was first alleged that it was a contract to do all the work charged for 20l., and that the amount charged was excessive.

Mr. Irons, Surveyor to the Clerkenwell Vestry, was called to prove that the charges were high, but he admitted in cross-examination that he had not measured up the work.

His Honour, in giving judgment, said that he did not think the defendant's statement that there was a contract had been proved; on the contrary, he thought the plaintiff had fairly made out his case, and that his charges were fair and reasonable; he, therefore, gave a verdict for the plaintiff for the amount claimed, with costs.

#### SUNDERLAND MUNICIPAL BUILDINGS COMPETITION.

SIR.—I am a stickler for the observance of regulations in the present as in all such competitions. But I do feel that in disqualifying two of my fellow competitors for being a few hours late, the Committee have been rather too strict.

If they are equally strict in disqualifying all designs not done on their regulation "double elephant," and "without frames or borders" or "colour," I fear others will have to share in the unfortunate fate of the two above-named.

As regards the style of getting up the drawings, the Committee ought to keep to their text, because, as we all know, that sort of thing does tell for or against a design very powerfully, even with comparatively skilled critics. But to disqualify the Edinburgh architect who posted his plans on Saturday, because they arrived a few hours after midnight, is really carrying things too far.

A COMPETING SUNDERLAND ARCHITECT.

#### STONE-SAWING MACHINERY.

SIR.—We observe in your issue of the 10th inst. (p. 560), a letter from Mr. Powis Bale describing some Belgian stone-sawing machines, which he considers to be "considerably in advance of any machines for the like purpose yet made in this country."

As we have manufactured, and made a special study of, stone-sawing machinery for several years past, we trust that you will allow us to state that we have turned out a number of machines constructed as described by Mr. Bale, in which the saw-frame is driven by a pair of side-levers instead of the one long connecting-rod or pendulum.

We also fit our machines with an improved self-acting downward-feed motion, and a self-acting gear for winding the saw up out of the stone when the block is cut through. We trust that your readers will be good enough to favour us with their inquiries before placing their orders for stone-sawing machinery with Belgian manufacturers.

E. P. EASTIN & CO.

West Drayton.

SIR.—I can only conclude your correspondent Mr. Lee, can hardly have an accurate knowledge of facts, or he would not write as he does in your last issue [p. 593]. I am well acquainted with Cox's stone-sawing frame, and, I believe, with every other of any note made in this country, and many of those made on the Continent and in America. As Mr. Lee suggests Cox's frame has been copied in Belgium, for his information I may say that the firm whose machines were alluded to in the recent trial made crank-worked side-lever machines years before Cox's patent was taken out. In addition to this, however, the Belgian machines contain a most perfect sanding arrangement, and extremely clever automatic raising and lowering and adjustable downward feed movements controlled by one lever; in fact, the whole design is so good that it was, I think, the unanimous opinion of myself and the other engineers who went to Paris to witness the trials (several of whom are makers of stone-saws) that these Belgian machines are far ahead of anything yet made in this country. I have no interest whatever in the Belgian machines,—rather the reverse,—but I think the time has gone by for us to sit at home "and fancy our little world mauling," in stone-working machinery as in other matters. I therefore wrote a short description of the machines, thinking it would interest your readers.

As from a user of machinery, Mr. Lee's opinion should doubtless be received with respect, but I think it highly probable that he cannot name the maker of these Belgian machines, and he certainly has never seen them at work; therefore, I take it, his dictum must be taken cum grano salis.

M. POWIS BALE,

Author of "Stoneworking Machinery," &c.

#### A QUESTION OF CEMENT PATENTS.

SIR.—As much has recently been published as to the alleged excellence of Robinson's cement, may we claim a portion of your space to ask Messrs. Robinson if they will point out the difference between their patent and the "cement or plaster" patent taken out by Mr. A. Francis in 1857?

Quoting from the recently-published patent of Mr. Thomlinson (Robinson & Co), we have as the essential part, the parentheses being our own:—"I grind the calcined gypsum in the usual manner to a fine powder. I also in like manner, and separately, grind (some) tinal (native borax). I mix the two powders in the proportion of about 40 lb. to 50 lb. of tinal to the ton of calcined gypsum; the proportions may be varied."

Mr. Francis's patent of May 8th, 1856, says:—"I first subject the gypsum to heat to calcine it, and then mix therewith dry borax. I find it important to reduce the dry borax to a very fine powder, and in this finely-powdered state I mix it with calcined gypsum, reduced by grinding or otherwise to a fine powder. The proportions of the

compositions which I have found to answer well are 40 lb. to 50 lb. of dry borax to 20 cwt. of calcined gypsum, but these proportions may be varied."

Mr. Thomlinson continues his specification:—"In some cases I mix other materials as well as tinal with the calcined gypsum, thus a good cement is obtained from the following materials:—

Finely-powdered calcined gypsum,	1 ton.
" "	tinal, 45 lb.
" "	alum, 15 lb.

The cement thus made I call Robinson's cement."

Finally, "I declare that what I claim is a cement consisting of calcined and powdered gypsum, mixed with powdered tinal, and with or without other ingredients, substantially as described."

The use of alum for the hardening of plaster is a very old expedient, well known to every plasterer. Subject to correction, we therefore claim that it is open to anybody to manufacture and sell an article identical with Robinson's cement as above described.

JOHN HOWE & CO.

Carlisle, April 20, 1886.

#### PROVINCIAL NEWS.

*Accrington.*—On the 5th instant, Major General Hutchinson, R.E., inspected the tramways recently constructed by the Corporation of Accrington, which extend for a length of nearly six miles through the borough, and into the adjoining townships of Church and Clayton-le-Moors. The General examined the depot, and then went over the whole length of the line with an engine and car, accompanied by Mr. Alderman Hindle and Mr. F. S. Butten, Borough Surveyor (representing the Corporation), Messrs. C. C. Cramp and A. C. Cubitt (directors), Mr. C. R. Whyster Holt, C.E. (representing the Company who have leased the lines from the Corporation for a term of twenty-one years), and Mr. Rowley (representing the makers of the engines). Several slight alterations are required to be made before the lines are worked by the full complement of engines and cars; but the General gave his consent to the lines being worked at once on the understanding that the requisite alterations would be made. The certificate of the Board of Trade was received on Tuesday last, and the lines are now being worked by two engines and three cars, but the full number intended to be worked is eight engines and eight cars. The engines are built by Messrs. Green & Son, Smithfield Ironwork, Leeds, and the cars by the Falcon Car Company, of Loughborough.

*Birmingham.*—Mr. James Kent, a well-known boot and shoe manufacturer, and the proprietor of a large estate at Olton, about seven miles from Birmingham, has, in order to open up the estate, commenced building operations. At the present time he has eighteen villa residences in course of erection. They recede a considerable distance from the road, and are replete with all conveniences for this class of building. The front elevations are Gothic in style.—On the "Gillott" estate, also, near this town, Mr. Edward Airey, the contractor for the Artisans' Dwellings, has in course of erection twenty or thirty villas. These houses are of somewhat similar arrangement and style to those just mentioned. The cost of the whole of the buildings will be about 10,000l. Mr. J. Stathall Davis, of Birmingham, is the architect.

*Brighton.*—The plans of the New Palace Hotel at Brighton have been approved of by the Brighton Town Council, and shortly the work of constructing the hotel will be commenced. The site comprises the premises occupied by Mutton's Hotel and Restaurant, 80 to 83, King's-road, Whitehall Yard-mews, and the premises held by W. Challen, Jeweller, and Messrs. Savory & Moore, chemists, at the bottom of Russell-street, as also nine tenements on the east side of Russell-street. The building will be nine stories high, and will contain 400 rooms in addition to spacious public rooms, baths, &c. A Bijon theatre, with foyer, on the plan of the Grand Opera, Paris, will be attached to the Grand saloon, the whole illuminated by the electric light. The area to be utilised contains 24,450 superficial feet; the frontage on the King's-road will be 128 ft., and in Russell-street 238 ft. The capital required in 20,000 10 shares is 200,000l., and it is contemplated the hotel will be open in about eighteen months. The architect is Mr. F. T. Pilkington, of Russell-square, London.—Plans have been prepared for the erection, on the site of the Grand Concert-hall, in West-street (destroyed by fire two or three years ago), of a theatre or opera-house, to be called the "Grand Theatre," capable of holding over 3,000 spectators, at a



estimated cost of 36,000l. Messrs. Bucknall & Jennings, of Clifton, Bristol, have prepared the plans, which are before the Town Council, and the scheme is to be developed by a limited liability company.—We hear that active steps are being taken to erect a new bijou theatre or the West-enders in the Western road.

**Stourcliffe (Bournemouth).—**A new chine is about to be cut at Stourcliffe, three miles to the east of Bournemouth Pier, where access to the beach is much required. A committee of neighbouring landowners having been formed to take the matter in hand, have appointed Mr. Reginald Pinder, F.R.I.B.A., of Bournemouth, as engineer, and plans are approved showing a road with a gradient of about 1 in 7½, and a total difference of level of 100 ft., with surface-drains, foot-walls, &c.

#### STAINED GLASS.

**Appleton (Yorks).—**A Munich stained-glass window has just been erected in Appleton church, Yorkshire, in memory of the late Mrs. Handos-Pole. The subject represented in the window, which consists of two lights, is Christ in the house of Martha and Mary, while in the niche above is a bust of St. Catherine. The artists are Messrs. Mayer & Co., of Munich and London.

**Rainhill. —**On Sunday, the 18th inst., a large stained-glass window, by Messrs. Heaton, Butler, & Bayne, was unveiled at St. Anne's church, the subject it illustrates being the institution of the Lord's Supper. It is of good design, the figures being well drawn, and the general effect of colour pleasing and harmonious. The stained glass fills the east window of the church, which is a large one of seven lights, in a perpendicular style, by the late Mr. G. H. Dade, of Liverpool, who was the architect from whom the enlargement of the church was carried out about seventeen years ago. The window is in memory of the late Mr. George Anderson, of Rainhill (who at the time of his death was a churchwarden), and is presented by his widow. During the last few years, the interior of this church has been greatly improved by memorial gifts, a richly carved and decorated reredos having been contributed by Mr. Clay, widow of the late Vicar, the Rev. Walter Clay; and also corresponding side altar screens, by Mr. John Birchall, in memory of his wife and mother (both being from the designs of the late Mr. G. H. Dade). These, with the addition of the handsome and costly stained-glass window just finished, have converted a chancel of somewhat old and incomplete appearance into one possessing very considerable architectural merit.

#### The Student's Column.

#### OUR BUILDING STONES.—VII. HARDNESS OF STONE.

THIS is quite distinct from specific gravity. It applies more especially to the different minerals forming a rock, rather than to the rock as a whole.

The scale of hardness in use among mineralogists is divided into ten degrees, each noted by the name of some mineral:—1, talc; 2, rock-salt; 3, calcite; 4, fluor-spar; 5, apatite; 6, orthoclase; 7, quartz; 8, topaz; 9, corundum; 10, diamond.

Few stones used in building are partly due up of the mineral calcite, and it is not always easy at first sight to distinguish this mineral. Calcite and quartz weather very differently from each other, and make a considerable difference in the cost of working the stone. The degree of hardness of these two minerals, however, is such that they can be easily distinguished from each other. If we have a pocket-knife, we shall find it is with the greatest difficulty that we are able to scratch calcite, but if the mineral should be quartz, it is very easily marked.

The brittleness of a stone as distinct from its hardness is an important factor in estimating the cost of working. Stones of the greatest strength are often largely made of silica, and are very brittle, breaking with a splintery fracture. Nearly all workable stones have a clear method of fracturing, which cannot be defined or found out, except by a practical acquaintance in shaping each kind.

#### THE EXAMINATION OF STONE BY THE MICROSCOPE.

We have seen that the weathering of stones, in a great measure, depends on their structure. Even where chemical composition would seem to indicate that certain kinds are unfit to withstand the destructive effects of the atmosphere, structure comes to their aid, and often produces good stones. The effects of frost, amount of absorption of water, strength and density, are all dependent on minute structure.

The minute parts of a stone are always the first to decay, and if, therefore, we can properly understand them, we shall strike at the very root of its weakness.

The instrument we propose to use in the investigation of these minute parts is the microscope. By highly magnifying pieces of stone, which are ground down to transparency, it shows what the structure is like better than any other means at our command. In many cases it directly points out the nature of the matrix of a stone, upon which the weathering might solely depend. It very largely shows the distribution of the chemicals in the rock, rigidly defining the crystals or crystalline particles composing it, which a chemical analysis of the aggregate totally fails to do.

But the microscope requires careful handling. It is only after considerable experience that anything like precision in the determination of good and bad stones is gained. This mode of investigation, although so much used by geologists to help them in unravelling the complex problems presented by igneous and metamorphic rocks, has been but very little introduced for the examination of aqueous rocks,—the chief building stones of our country. So that, whilst we will do our best to help the student to prosecute this part of the inquiry for himself, he must bear in mind that the principles we shall lay down are only the beginning of what will probably develop into an important part in the study of the selection of stone for building purposes.

Apart from the high character of the results obtainable by this method of investigation, and their very practical bearing, we have the element of cheapness,—a matter of considerable importance now-a-days.

When the microscope and its few accessories are purchased, the principal expense is at an end. If the student does not care to grind down his own pieces of rock for examination, there are several lapidaries, and mounters of microscopical objects, who would be glad to do so for him at 1s. 6d. per slide, and more cheaply if several slides are required. But we would strongly recommend that at first he should grind and mount his own specimens, for he then becomes more familiar with the stones, whilst practice teaches him the peculiar features consequent on bad mounting.

We will first treat of the microscope and its necessary accessories. The microscope required need not be of a very expensive character. A complete enough examination may be carried out with one capable of magnifying 100 diameters, whilst it is often found more convenient to use a much lower power,—60 diameters.

The stages of the more expensive microscopes used in examining rocks are usually made to revolve, as there are many advantages derived; and they have also rackwork for moving the object under examination to and fro, or up and down. A special contrivance for successively bringing various different magnifying powers to bear, without having to screw and unscrew them as required, and rackwork for fine adjustment have been invented, but none of these are absolutely necessary for our purposes, although if they are obtained, so much the better, as they save quite time and trouble. The numerous small pieces of apparatus necessary for physiological work, are not needed in the examination of rocks and minerals.

The microscope, however, must have a polariscope attached. The polarising apparatus commonly employed consists of two Nicol's prisms,—one placed above the eye-piece of the instrument, or above the objective, which acts as the analyser; the other fitted under the stage of the microscope being the polariser. The polariser should always be placed so that it revolves freely when turned by the hand.

The Nicol's prism is constructed out of a rhombohedron of Iceland spar, about 1 in. in height, and ½ in. in breadth. This is bisected

in the plane which passes through the obtuse angles. The two halves are then again joined in the same order by means of Canada balsam. It polarises light completely, and transmits only one beam of polarised light, the other being entirely suppressed.\*

The field of the microscope appears clear and well illuminated when the shorter diagonals of the two prisms coincide in direction, but when they are placed at right angles to one another the field appears quite dark, light being totally extinguished. The intermediate positions exhibit different shades, either dark or light according to the relation of one prism to the other.

The use of the polariscope is briefly this. If the rock under examination contains any portions that are amorphous (that is, those in which no crystalline structure is developed), or crystals belonging to the cubic system, with, perhaps, too exceptions, they will be seen to become light and dark as the polariser is revolved. This is owing to their being singly-refracting, or isotropic substances.

If, however, the stone contains crystals belonging to one of the other crystallographic systems it will modify the polarised beam of light. All such minerals or crystals are said to polarise; in other words, they exhibit double-refraction, and are called anisotropic.

The direction in which the sections of the crystals is cut must be taken into consideration, because, under certain circumstances, as we shall presently see, they become singly-refractive. In cutting rock sections for our purposes of examination it would be quite an accident were any of these peculiar conditions to present themselves, as, generally speaking, the stone would be chipped at random, without any attention being paid to the direction of the blow.

Another test with the polarising apparatus, very useful in determining the mineral constituents of rocks, is in finding whether any pleochroism or dichroism is present. To do this the upper Nicol prism is removed, leaving only the lower. If, as we rotate the latter, no change in tint is observed, there is no pleochroic mineral present, or at least none which shows pleochroism at the angle at which it has been bisected; but very often the hue of certain crystals is changed, and they present many different colours. This is pleochroism. When, during the rotation of the prism, only two colours have been observed, the minerals presenting that appearance are said to be dichroic, or to exhibit dichroism.

Dichroism, or pleochroism, practically never occurs in crystals belonging to the cubic system. It is exceedingly useful in the determination of some common rock-forming minerals, enabling us, in most cases, at a glance to distinguish crystals in many other respects resembling each other.

A useful accessory to the microscope is a bull's-eye condenser, which is used to examine rock sections by reflected light. This is done by throwing the mirror, under the stage of the microscope, out of gear, and by means of the condenser, directing a strong light on the surface of the section. The advantage of this method is more particularly noticeable in the case of minerals, which, when examined by transmitted light, are seen as black objects,—opaque.

Reflected light often enables us to discover the character of, and to define, opaque minerals.

A lamp giving a good light may also be obtained specially for microscopic purposes.

#### Books.

*The American Journal of Archaeology and of the History of the Fine Arts.* Baltimore. Vol. 1, No. 4.

THE fourth number of the American "Journal of Archaeology" completes the first volume of this very valuable publication. The great strength of the periodical is still its excellent summary of the archaeological news of the year and of the contents of current journals. In this matter it has no superior, and only one rival, the *Gazette Archéologique* of Lenormant and De Witte,—a publication which is, however, too costly to be in the hands of any but professionals. In the field of classical

\* The polarisation of light is well explained in Ganot's "Physics," 1883, pp. 584-5, 6.



archæology this fourth number has several original papers of interest. M. Salomon Reinach makes a timely publication (in phototype) of a small bronze basin, which, long known to archæologists, has gained fresh interest since the French excavations of last spring at Akraiphnia, in Boeotia. The basin still supports two fragmentary feet of very delicate workmanship, but its great interest lies in the long inscription engraved upon it. The inscription runs as follows:—*Τίμασιφιλος μ' ἀνέθηκε τῷ Ἡρόδοτῳ Πρωτῷ*, i.e., "Timasiphilos has dedicated me to the Ptoian Apollo." After this perfectly simple and easy dedication there follow certain letters which no epigraphist has as yet interpreted, but, as M. Reinach wisely thinks, publication should and must often precede elucidation,—*primum edere, deinde philosophari*.

It will be seen that, in the present number of the *Builder* (p. 603, ante), we have noted the excavations carried out on the site of the ancient Temple of Apollo Ptoos, near Boeotia. M. Maurice Holleaux superintended them, and has had the good fortune to bring to light a number of votive inscriptions similar to that on the bronze, and also a quantity of architectural remains of the temple. He has also found a life-size archaic statue of Apollo Ptoos himself, which is to be published next year in the *Bulletin Hellenique*. The bronze published by M. Reinach is now in Paris in the possession of M. Eugene Piot. He bought it twenty years ago at Athens, but was told at the time that it had been found in Boeotia. Mr. Augustus Merriam publishes a long and interesting commentary on the Gortyna inscription, which we recently noted. This is the first detailed notice the inscription has received in the English language. M. Reinach also publishes a marble statue of Artemis, now in the Tchinly-Kiosk Museum at Constantinople. He thinks it possible that we have in this statue a small-sized replica of the Artemis Brauronia, seen by Pausanias on the Acropolis, and noted by him as the work of Praxiteles. Anyhow, this much is certain, that the Constantinople figure reproduces in a striking way the lolling attitude of the Praxitelean satyr.

For the next year we are promised papers by Mr. J. T. Clarke, the explorer of Assos, and notes and inscriptions collected by Professor Ramsay in Asia Minor; also, among a host of foreign contributors, Dr. Helbig and M. Ernst Babelon have promised them help. Apart, however, from so promising a programme, we must repeat that, for the student as well as the expert who desires to be au courant with archæological news, the journal is simply indispensable.

*A Manual of Greek Archaeology.* By MAXIME COLLIGNON. Translated by JOHN HENRY WRIGHT. Cassell & Co. 1886.

We are glad to welcome the English translation of M. Collignon's excellent manual. Handbooks of Greek sculpture by this time abound, but M. Collignon's book remains unique in that it treats of Greek archæology as a whole, giving due weight to the evidence of minor arts such as vase-paintings, terra-cottas, coins, bronzes, gems. As we have discussed the merits of this and several successive volumes of the *Bibliothèque de l'Enseignement des Beaux Arts*, it only remains now to say a word as to the translation. In some respects distinct advance is made on the original, noticeably in the matter of the short bibliographies printed at the head of each chapter; here Mr. T. H. Wright has re-written the references up to date, and naturally due weight is given to recent English and American research; the references also gain much in clearness at small sacrifice of space by being printed in separate lines; in an elementary text-book no teacher of archæology will think those matters of small importance. Further, the illustrations have been enriched, e.g., in the chapter on terra-cottas, the interesting Berlin plaque showing miners at work at the base of a hill, cited before, is now reproduced in outline. With so much to recommend the book, we regret to have to say that the translation is always inelegant and sometimes inaccurate. The inaccuracies do not seriously affect the subject matter, but they just betray want of touch with the delicacies of the French language and want of close, sharp constraining. On the very first page, as we open the book, we find "Quelques rares mentions dans les documents écrits de l'Égypte" rendered "occasional scattered references in documents written in Egypt," a slipshod rendering which speaks sorry volumes for

the state of the translator's mind. The commonest care would have avoided Gallicisms like "Mythological scenes, where figure all the Olympian divinities," such sentences, irritating and distracting, occur by the dozen. Those who know M. Collignon's delicate, lucid French will feel that the translation can honestly be recommended as useful, but only (till revised, as we trust it will be in a second edition) to those wholly ignorant of the original tongue.

*A Digest of the Law of Light.* By EDWARD STANLEY ROSCOS, Barrister-at-Law. Second Edition. London: Reeves & Turner.

This excellent handbook is rightly named a digest, for it gives all that need be known upon the subject by a layman, in a concentrated form. The rationale of the law affecting this important easement has never, to our knowledge, been so clearly and concisely stated before, and the architect and surveyor will find in it a text-book of the greatest value in his dealing with the often complicated questions upon which it treats. The method of the work is not the least admirable part of it. First, the creation of the right by uninterrupted enjoyment, confirmed by prescription, is discussed, with all the essential particulars as to what that enjoyment consists in, and illustrations drawn from determined cases. Next the means by which an accruing right to light may be prevented. The effect of the abandonment or suspension of the right and the means of reassertion form the subject of a third section of the book, and following it is a clear exposition of the extent of the right with and without certain modifications. Finally, the means by which the right may be vindicated are duly set out, with forms of reservation to a grantee, of acknowledgment, of pleading, and of injunction. There are extracts from the Prescription Act,—which is the foundation of legislation on the subject,—the Common Law Procedure Act, Lord Cairns's Act of 1858, and the Judicature Act of 1873,—with the well-known clause 23 from the Metropolitan Building Act. Much practical advice on the whole subject of differences as to the right to light and its infringement is given by way of appendix, and a very useful series of what are called "plans," but which are really elevations, showing the result of decisions in cases where new windows have replaced old ones, identical in area and position, or varying in one or both of these particulars.

The vexed question as to how the value of obstructed light is to be estimated is very properly omitted, as beyond the scope of a work on the law of light. The author is very strong on the prudence of owners having plans (i.e., elevations) of their premises kept with their title-deeds, showing clearly and accurately every window; and he quotes approvingly Mr. Justice Baggallay's very pertinent remarks on this head:—"Having regard to the importance of the right to light, plans of the windows should always be made, even if there is no present intention of pulling down or altering a building. The small expense will always be many times recouped by the fact that a permanent record of the position of the ancient lights is in existence."

This is a book which really should be on every architect's shelves, for it is full of sound information and wise counsel on points with which any architect may at any moment be called upon to deal.

*Bevis's Builder's and Contractor's Price Book, and Guide to Estimating.* 1886. London: The Scientific Publishing Company, Limited.

This work, which is again edited by Mr. Bevis, introduces a new feature in the shape of "novelties," or new inventions; we note among these a push-and-pull lock of Chubb's; we thought this was the special patent of Kaye & Son; the locks of this latter maker seem the cheapest. Folding lavatories seem to be very useful where space is limited; the automatic electric speaking tubes appear to be rather too complicated to be efficient.

In Section I.—Plant, Machinery, &c.—the prices of plant, &c., are given much lower in many cases than in the last edition.

In the Excavator, page 50, concrete is given in gravel or burned ballast as being of the same value. This is an error: if the gravel or stone ballast is to be obtained on the site at the cost only of digging and screening, it is

then, of course, cheaper than burned ballast, whether you burn the latter yourself, or buy it, but if the stone ballast has to be bought the cost will be much more than in burned ballast.

The price of 1s. 3d. per foot run for strutting and planking 6 ft. deep is much too high, so is the list of drain-pipes, exclusive of digging or laying.

In the Bricklayer, page 59, the prices are materially lowered, though they are still a little high. There is rather an odd error in the printing of extra facings in "picked stones" instead of stocks. We are pleased to see that the daywork prices for labour have been properly revised; the last edition had them a little below prime cost; the prices for horse cart, and man, have also been altered.

There must surely be an error in the price of the Victoria stone damp course, 100 ft. super for tenpence.

The prices of lime that are given as including profit, &c., are only p. c., and the hair is less than p. c. The prices of glazed bricks are lower than p. c.

In Section V.—Slater,—there is an error in the second paragraph, the allowance for raves in duchess slating is 12 in.; counters 10 in., and ladies, 8 in., the usual custom being both with slaters and surveyors to allow the width of the slate, and the method for measuring a slate cistern is not given quite clearly, the sides are usually about 4 in. longer (i.e., 2 in. each end) than the outside of the ends which are grooved into the sides. The slate shelves are too low in price; p. c. prices are given.

In Section VI.—Stonemason,—stone is given at p. c. prices. Bath stone sawing is given at 6d., and Portland at 7d. This seems very careless; Bath stone sawing is not worth half of Portland.

In Section IX. we are glad to see that the prices for floors have been increased. They are now, in yellow deal, the best we have seen, and should only be used for pricing estimates at, if they are close. The prices of doors, &c., many of them still much too high, and need very carefully revising.

There is a useful list of the prime cost price of deals, &c., and the note attached to them must be borne in mind in using them. This is the carting, profit, waste, and sawing to add in the hard woods this will increase the cost at least 2d. per foot super. in the inch. The prices given for "windows" are out of all question.

A very full list of ventilators is given under Section XII.

The prices of rolled joists on pages 158 and 159 are very low, and really prime cost, by the ton.

In the Plasterer, Section XV., page 170, the prices for cement work are low, and can be used in competition. The plasterer should be the same price per hour, daywork, as other mechanics. He is given at 10d.

The plate-glass is too high. Under Sundries, Section XXI., there are a good many useful outside prices.

The present edition is a great improvement on the last one, and is much more reliable.

*The Artist's Manual of Pigments: Showing their Composition, Conditions of Permanence, Non-permanency, and Adulterations; Effected in Combination, &c.* By H. C. STANLEY. London: Crosby Lockwood & Co. 1886.

THE author of this work considers that the deterioration in colour of many modern English pictures is due to the ignorance of the modern artist as to the actual nature of the materials he employs. One eminent modern artist, Mr. Holman Hunt, not long since stated the contrary as his own experience. He knew, he said, what pigments he ought to have, but could not get them. Mr. Standage supplies a great deal of very valuable information and merenda as to the chemical qualities and artistic effect of the principal pigments used by painters; the tests to ascertain the purity of each; the general remarks on the best uses of each pigment; and what to do with it, and what not to do with it. The book appears to be carefully done, and is very concise and brought in convenient compass, and ought to be practically useful. There are appended to it the question set at the South Kensington School of examination in painting, with suggestions as to the best books to go to for the answers to them. The author has also added lists of colours in various objects in landscape, and also of palettes of several eminent painters, commencing with that of the P.R.A. Such



we think of little use; they lead only to manerism and imitation. Every artist's palette results from his experience as to the means by which he can best produce the effect he aims at, and this experience must be bought; it cannot be borrowed second-hand.

*Gints on Repoussé Work. Illustrated. London: T. J. Gauthorpe.*

Mr. GAUTHORPE is apparently both author and publisher of this little pamphlet, which contains a useful description of the process of repoussé working in metal, with illustrations of the tools employed.

#### RECENT PATENTS.

##### ABSTRACTS OF SPECIFICATIONS.

**7,707, Utilization of Slag.** L. Perin, France. Molten slag is cooled slowly in moulds smeared with sandy clay to prevent adhesion, and sunk in hot water covered with cinders. The castings may be used for paving and the like, and are suitable for abutting iron for fencing, posts, &c.

**14,752, Ventilating Sewers.** W. Paulson. The ventilating-pipe, in connexion with the sewer, is, as is to a street lamp, where the foul air passed through the gas-flame or filtered through charcoal placed in a compartment at the top of the pipe.

**15,275, Making Bricks, Tiles, &c., from Slate.** J. T. Welsh.

In order to utilise the debris from slate quarries in making bricks, it is pulverised, and, if intended for coarse work, it is mixed with fragments of slate of a somewhat larger size than the particles of pulverised slate. The pulverised material is slightly moistened with water, and is pressed by any of the means usually employed for moulding dry clay into bricks, blocks, or tiles. The moulded articles are then dried and burned, or, if they are required to have a glazed or coloured surface, they are dipped into a slip before being burned. [This patent is opposed; the case is not yet decided.]

**16,258, Water-waste Preventer.** H. Wainwright. The cistern is divided longitudinally by a partition in which is an opening closed by a clock valve and a projecting arm. One of the compartments is filled by the dividing partition is supplied with a ball-cock in the usual manner. A weighted sliding-valve is so formed that the valve-spindle has a certain amount of vertical motion. Upon the spindle is a collar which, when in its lowest position, rests upon a projecting arm and keeps the clock valve open. When the chain is pulled the first motion raises the collar and closes the clock-valve, after which the flushing-valve opens and discharges the contents of the second compartment.

**16,791, Planing Machine.** P. R. Shill. On the driving-shaft of the machine are fixed two belts carrying bands of leather or metal, which pass round a pulley or pulleys, so mounted that the tension of the bands can be regulated by a screw. The strips of wood to be planed are stored in a box, the sliding front of which permits only one board to pass out at a time. Strips of metal on the bands grip the boards over the cutters. The boards are fed against the cutters by rods sliding in pillars supported down by springs, the tension of which can be regulated.

**16,588, Union Joint for Lead Pipes.** A. E. Jones.

The end of the leaden pipe is passed through a cone and is bell-mouthed by a turn-pin. A coned plate is then screwed into the socket, completing the joint. It may be constructed in two parts, one screw together, and may be used for joining cast-iron, cast-steel, &c., to lead pipes.

#### NEW APPLICATIONS FOR PATENTS.

**April 9.**—4,943, T. Twyford, Manufacturing and Sales. 4,951, J. Chapman, Planes. 4,953, C. W. Flushing Water-closets. 4,954, J. & T. Mason, Trepanning or Slotting-out Wood. 4,952, Porter, Draught and Dust Excluder. 4,973, G. per, Stop for Doors.

**April 10.**—4,937, C. Henderson, Heating and Ventilating Stove. 5,007, C. Hengst and J. Shake, Window-sash Fasteners. 5,022, H. Lake, Stove. 5,011, Weaver, Water-closet Apparatus.

**April 12.**—4,939, C. Ewing, Fasteners for Window-sashes. 5,054, A. Stribling, Obtaining Levels of Floors of Roofs. 5,080, A. Tucker, Locks and Keys.

**April 13.**—5,110, W. Batsford, Window-sash Fastener. 5,124, W. Allen, Ladders. 5,127, R. H. H. French Traps, &c. 5,131, C. Gordon, Aesthetic Grates.

**April 14.**—5,167, J. Smalley, Preventing Down-draughts in Chimneys. 5,175, S. Bott, Cupboard and Shelves. 5,187, W. Walker, Ornamental Cover for Walls, Ceilings, &c. 5,191, T. Dennis, Sten Range. 5,197, F. Powell, Heating Apparatus for Buildings. 5,206, W. Thompson, Bridges.

**April 15.**—5,228, J. Matthews, Brickmaking

Machinery. 5,235, W. Jenkins, Treble Ladder. 5,237, T. Fawcett, Brickmaking Machinery. 5,238, F. Milian, Hot-water Apparatus for Warming Rooms.

#### PROVISIONAL SPECIFICATIONS ACCEPTED.

3,018, R. Beattie, Air-tight Inspection Chamber for Drains. 3,119, C. Henderson, Ventilation. 3,115, G. Kyte, Self-locking Coal Plate. 3,161, W. Meakin, Drain-pipes. 3,520, F. Biggs, Locks and Latches. 3,760, J. Wheeler, Warming and Ventilating Rooms. 3,834, A. Salmon, Air-heating Grate Backs. 4,039, T. Pessell and J. Mills, Chimney Cowl. 4,091, C. Greenfield, Drain Trap. 3,372, C. Wharton, Continuous Motion Handle for Screwdrivers, &c. 3,807, F. Pontifex, Speaking Tubes. 3,375, W. Lund, Brace Bits, Gimlets, Brad-aws, &c. 3,424, M. Macleod, Laying Wood, Tile, or Concrete Pavements. 3,449, C. Davis, Roofing Tiles. 3,452, J. and F. Loughran, Window Sashes and Frames. 3,941, W. Macvittie, Attaching Door Knobs and Handles. 4,101, T. Bamford, Chimneytops. 4,123, W. Sisson, Fastenings for Fall Pipes, Rain-water Pipes, &c. 4,213, J. Menck, Pile Drivers. 4,290, R. Willoughby, Circular-saw Guards, &c.

#### COMPLETE SPECIFICATIONS ACCEPTED.

##### Open to opposition for two months.

5,506, R. Haap, Water-closet Seats. 7,103, E. Wright and T. Summers, Water Waste Preventer Cisterns. 2,014, J. Armstrong, Locks and Latches. 2,150, B. Twigg, Chandeliers. 7,620, H. Byles and T. Hanson, Water-closets. 8,008, P. Bunn, Manufacture of Pigments. 8,009, F. Bolton, Covering for Walls, &c. 8,044, E. Stevens and Others, Affording Ingress to and Egress from Buildings, &c. 8,072, J. Adams, Silent Closing and Retaining Door Springs. 8,309, A. Rockwell and F. Davis, Sash Fasteners. 9,443, W. Fryer, Spring Arrangement for Closing Doors, &c.

#### RECENT SALES OF PROPERTY.

##### ESTATE EXCHANGE REPORT.

###### APRIL 12.

By HORNE, SON, & EVERFIELD.  
Croydon—1 and 2, Norbury Villas, freehold ..... £2,000  
Streatham—8 and 9, Pendennis-road, 63 years, ground-rent 157. 15 ..... 690  
Kennington Park-road—The Hammer Arms Public-house, 69 years, ground-rent 191. 4s. .... 1,790  
2, Hanover Garden, 48 years, ground-rent 71. 6s. .... 2,840  
Nos. 328, 331, and 332, 69 years, ground-rent 241. Bedford Row—Improved ground-rent, 421. 8s. 6d., term 1 year ..... 90  
By VENTON, BULL, & COOPER.  
West Kensington—39, Gunterston-road, 91 years, ground-rent 142. .... 870  
2 to 4, Edgar-road, 64 years, ground-rent 401. .... 2,660  
6, Gower-road, 80 years, ground-rent 11. 11s. .... 830  
43, Gwendwr-road, 90 years, ground-rent 127. .... 830

###### APRIL 13.

By C. & H. WHITE.  
Brixton—28, Crawshay-road, 78 years, ground-rent 51. 5s. .... 280  
Pimlico—22, Denbigh-street, 62 years, ground-rent 31. .... 720  
Canterbury—5 to 8, Claremont-road, 41 years, ground-rent 141. .... 830  
Southwark—81 to 97 odd, Red Cross-street, 25 years, ground-rent 161. .... 715  
Kennington—2 and 4, Barnenden-road, 45 years, ground-rent 131. .... 675  
Hoxton—13, Allerton-street, 21 years, ground-rent 31. 13s. .... 120  
46 and 73, Cornhill-street, 24 years, ground-rent 71. 10s. .... 225  
67, Prevost-street, 16 years, ground-rent 31. .... 105  
87, 88, and 89, Shaftesbury-street, 16 years, ground-rent 161. 12s. .... 450

By BATTAM & CO.  
Calford—5 to 10, Aiken-road: 43 and 44, Barnet-road, and 1 to 16, 18, and 20, Charsley-road, 91 years, ground-rent 182. .... 2,561  
Bromley-road—Four residences, 91 years, ground-rent 506. .... 1,700

By DORRILL, TAYLOR, & CO.  
City—28, Aldermanbury, freehold ..... 2,000  
Haymarket—27, Pantoon-street, freehold ..... 3,625  
Long Acre—68, Neal-street, freehold ..... 1,063  
Notting Hill—27, Notting Hill-terrace, freehold ..... 2,820  
Freehold ground-rent, 111. 2s. .... 403

By FARRBROTHER, ELLIS, CLARK, & CO.  
East Ham—17 to 23, Talbot-road, freehold ..... 630  
By CAIRNCOCK, GALEWORTH, & CO.  
West Dulwich, Allyn-park—The residence called Fairfield, 71 years, ground-rent 221. .... 1,550  
Strand—No. 339, term 42 years, ground-rent 764. .... 6,500

By FRIZERS, LEE, & DAVIES.  
Islington—74, Morton-road, 68 years, ground-rent 81. .... 500  
Ball's Pond—38 and 40, King Henry's Walk, 71 years, ground-rent 101. .... 640  
Linehouse—113 and 115, Burdett-road, 72 years, ground-rent 81. .... 900

By ROGERS, CHAPMAN, & THOMAS.  
Westminster—2, Church-street, freehold ..... 750  
Bromley Park—7, 21, and 27, King's-road, 73 years, ground-rent 271. .... 953

###### APRIL 14.

By G. HAD & CO.  
Montague-square—12, Upper Montague-street, 15 years, ground-rent 81. 8s. .... 420  
Portman-square—46, Gloucester-place, 9 years, ground-rent 21. .... 700

By H. TRIST & SON.  
Seven Sisters-road—10, Cumberland-terrace, 81 years, ground-rent 101. 10s. .... 753  
Belvedere—Freehold Land and Gravel Pit, 1a. 2r. 2ep. .... 678  
A Plot of Freehold Land ..... 100

By RICHMOND & STEVENS.  
St. John's Wood—35, 67, 69, and 76, Clifton-hill, freehold ..... £3,860

By GHOUGH & BOYD.  
Hyde Park—10, Connaught-place, 17 years, ground-rent 4. 11s. .... 4,400

By E. & S. SMITH.  
Hackney—108, Gore-road, 67 years, ground-rent 101. .... 550  
King's Cross—1, 2, and 3, M. de Ville-place, 48 years, ground-rent 241. .... 1,320

Holloway—78, Parkhurst-road, 45 years, ground-rent 101. .... 695  
Canonbury Park South—No. 8, term 50 years, ground-rent 81. 8s. .... 500  
Islington—1, Adelaide-terrace, 53 years, ground-rent 41. 4s. .... 625

49 to 67 odd, Upper Barnsbury-street, 23 years, ground-rent 101. .... 438

By B. BROWN.  
East India-road—Nos. 169, 163, 162, and 219, freehold ..... 2,810  
Ground-rent of 201, reversion in 1987 ..... 516  
The British Admiralty Public-house, freehold ..... 1,100

Grundy-street—The African Tavern, freehold ..... 1,370  
85, G. mndy street, and 131, Vesey-street, freehold ..... 575  
122, 124, 126, and 145, Grundy-street, freehold ..... 1,190  
Grundy-street—The Princess of Wales Public-house, freehold ..... 550

161, Grundy-street, freehold ..... 550  
26, 27, and 34, Ellertorpe-street, freehold ..... 935  
25, Willis-street, freehold ..... 241  
40, Tetley-street, freehold ..... 210

26, 27, 35 to 39, and 45 to 51 odd, Ida-street, freehold ..... 2,305  
13 to 16, St. Mary's-place, freehold ..... 505  
219 and 221, Brunswick-road, 58 years, ground-rent 81. .... 480

Harold Wood, Essex—A Plot of Land, 1½ acre, freehold ..... 320

###### APRIL 15.

By MESSRS. COXON.  
Paddington—63, Watlington-road, 77 years, ground-rent 91. 9s. .... 615

By NEWSON & HARDING.  
Dalston—73, Malvern-road, 73 years, ground-rent 91. 9s. .... 400  
Caledonian-road—No. 139, term 61 years, ground-rent 241. .... 440

Stoke Newington—4, Albion-road, freehold ..... 700  
City-road—101 and 104, Britannia-terrace, and 1 and 6, Wellington-place, freehold ..... 1,410  
Clapton—1 and 5, Five Elm-terrace, 71 years, ground-rent 191. .... 1,955

By H. A. COX.  
Barnes—29 and 38, Alma-road, 39 years, ground-rent 31. .... 500  
64 to 62 even, Trantford-road, 43 years, ground-rent 171. 10s. .... 1,180

1 to 6 and 10, New Place, 48 years, ground-rent 131. 10s. .... 1,123

By WILKINSON & SON.  
Brighton—29, Regency-square, freehold ..... 3,630

By GOMES & GOUTENSMITH & CO.  
Pimlico—27 and 29, Westmoreland-street, 44 years, ground-rent 311. .... 580  
By DENNANT & PORTER.  
Deptford—18, Douglas-street, freehold ..... 370  
Lewisham High-road—The residence, Claremont Villa, 78 years, ground-rent 131. .... 1,270

#### MEETINGS.

THURSDAY, APRIL 29.  
Edinburgh Architectural Association.—Mr. James Gordon on "Gothic Ornament." 8.30 p.m.

FRIDAY, APRIL 30.  
Institution of Civil Engineers (Students' Meeting).—Mr. D. S. Capper on "Continuous Railway Brakes." 7.30 p.m.  
Junior Engineering Society.—Mr. C. R. Harris on "Some Physical Considerations in Building Operations." 7.45 p.m.

SATURDAY, MAY 1.  
Association of Public Sanitary Inspectors.—Address by Mr. Edwin Chadwick, C.B., President. 8.30 p.m.

#### Miscellaneous.

**Science Lectures for the People.**—The "Penny Science Lecture" at the Royal Victoria Hall, Waterloo-road, on Tuesday evening last, was delivered by Prof. H. G. Seely, F.R.S., who took as his subject "Water and its Action in Earth-Shaping." The lecturer clearly explained the erosive action of the tides upon the land, and described the action of glaciers upon mountains. The lecturer's remarks were well illustrated by a number of large photographic views shown by means of a lantern upon a screen filling up the proscenium opening. The audience was very attentive and appreciative. The management of this place of entertainment is to be congratulated upon providing such excellent science lectures for the people.

**Fire Engines and Escapes.**—Messrs. Shand, Mason, & Co. have issued a large and elaborately illustrated catalogue of their very various contrivances for contending against, and escaping from fires, including fire-engines, hose, firemen's dress and accoutrements, fire-escapes of many descriptions. A great deal of information is contained in the descriptive matter, and the whole catalogue forms in itself a very useful manual and suggestion book for architects and house-owners in regard to the means for dealing with fires.



**Decorations at the Italian Church, Hatton Garden.**—The Italian (R.C.) Church in Hatton Garden, erected in 1862, has lately been undergoing internal decoration, the entire walls from floor to cornice, as well as the ceiling, having been painted and enriched by numerous figures representative of scriptural subjects and characters. The ceiling of the nave contains in its central panel a painting of St. Peter (to whom the church is dedicated) in glory, surrounded by angels holding the emblems of his authority and martyrdom. Over the sanctuary is a picture of Paradise, containing figures of the Trinity, the four doctors of the Church, founders of religious orders, and other saints. The apse over the high altar has for its centre piece the Ascension of Our Lord in glory, imparting his last blessing to the Apostles and his Virgin Mother. On either side are the prophets, Isaiah looking towards Christ, and Jeremiah sitting in the ruins of the Temple and weeping over its destruction. Underneath, in bas-reliefs, is seen Christ holding communion with St. Peter, and, in the counter panel, washing the feet of that Apostle. The apses of the Lady-chapel and St. Joseph's are also illuminated by angels bearing the emblems of the Queen of Saints. On either side of the transepts are large windows filled in with paintings. The subjects are the Transfiguration and the Agony in the Garden. These pictures stand 21 ft. high. The whole work has been carried out under the direction of Signor Arnaud, of Caraglio, Piedmont, who has likewise executed all the figures in chiaroscuro. The several paintings are by Cav. Gauthier, of Saluzzo, Turin. It is stated that the cost of the decorations will be from 3,000l. to 4,000l.

**Leipzig Bourse.**—The new bourse at Leipzig has at length been completed, so far as the exterior is concerned, whilst the interior fittings are also finished to such an extent that the building will be opened for business on the 1st of July next. One portion of the structure has been specially reserved as the permanent offices of the Leipzig Chamber of Commerce. The estimates for the edifice were originally 926,000 marks, or 46,300l., but these have been considerably exceeded, and the total expenditure will ultimately amount to no less than 1,200,000 marks, or 60,000l. sterling. The latter sum, however, includes the outlay for a complete installation for illuminating the buildings throughout with electricity. There are several other architectural works of interest which will be opened in Leipzig during the coming summer, amongst the most important being the City Museum and likewise a magnificent monumental fountain. A deceased Leipzig lady left a considerable sum of money for the erection of the latter work, which it is proposed to construct on Augustus-square, in front of the City Museum.

**An Archaeological Anniversary.**—The Royal Historical Society has appointed a committee to make arrangements for the celebration of the 800th anniversary of the completion of the great survey of England contained in Domesday Book, which was, almost certainly, finished in the year 1086 A.D., and has invited the leading antiquarian and architectural societies throughout the country to take part in the celebration. The invitation has been accepted by most of the societies, including the Society of Antiquaries and the Royal Institute of British Architects, which have appointed delegates to serve on the committee. Any person interested in Domesday Book, or any learned society to which by chance an invitation has not been sent, may communicate with the hon. secretary, Mr. P. Edward Dove, barrister-at-law, 23, Old Buildings, Lincoln's Inn, London.

**The Demolition of Lord Carrington's House.**—The second and concluding sale of the materials of Lord Carrington's House, Whitehall, and the adjoining buildings in Whitehall and Whitehall-yard, took place on Tuesday, by Messrs. Horne, Son, and Eversfield, when the whole of the brick and stone work and other materials were disposed of. There was a large attendance, and high prices were obtained, the lead more especially being warmly competed for. This portion of the material on the main building was sold for 213l., whilst that on the stables realised 52l. The total proceeds of the day's sale amounted to 620l., which, added to 615l., the sum produced at the first sale on the 6th inst., brings up the aggregate sum realised for the whole of the materials to 1,235l. The buildings are to be taken down, and the whole of the site cleared, in six weeks.

**New School of Art Buildings at Clapham.**—A School of Art was some time since established at Clapham, and new buildings in connexion with the institution have just been erected, and are now nearly ready for occupation, on a site in a newly-formed road on the west side of High-street, the principal elevation to this road being 80 ft. in length, the building extending to a depth of upwards of 100 ft., and covering an area of about 8,500 ft. The whole of the central portion of the frontage, which is surmounted by a gable, is faced with Lawrence's red brick, the strings, window arches, and sills being in Brown's patent moulded brick. Immediately under the central gable there is an arched entrance, 8 ft. in width. The two wings on each side of the central portion of the frontage, are faced with stock brick, with red moulded bricks for strings, window-heads, &c. A parapet, running the entire length of the frontage, is decorated with large griffin panels in buff terra-cotta, supplied by Messrs. Stiff, of the Lambeth Potteries, and above these are vases, also in terra-cotta. The building is intended to be heated by hot-water apparatus, supplied by Messrs. Bailey & Co., of Gracechurch-street. Messrs. L'Anson & Son are the architects, and Messrs. Kynoch & Co., Limited, are the contractors, the works being under the immediate superintendence of Mr. Carmichael Kynoch, a member of the firm.

**Independent Water-supply in London.**—The Artesian tube wells are now being fixed at the following places in London:—For the supply of the flats and offices of the Albert Hall Mansions, South Kensington, and the Westminster Chambers, Victoria-street, S.W. The depth to be reached in each case, to obtain the required supply, will be over 400 ft. Ere the chalk-beds are reached thick layers of London clay and Woolwich and Reading beds will have to be penetrated. It is only of recent years that this system of obtaining supplies of pure water from deep sources has been so perfected as to almost entirely supersede the old and costly method of sinking dug wells. These artesian wells are protected by an even-sized tube, which is carried from the surface to the chalk beds, so as to prevent any of the polluted springs which are found in the upper beds to contaminate the lower springs. Messrs. C. Isler & Co., of Southwark-street, have had these works entrusted to them.

**Association of Municipal and Sanitary Engineers and Surveyors.**—The first examination held under the auspices of this Association was held at the Institution of Civil Engineers, Westminster, on Friday and Saturday, the 16th and 17th of April, when nineteen names were entered. The written and graphic examination was taken on the first day, while the viva voce occupied the greater portion of Saturday. The examiners were Messrs. R. Vawser, M.Inst. C.E., President of the Association; W. G. Laws, M.Inst. C.E., City Engineer, Newcastle-on-Tyne; E. B. Ellice Clark, M.Inst. C.E., Hove; and C. Dunscombe, M.A., M.Inst. C.E., Liverpool.

**The Indestructible Paint Company, Limited,** call our attention to the fact that it is now seven years since the Egyptian obelisk known as "Cleopatra's Needle" was protected with Browning's patent preservative solution. Dr. H. C. Bartlett, F.C.S., in a report on the subject, says that whereas on the arrival of the obelisk in this country, "the granite was precisely in that absorbent state that it would imbibe damp from our atmosphere, and become liable to exfoliate and throw off scale after scale under the influence of frost, until but little of the inscriptions would be likely to remain after one or two of our English winters," the obelisk is "sounder than when the solution was first applied, and all four faces are weatherproof."

**A New Building Estate on Clapham-common.**—What is known as the Clock House Estate on the south side of Clapham-common is about to be laid out for building operations. Several new roads are now in course of construction. The materials of the mansion and outbuildings, together with those of the adjoining mansion, called the "Lees," were sold on Tuesday last preparatory to clearing the site for building purposes. The two mansions and grounds cover an area of upwards of twenty-two acres, with a frontage to the common nearly 900 ft. in length. It is said that the estates will be laid out for the erection of between 300 and 400 high-class residences.

**The Enlargement of the Junior Carlton Club.**—An extensive enlargement of the Junior Carlton Club, in Pall Mall, which has been in progress during the last twelve months, is now on the point of completion. For the purposes of the enlargement the authorities of the club purchased Adair House adjoining, at the corner of George-street, at an outlay, it is stated, of about 25,000l. The club as now enlarged has a frontage to Pall Mall upwards of 120 ft. in length, with a frontage of about the same length in St. James's-square, together with a west frontage in George-street. The Pall Mall frontage has to some extent undergone reconstruction, the alterations consisting of a new entrance in the centre, 12 ft. in width, having on each side double polished granite columns and pilasters surmounted by a balcony, which it may be stated, is carried the entire length of the frontage at the first-floor level. Prominent bay windows have also been introduced in the ground-floor portion of the building, at the east and west ends of the frontage. The St. James's-square elevation is likewise undergoing certain alterations, bold bay-windows being carried up to the top of the first floor, surmounted by a balustrade. The entrance-hall is being richly ornamented with costly marbles. Internally, the building has been to a large extent reconstructed, the alterations and additions including a new reading-room and library on the first floor, and a billiard-room on the floor above. The principal staircase has likewise been reconstructed, and the smoking-room enlarged, whilst a new strangers' smoking-room has been provided. The alterations are expected to be completed early in the approaching summer. The works are being carried out from the designs of Mr. J. Macvicar Anderson, architect. Messrs. Holland & Hannen being the contractors.

**Assaulting a Clerk of Works.**—At a Farnham Petty Sessions, William Waller was charged with assaulting John Stevenson, clerk of works, employed in the interest of the Farnham Local Board on the drainage works now being carried out in the town. The defendant, who is managing foreman, Mr. R. C. Trimmo, the contractor for the Farnham drainage works, had some dispute with the clerk of works about the measuring-up of work and assaulted him, striking him on the head and knocking him down. Mr. Crundwell, who was instructed by the Local Board to conduct the case on behalf of the complainant, said the Local Board wished him to remind the Bench that this was not the first occurrence of the kind, and that there had been an organised opposition to the clerks of works and engineers. A clerk of works should be free and unfettered in his supervision. If he was not fully protected he would find his work very difficult indeed. The Chairman of the Bench said he saw the case in all its bearings, and inflicted a fine of 40s. and costs, and bound the defendant over to keep the peace in the sum of 100l. *Surrey and Hants News.*

**The Edinburgh International Exhibition.**—Messrs. Field & Allan, of George-street are presenting to the International Exhibition, Edinburgh, a handsome tile pavement, designed by Mr. H. Stephens, to be fixed at entrance to the grand pavilion. The pavement, which is about 30 ft. long and 12 ft. wide, is treated in a style suitable to the building and in harmony with the surroundings. The centre panel is 4 ft. square, and is composed of sixty-four 6-in. encaustic tiles, the groundwork of which is a rich dark blue, with the figure of a Cupid in the centre holding a ribbon bearing the word "Caledonia." On each side of the centre panel is a smaller one, 3 ft. square, composed of thirty-six 6-in. encaustic tiles, which have a very rich effect, though treated in somewhat different manner to the centre. The border is the same class of design, and is surrounded by a white marble strip, 15 in. wide. There is also a variously-coloured marble pavement about 9 ft. long by 2 ft. 6 in. wide, in the doorway. The tiles have been manufactured by the Campbell Tile Company, of Stoke-up-Trent.

**Westmoreland Green Slates.**—In an account of the recent Building Trades' Exhibition at Islington, we omitted to mention the exhibit of green slating by the Buttern Quarry Company, of Keswick. Both for uniformity of colour and strength this company's productions seem to meet all that is required of materials of this class. Messrs. Roberts, Adie & Co. are the agents for these slates.



*Epitome of Advertisements in this Number.*

## CONTRACTS

Nature of Work, or Materials,	By whom required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Clock and Bells for Town-hall	Rochdale Corporation	A. Waterhouse	April 27th	i.
Making-up Streets	Wandsworth Bd. of Works	<i>Official</i>	do.	ii.
New Pavement to be Laid in	St. Marylebone Vestry	H. H. & E. Cronk	April 28th	xvii.
Wood Paving Bridges	St. George's Vestry	<i>Official</i>	do.	xviii.
Machinery for Treatment of Sewage, &c.	Hendon Local Board	F. Cousins & Son	May 1st	xviii.
Storehouses for Fire Bricks	Bognor Local Board	<i>Official</i>	do.	xviii.
Painting, &c. Hospital Ship	St. Giles, Camberwell, Vestry	J. W. Peggs	do.	xviii.
Removal of Street Refuse by Barges	St. Giles, Camberwell, Vestry	<i>Official</i>	do.	xviii.
Repairs and New Workshops	G. Bradley	<i>Official</i>	May 3rd	ii.
Water Works	Newmarket Water Co.	<i>Official</i>	do.	ii.
Road Materials	Lewisham Board of Works	F. Easton & Co.	do.	xviii.
Making-up Pavements and Footways	Chelsea Vestry	<i>Official</i>	May 4th	ii.
Dwarf Wall and Railings to Infirmary	St. George's Vestry	G. R. Strachan	do.	xviii.
Wood Paving	St. George's Vestry	<i>Official</i>	May 5th	ii.
Water Work	Westminster Bd. of Works	G. E. W. Wheeler	do.	xviii.
Brick Paving on Planes	Mile End Vestry	J. M. Knight	do.	ii.
Adapting Premises for Telegraph Factory	County Local Board	<i>Official</i>	May 7th	ii.
Alterations and Additions to Hospital	Bognor Local Board	<i>Official</i>	do.	ii.
Idleness and Bridge	Met. Asylums Board	A. & C. Harston	do.	ii.
School Buildings	County of Stafford	R. Griffiths	May 8th	xviii.
Additions to Schools	St. Giles Vestry	G. H. & J. H. Griffiths	May 9th	xviii.
Painting, White-washing, &c.	Wimbledon Par. Sch.	C. G. Maylard	May 10th	xviii.
	Central London Sch.			
	Asylum District			
Cooking Apparatus	Swansea Union	<i>Official</i>	do.	xviii.
Wrought-iron Tumbler Carts	Southampton Corporation	W. B. G. Bennett	May 11th	ii.
Works, Repairs, and Materials	War Department.	<i>Official</i>	May 12th	ii.
Pipe Sowers and other Works	St. Mary's Vestry	W. T. Murphy	do.	xviii.
Enlargement and Additions to Board Schools	School Bldg for London	<i>Official</i>	Not stated	xviii.

## PUBLIC APPOINTMENTS.

<b>PROMSBOGGE.</b> —For houses on the Shapley Hills Building Estate, near Bromsgrove, Worcester-shire, the property of Mr. Thomas Werthington, Mr. John G. Elgodd, architect, King-street, Manchester:—				<b>HOLLOWAY.</b> —For building three shops at Upper Holloway, near the Regent Approach, London Bridge, for Messrs. W. H. Chapman, Mr. J. W. Brooker, architect, Regent-street, London:—			
<i>House on the Long Dyke (No. 2).</i>				Burman & Co. ....			
Thos. m Rowthorn, Birmingham	2,635	0	0	Downs .....	2,377	0	0
John Bowen, Birmingham	2,229	0	0	Shurman .....	2,339	0	0
James Moffatt, Birmingham	2,218	0	0	Cooker .....	2,144	0	0
Samuel Taylor, Birmingham	2,068	0	0	Batley .....	2,127	0	0
Atzars, Sance, & Reed, Bromsgrove	2,024	0	0	.....	2,047	0	0
J. Wilson & Son, Birmingham	1,993	0	0	J. Besle .....	1,893	0	0
W. & J. Webb, Birmingham	1,961	0	0				
Henry Lovatt, Wolverhampton	1,955	0	0	<b>HORSNEY.</b> —New sewers in northern portion of Horsney District, for the Horsley Local Board. Mr. T. de Courcy Jackson, engineer:—			
Thomas Smith, Birmingham	1,899	10	0	Meade & Son, Finsbury Park .....	£2,490	0	0
Sapcote & Sons, Birmingham	1,898	0	0	H. Rill, High Wycombe .....	2,430	0	0
Tilt & Weaver, Bromsgrove	1,898	0	0	Morgan & Co., Westminster .....	2,430	0	0
P. Horsman & Co., Wolverhampton	1,861	0	0	A. Walker, Upper Holloway .....	2,395	0	0
James Smith & Sons, Birmingham	1,859	0	0	Saunders, Peckham .....	2,295	0	0
J. B. Rogers & Son, Birmingham	1,798	0	0	Dunmore, Crouch End .....	2,181	0	0
Horsley Bros., Birmingham	1,781	0	0	Cooke & Co., Battersea .....	2,027	0	0
Barker & Son, Birmingham	1,737	10	0	.....	1,969	0	0
				Nichols Wand Gange .....	1,969	0	0

## METALS.

* Accepted.		Neal, Wandsworth Common .....		1,685	0	0
		Oxenton, Kent .....		1,684	0	0
		Stanley, Harlesden .....		1,675	0	0
		[Engineer's estimate, 23, 447.]				
HORNSEY.—New road work, for the Hornsey Local Board. Mr. P. de Courcy Meade, surveyor:—						
		Raleigh Road.	Womersley Road.	Dashwood Road.	Clifford Road.	Crouch Hall Road.
John Bowen, Birmingham .....	£935	0	0			
Samuel Taylor, Birmingham .....	945	0	0			
W. & J. Webb, Birmingham .....	932	0	0			
Henry Lovatt, Wolverhampton .....	925	0	0			
James Moffatt, Birmingham .....	926	10	0			
Thomas Rowetham, Birmingham .....	917	0	0			
P. Horneam & Co., Wolverhampton .....	910	0	0			
Thomas Smith, Birmingham .....	890	0	0			
Tilt & Weaver, Bromsgrove .....	883	0	0			
J. Wilson & Sons, Birmingham .....	871	10	0			
Sapcote & Sons, Birmingham .....	860	0	0			
Ames, Seice, & Read, Bromsgrove .....	853	10	0			
Barker & Sons, Birmingham .....	826	0	0			
J. Smith & S. Co., Birmingham .....	819	0	0			
Horsley Bros., Birmingham .....	770	0	0			
* Accepted.		£	£	£	£	£
Mowlem & Co.,	1,795	1,034	686	918	2,294	317
Westons, Hornsey	1,821	1,252	822	1,103	2,872	
Fitzes, Hornsey						

## 8.110

[illegible]

## TENDERS.

Stephens & Bastow ..	1,389	929	2,318	* Accepted.	† Withdrawn.
Walters & Son .....	1,285	915	2,210		
C. Hayes .....	1,377	915	2,310		
Wilkins & Sons .....	1,324	889	2,184		
Howell & Son* .....	1,286	955	2,180		
	* Accepted.				

**GRAVEN ARMS (Salop).—**For Lodge, the Grove, Graven Arms. Mr. Cyril E. Tubbs, architect, Blagrove, Shropshire. Roading.—

	Stones.	Terra octia.
W. Bowler, Shrewsbury	2740 0 0	£830 0 0
J. Welch, Hereford ..	640	640 0 0
G. Grover, Ludlow .....	825 0 0	840 0 0
Henry Jones, Shrewsbury	0 0 0	610 0 0
W. & J. Cox, Hereford ..	545 0 0	555 0 0

\* Accepted.

**ISLINGTON.—**For alterations and additions to the Duke of Cambridge Public-house, Peterborough, designed for Mr. Murray. Messrs. Alexander & Gibson, a architects, Great James-street, W.C. —

Banks .....	£249 0 0
J. Anley .....	940 0 0
Batchelor .....	867 0 0
J. Jackson, Road .....	843 0 0
J. Beale .....	530 0 0

**ISLEWORTH.—**For alterations and addition to coach-house and stable at Cassell House, Isleworth, for Mr. Howard:—

J. Beale, Westminster Bridge-road ..	£263 0 0
--------------------------------------	----------



**KENNINGTON.**—For alterations and repairs to 115, Kennington Park-road, for Mr. W. A. Wall:—  
R. A. Lamprell (accepted) ..... £163 0 0

**LEWISHAM.**—For the erection of the New Church of St. Laurence at Catford Bridge, Lewisham, for the Lewisham Church Extension Association. Mr. H. Boumian Gough, architect, Carlton-chambers, Regent-street, S.W.:—

Church.	Fence walls and gates.	Total.
Kennard Bros. .... £7,240	..... £274	£7,514
Banks ..... 7,095	..... 698	7,793
Staines & Son ..... 7,344	..... 442	7,786
Brown, Son, & Blomfield ..... 7,049	..... 670	7,719
Jarrard ..... 7,000	..... 673	7,673
T. Wontner Smith & Son ..... 6,953	..... 398	7,351
Chamberlens Bros. .... 6,722	..... 404	7,126
Belham & Co. .... 6,863	..... 384	7,247
J. Lister ..... 6,389	..... 316	6,705

Church.	Fence walls.	Morning Chapel.	Total.
Chamberlens Bros. .... £3,316	..... £304	..... £518	£4,138
Belham & Co. .... 6,007	..... 810	..... 768	7,585
J. Lister ..... 6,076	..... 316	..... 539	6,931

Accepted conditionally.

**LIANDUFF.**—For the erection of a house at Lianduff, for Mr. H. M. Thompson. Messrs. Halliday & Anderson, architects, High-street, Cardiff. Quantities by Mr. Charles Taylor, Cardiff:—

D. Davies, Cardiff	.....	£1,991 0 0
W. & T. Cox, Lianduff	.....	1,859 15 0
C. Bird, Canton	.....	1,975 0 0
H. Gibbons, Cardiff	.....	1,855 18 0
J. Allen, Cardiff	.....	1,287 0 0
F. Martin, Cardiff	.....	1,885 0 0
J. Shepton & Sons, Cardiff	.....	1,825 10 0
J. D. Davies, Cardiff	.....	1,080 0 0
T. Gough, Cardiff (accepted)	.....	1,850 0 0

**LONDON.**—For additions and alterations at No. 4, Andley-square, W., for Mr. J. Jones. Mr. R. B. Marsh, architect. Quantities by Messrs. D. Campbell & Son:—

J. Mowlem ..... £4,098	0 0
Lawrence & Sons ..... 3,988	0 0
A. Bush ..... 3,848	0 0
Higgs & Hill ..... 3,840	0 0
E. Conder ..... 3,694	0 0
Nightingale ..... 3,651	0 0
Brass & Son ..... 3,650	0 0
J. & J. Greenwood ..... 3,401	0 0
Kilby & Gayford (accepted) ..... 3,430	0 0

**LONDON.**—For rebuilding Nos. 31, 33, 35, 37, Worship-street, for Mr. Beniner. Mr. E. Street, architect. Quantities by Fowler & Huggan:—

Pain ..... £5,894	0 0
Foster ..... 5,720	0 0
Dickson ..... 5,750	0 0
Downs & Co. .... 5,848	0 0
Palmer ..... 5,200	0 0
Mowlem & Co. .... 5,098	0 0
Watson ..... 4,995	0 0
Lyster & Son ..... 4,889	0 0
Nightingale ..... 4,863	0 0
Kilby & Gayford (accepted) ..... 4,818	0 0

**LONDON.**—For shops and residences, Mount-street, Grosvenor-square. Mr. J. T. Smith, architect. Quantities supplied:—

Boye ..... £32,390	0 0
Higgs & Hill ..... 32,368	0 0
Nightingale ..... 31,835	0 0
Downs ..... 31,815	0 0
Brass & Son ..... 31,815	0 0
Perry & Co. .... 30,914	0 0
Patman & Fotheringham ..... 30,860	0 0
Peto Bros. .... 29,298	0 0
Bywaters ..... 29,473	0 0

**LONDON.**—For shop and residence, Mount-street, Grosvenor-square. Mr. J. T. Smith, architect. Quantities supplied:—

Boye ..... £25,965	0 0
Downs ..... 25,930	0 0
Higgs & Hill ..... 25,650	0 0
Patman & Fotheringham ..... 6,671	0 0
Nightingale ..... 5,682	0 0
Brass & Son ..... 5,483	0 0
Peto Bros. .... 5,372	0 0
Perry & Co. .... 5,325	0 0
Morris ..... 4,956	0 0
Bywaters ..... 4,956	0 0

**LONDON.**—For repairs and additions to No. 74, Wandsworth-road, for Messrs. Roy & Cartwright. Mr. G. Treacher, architect, Carter-lane, E.C.:—  
Redick ..... £450 0 0  
J. Beale ..... 385 0 0

**MOUNTAIN ASH (Glamorganshire).**—For the erection of a Church at Mountain Ash. Messrs. Halliday & Anderson, architects, High-street, Cardiff. Quantities by Mr. Norman Wright, Cardiff:—

J. Kinsey, Tongwynlais ..... £1,990	9 7
S. Franklin, Cardiff ..... 1,921	1 8
D. C. Jones & Co., Gloucester ..... 1,787	0 0
C. Bird, Canton ..... 1,780	1 0
Jenkins Bros., Swansea ..... 1,737	0 0
W. & T. Cox, Lianduff ..... 1,680	5 8
Evan Thomas, Neath ..... 1,601	13 0
Miles Edmunds, Mountain Ash ..... 1,388	12 5
Edwin Parfitt, Cwmanan ..... 1,388	13 4

\* Accepted.

**NEWBURY.**—For building Oddfellows' Hall, Newbury. Mr. J. H. Money, architect. Quantities not supplied:—

W. Wilkins & Son, Ryeburn ..... £2,590	0 0
G. Elms, Stockcross ..... 2,436	8 0
C. Claridge, Banbury ..... 2,234	0 0
S. Elliott, Newbury ..... 2,177	0 0
Bottford, Newbury ..... 2,176	0 0
R. Harrison, Newbury ..... 1,915	0 0
Simonds, Reading ..... 1,830	0 0
T. Martin, Maidenhead ..... 1,724	0 0
E. James, Newbury ..... 1,657	0 0

**POPULAR.**—For alterations and additions to house, No. 1, Cuba-street, Millwall, Poplar, for Mr. Reeves. Mr. H. Hooper, architect:—

Colman ..... £233	0 0
Johnson ..... 370	0 0
Salt ..... 223	0 0
George Linn, Millwall ..... 210	0 0

**STRATFORD.**—For shop front and alterations for Mr. O'C. Wood, 11 and 12, Bridge-road, Stratford:—  
R. A. Lamprell, Clapham-road ..... £167 0 0

\* Accepted.

**TUNBRIDGE WELLS.**—For alterations and new shop front to houses, Colverton, Tunbridge Wells. Mr. W. H. Wright, architect:—  
G. Edwards ..... £198 0 0  
G. Winniffrith ..... 183 0 0  
H. Elwig (accepted) ..... 17 0 0

**SPECIAL NOTICE.** Lists of Tenders frequently reach us too late for insertion. They should be delivered at our office, 48, Catherine-street, W.C., not later than Four p.m. on THURSDAYS.

## PUBLISHER'S NOTICES.

Registered Telegraphic Address, "THE BUILDER, LONDON."

**CHARGES FOR ADVERTISEMENTS.**  
SITUATIONS VACANT, PARTNERSHIPS, APPOINTMENTS, TRADE, AND GENERAL ADVERTISEMENTS.

Advertisements for the current week's issue must reach the Office before THREE o'clock p.m. on THURSDAY.  
The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c. left at the Office in reply to Advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

**SITUATIONS WANTED.**  
FOUR Lines (about THIRTY words) or under ..... 2s. 6d.  
Each additional line (about ten words) ..... 6d. 6d.  
PARLAMENTARY IS ABSOLUTELY NECESSARY.

\* Stamps must not be sent, but all small sums should be remitted by Cash in Registered Letter or by Money Order, payable at the Post-office, Covent-garden, W.C. to  
DOUGLAS FOURDRINER, Publisher.

Advertisements for the current week's issue must reach the Office before THREE o'clock p.m. on THURSDAY.  
The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c. left at the Office in reply to Advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

**SPECIAL—ALTERATIONS IN STANDING ADVERTISEMENTS OR ORDERS TO DISCONTINUE same, must reach the Office before TEN o'clock on WEDNESDAY MORNINGS.**

**PERSONS Advertising in "The Builder," may have Replies addressed to the Office, 48, Catherine-street, Covent-garden, W.C. Free of charge. Letters will be forwarded if addressed envelopes are sent, together with sufficient stamps to cover the postage.**

**TERMS OF SUBSCRIPTION.**  
"THE BUILDER" is supplied gratis from the Office to residents in any part of the United Kingdom at the rate of 12s. per annum. Foreign, to all parts of Europe, America, Australia, and New Zealand, 20s. per annum. To India, China, Ceylon, &c. 30s. per annum. Remittances payable to DOUGLAS FOURDRINER, Publisher, No. 48, Catherine-street, W.C.

## TO CORRESPONDENTS.

Registered Telegraphic Address, "THE BUILDER, LONDON."

A. S. & S. C. T. C. N. W. D. W. F. P. M. H. K. E. O. F. Berlin (thanks).—J. H. (more a matter for Notes Queries than for our column).—O. F. (thanks for photograph).—All statements of facts, lists of tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.  
Note.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.  
We cannot undertake to return rejected communications. Letters or communications beyond mere news-items which have been duplicated for other journals, are NOT DESIRED.

All communications regarding literary and artistic matters should be addressed to THE EDITOR: all communications relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

## Best Bath Stone for Winter use.

**WESTWOOD GROUND,**  
Box Ground,  
Combe Down,  
Corham Down, and { Summer  
Farleigh Down, { Dried.  
**RANDELL, SAUNDERS, & CO., Limitd**  
Corham, Wilts. [Ad]

## Box Ground Stone

is the best for use in all exposed positions being a well-known and tried Weather Stone, 50,000 ft. cube in stock.  
**PICOT & SONS,**  
BOX, S.O., WILTS. [Ad]

## Douling Freestone.

The stone from these quarries is known as the "Wool Bed," and is of a crystalline nature, and is doubtless one of the durable stones in England. It is of the same crystalline nature as the Chelney Stone, but finer in texture, and is suitable for the most finished work.

**THE CHELYNCH STONE.**  
**THE BRAMBLEDITCH STONE.**

**HAM HILL STONE.**  
Greater facilities have been provided for working these quarries, and the stone can be supplied in large quantities at short notice.

Prices, and every information given, in application to **CHARLES TRASK & SON**, Norton-sub-Hamdon, near Ilminster, Somerset.

London Agent—Mr. B. WILLIAMS,  
16, Craven-street, Strand, W.C. [Ad]

## Douling Free Stone

For prices, &c., address S. & J. STAP,  
Quarry Owners, 81, High-street, Ilminster, Somerset.  
**HAM HILL STONE,**  
**BLUE LIAS LIME**  
Stoke - under - Ilminster. [Ad]

**Ham Hill Stone!** Ham Hill Stone is the best quality and weathering stone in the country.

For Ham Hill Stone of best quality and weathering, apply to **JOHN HANN & SON**, Quarry Owners, Montacute, Ilminster. Established 1837. Agents, **MATTHEWS & GEARD**, Albion Wharf, Regent's Park Basin, N.W. [Ad]

**Asphalte.**—The Seyssel and Metallo I Asphalte Company (Mr. H. Glenn), Office, Poultry, E.C.—The best and cheapest material for damp courses, railway arches, warehouses, flat roofs, stables, cow-sheds, and floors, granaries, tun-rooms, and terraces. [Ad]

**Asphalte.**  
Seyssel, Patent Metallo Lava, and White Asphaltes.  
**M. STODART & CO.**  
Office:  
No. 90, Cannon-street, E.C. [Ad]

# BANNER VENTILATORS.

The Strongest Exhaust Ventilators for all Buildings, Public Halls, Churches, Billiard-Rooms, &c.

HIGHEST PRIZES at all the most important Exhibitions.

## BANNER SYSTEM OF SANITATION AND SANITARY APPLIANCE

WERE AWARDED AT THE

International Health Exhibition, 1884, One Gold Medal, Three Silver Medals, and One Bronze.

For further Particulars and Prices apply to

**BANNER BROS. & CO. Sanitary and Ventilating Engineers**

11, BILLITER SQUARE, LONDON, E.C.



## ILLUSTRATIONS.

The Northumberland Avenue Hotel.—Messrs. Isaacs & Florence, Architects .....	612-645
First Premiered Design for Fulham Vestry Hall: Front Elevation and Section.—Messrs. Newman & Newman, Architects .....	649
Detail of Front of Messrs. Newman & Newman's Design for Fulham Vestry Hall .....	649
First Selected Design for New Public Buildings, Newcastle-under-Lyme.—Messrs. Wm. Sugden & Son, Architects .....	652
Detail of Bay of Messrs. Newman & Newman's Design for Fulham Vestry Hall .....	653

## CONTENTS.

Architecture at the Royal Academy.....	631	First Selected Design for Public Buildings, Newcastle under-Lyme.....	639	Stone-Sawing Machinery .....	657
New Light on the East Pediment of the Zeus Temple at Olympia.....	632	The Northumberland-Avenue Hotel.....	639	Robinson's Cement .....	658
Notes.....	633	Deerhurst Church (Illustrated) .....	639	"Haskell & Bradburn" .....	658
Letter from Paris .....	635	Dry Rot .....	639	The Student's Column: Our Building Stones.—VIII. ....	658
Annual Institute of British Architects: Annual Report of the Council .....	635	The Almonchroft Cow Company's Exhaust Ventilator (Illustrated).....	639	Recent Patents .....	658
Design for a Silk Brocade (Illustrated).....	637	Water Supply.....	639	Recent Sales of Property .....	659
Architectural Association: Italy Excursion.....	637	Stone for the New Government Offices.....	639	Meetings .....	659
Ordering at Swansea.....	638	Staircase, Albany Capital.....	639	Plumbers' Company .....	659
Fulham Vestry Hall Competition Designs (with Plans).....	639	Ancient Greek Sculptors .....	639	The Resistance of Building Stones to Frost .....	659
				Macellanes .....	659
				Prices Current of Building Materials .....	661

### Architecture at the Royal Academy.



NOTES on the general contents of the Royal Academy exhibition of 1886 we defer till next week, only remarking here that, as far as paintings are concerned, we fear it will not be registered as a good

year. There are two or three remarkable pictures, and a fair sprinkling of good ones, amid what seems to us so far to be a more than usual proportion of uninteresting and commonplace work. On the other hand, sculpture, in spite of the absence or very poor representation of some of the best names of the day, shows a good average, and includes some works of very high beauty, interest, and originality.

The standard of work in the Architectural room seems more generally up to a good average than any other department of the exhibition. Of course, it must be borne in mind that the number of these works is comparatively small: 202 drawings are exhibited, the total of works in the whole exhibition being 925; and equally, of course, architectural drawings, which are only representations of the work and not the work itself, do not stand the same category as paintings and sculpture, which are themselves the finished work. Nevertheless, the architectural visitor will, we think, find that there is a good standard maintained, and though there are few remarkable things, there are few which do not vindicate their right to be present. There is a considerable proportion of church architecture, and a rather larger amount than usual of decorative work, mostly of a good class. Public buildings any scale or importance are, as usual, in the minority; domestic architecture is fairly represented.

As we have sometimes done on former occasions, we will look through the churches first. Church architecture stands on different ground on every respect from other branches of modern architecture, in that it is more, distinctly influenced by precedent than any other class of buildings. The days have gone by when it is considered by clients sufficient to have what was called a comfortable house, and when we even considered rather "bad form" to wish to have a dwelling distinguished by any special effort at artistic effect from those of our neighbours. There is now, on the contrary, a desire on the part of men who build themselves and their families to have homes reflecting their own tastes, or, at all events, the taste of their architect; and the conditions of

plan and arrangement are more elastic in the case of a dwelling-house than in any other kind of structure except those which are purely monumental or decorative in character and aim. In the case of the church, on the other hand, the Mediaeval plan, subject to modification within rather narrow boundaries, is still *de rigueur*. Orientation, the position of the chancel, of the baptistery (where there is one), of the choir, are settled by prescriptive custom or tradition, and the possible variety of plan is therefore very small; and practically style is, to a certain extent, also prescribed, though the latitude here is much greater than in regard to plan. It is still tacitly regarded, however, as a principle, that a church, to be acceptable, must be Gothic; it may be Gothic "with a difference," but it must, as a rule, fall within that category, and almost every one of the churches in the present exhibition does so. The matter of interest, therefore, is to find churches, designed within the accepted lines and in regard to plan and style, which present, nevertheless, some degree of originality in their details or in the variations played on the prescribed theme; and of this there are some interesting examples in the present exhibition.

Taking them in the order of hanging, the first we come to is Mr. Needham Wilson's Soane Medallion prize design for "a town church" (1,560); an exterior perspective view finely drawn in pen and ink, but taken from a point of sight rather too near to give the idea of the whole grouping, and producing a rather confusedly heaped-up effect, which is, however, picturesque, and was perhaps intentionally aimed at. The church is a brick one treated in a very severe style, with plenty of solid mass of wall, and large in scale; it realises its intended character as a town church,—it would be rather difficult to define what special characteristics go to distinguish a town church from a country one, but they are felt intuitively by most people who have any perception at all on such a subject. The placing of the tower at the angle where two streets meet secures one of the points of effect of which church architecture in streets is susceptible. Below this (1,561) is Messrs. Goldie, Child, & Goldie's interior of the church for Spanish-place, which has been illustrated in our pages, and of which we spoke at length at the time of the competition for the building. It represents the frank adoption of the Mediaeval model, in detail as well as in general arrangement, and is, as we have before said, a very successful example of that class of archaeological architecture which may be called mere imitation, but which, at all events, it requires no little knowledge, natural taste, and experience to

reproduce successfully. The same architects exhibit one of the exterior views of this church (1,696), a large pyramidal group, rising effectively above the houses surrounding it.

Mr. Seddon's competitive design for the memorial church at Paisley (1,567), we have also illustrated. It makes a very effective coloured drawing, and represents a spirited attempt to adapt Mediaeval architecture to the special requirements of a Baptist church. It is a design practical for its purpose, as well as effective as a whole, but we cannot like some of the detail, which savours too much of "Dissenting Gothic" for our feelings, though, perhaps, thereby the more fitted for its object.

St. Paul's Church, Finchley (1,570), by Mr. John Ladds, shows no special originality, but has the merit of refinement and solidity at the same time: it shows a tower on the north side, nearly a solid mass of wall in the lower stages, with octagonal turrets and a short lucarned spire. There is no attempt at adapting Gothic, but there is a good feeling about the whole. Mr. Arthur E. Street's "Church of St. Paul, Worcester" (1,571), is an interior with a good deal of character. It is a very solidly-treated design with little ornament, of generally thirteenth-century character, but with a special type about it; the piers and arches, without caps or impost mouldings, are diversified with bands of red brick with black edging bands, alternating with a light-coloured stone; the roof is a plain solid-looking Mediaeval roof, with heavy curved braces springing from timber corbels. The pulpit is too "stumpy" in appearance, and does not harmonise much with the rest of the design; but the whole is a good interior, and very monumental looking. "All Saints Church, Gosforth" (1,574), by Mr. R. J. Johnson, is a pen-drawn interior of a church in orthodox Late Gothic style, with nothing to find fault with or to comment on in particular. The "Church of St. Peter, Accrington" (1,577), by Mr. Henry Ross, is a plainly-treated edifice with a main roof running from end to end, the ridge only broken by a rather picturesque timber bell-cot and spirelet; there is a small transept much below the ridge of the main roof; plenty of solid wall, little ornament, square windows in aisles and pointed windows in clearstory. The employment of square-headed windows in church design, in conjunction with a style of Gothic not generally associated with that form of window-head, is one of the variations in which modern Gothic is indulging; with a low aisle it gives a greater proportion of light, and thus the great inspiring spirit of utilitarianism (for such it is, rightly regarded) is creeping into modern Gothic church architecture.

The "Interior of St. Bartholomew the Great,



Smithfield" (1,603), by Mr. Aston Webb, showing the proposed restoration of the east end, is one of the finest drawings in the room, and one of great interest, as showing the proposed treatment of the most interesting ancient church in London. We shall publish a reproduction of the drawing next week, together with some account of the church as it is and is proposed to be. We will only remark here that the architect has gone on the principle of restoring the Norman arcade on the ground story as a continuance of that part of the original design, and restoring the fourteenth-century story above, round the apse, so as again to make a continuous design; thus striking a balance between the claims of archaeological truth and architectural effect; and we believe this is the best course that could have been adopted under the circumstances; but there will be an opportunity of going into the subject more in detail next week.

Of Mr. Doyle's "Design for St. Bartholomew's, Liverpool" (1,606), the tower is the best portion. It shows an octagon rising, unsymmetrically, off a square mass in the lower stage, the square portion reaching to the height of the body of the church; the octagon has an upper stage of long window-lights, and is crowned by a smaller octagon stage and conical roof, very plainly treated. The effect of this is picturesque and rather unusual; the remainder of the building is rather bare and devoid of character. The "Interior, looking east, of Audlem Church, Cheshire" (1,612), by Messrs. Lynam & Rickman, is apparently an old church "done up," probably re-seated, but there is no indication what is actually new in the work; it is a plain, very solid, interior, of rather late date, with octagonal piers, with plain bell capitals and no carving.

Mr. E. C. Lee's design for "Proposed New Church, Teddington" (1,605) is hung too high to be well seen; it is a stately-looking church, in a Late Decorated style, with window tracery of Perpendicular type; a battlemented tower, with large angle turrets, at the crossing; it may be taken as a good specimen of the orthodox Gothic church. The "Trinity Presbyterian Church, Wimbledon," by Messrs. Potts, Sulman, & Hennings (1,615), is a pretty structure, with some original points about it; low walls and high roofs, with a very small clearstory, a tower at the south-west angle, with an octagon spire rather playfully treated, and a simple but elegant *niche* at the crossing; the details are Early Geometric Gothic in character. "Our Lady's Church, Wellingborough" (1,616), by Mr. S. J. Nicholl, is a pleasing example of a small town church, Late Gothic, with a tiled roof, a low transept not breaking the main lines of the nave, and a square low tower nearly detached from the church at the north-west angle, the tower kept very plain, except for an enriched story just below the battlemented parapet, and with a short spire over it. The shafts running past the centre of the tower windows and through the battlements, and ending in finials, are a little whimsical and out of keeping with the solidity of the general design. The "Woodberry Down Baptist Chapel" (1,627), by Messrs. Paull & Bonella, shows some originality of treatment; the large end window is flanked by bastion-like side masses projecting in semicircular form, which above the roof become complete octagonal turrets, but the small buttresses in three stages in this turret portion, radiating from the angles, produce rather confused lines, and seem out of scale with the rest, and do not sit very well on the sub-structure. If not already built, this portion is capable of improvement.

Mr. Leonard Stokes's drawing of a portion of his design submitted in competition for the Spanish-place Church is a very fine pen-drawing (1,635), showing the portion of the design with the semicircular vestibule, with a door and sculptured gablet at each extremity of the semicircle. The portion of the building rising above the porch is very severe and massive in style. We commented on it at the time of the exhibition of the competitive drawings; but the porch with its cinquefoil

arcade hardly seems to belong to the rest of the building, and this, with the rather awkward manner in which the semicircular line of roof fits (or does not fit) into the angle of the main building, makes the porch look rather like an afterthought added by another hand. Otherwise, this is one of the best drawings in the room, showing a part of what as a whole was a very fine design.

Mr. Billing's "Proposed Memorial Church, Paisley" (1,638), an exterior perspective and, (like the last) a competition design, we cannot say very much for, save that it is large, elaborate, and ambitious, but incoherent, and not really effective, in spite of all its elaboration of detail. Messrs. Goldie, Child, & Goldie's "New Catholic Church, Mount Vernon, Liverpool" (1,644), is a simple Geometric Gothic church, with no tower, only a large octagonal turret at the south-west angle, and a porch the width of the nave, beneath the seven-light west window, which (the porch, namely) does not seem quite sufficiently connected with the rest of the design. The effect of the whole is quiet and picturesque.

Mr. J. D. Sedding's "New Church, Roche, Cornwall" (1,643), is shown in a bird's-eye view pen-drawing; it is apparently a church with all three aisles completely roofed with ridges, instead of the aisle roofs being treated as lean-to's; the design has a good deal of character of an unpretending kind, the porches are treated with variety and originality; the tower seems rather wanting in character. Mr. Sedding's other church, "New Church at Hayle" (1,709), is still more original, in fact defiantly so. The tower occurs in the middle of the north side of the church, a great square mass below, with an octagon lantern planted upon it; the square mass is cut into a deep square-headed recess on each of the visible faces, in the upper part of which recess windows lurk; the nave aisles are very low with broad single buttresses of one set-off, and in the centre of each wall-space between the buttresses is one very small window, square in two of the bays, circular in another, giving the idea that the aisle must be divided into cells internally. The clearstory windows, on the contrary, are long lancets piercing the wall midway between the buttresses, and with moulded relieving arches over them connecting the buttresses. Towards the east end the ground falls very much, and this portion has two full window tiers. The little windows dotted in to the nave aisle wall seem like a joke; but then it is a very amusing joke, and the whole design is exceedingly original and picturesque, and shows a determined effort not to continue in mere archaeological leading-strings, even while working in a spirit akin to that of Medieval architecture. Mr. Sedding's large and elaborate drawing for the restoration of the choir screen at Winchester we will speak of on another occasion.

#### NEW LIGHT ON THE EAST PEDIMENT OF THE ZEUS TEMPLE AT OLYMPIA.



THE Museum of Casts at South Kensington has made it possible to take an intelligent interest in the question of the restoration and interpretation of the Olympian marbles, without the, — once indispensable, — journey to Berlin or to Olympia. If our readers will take the trouble to visit the museum, and study the "reduced copy of the east pediment group of the Temple of Zeus at Olympia" (in the catalogue No. 76a) they will find themselves easily in a position to appreciate the brilliant theory of interpretation which Dr. Loeschke has just sent us from Dorpat. To readers of the *Builder* Dr. Loeschke's name is familiar; his new theory is stamped with just the old impress, the hall-mark of constructive genius which stimulates the imagination as much as it convinces the intellect.

Mr. Perry, in his arrangement of the east museum, has selected the restoration of the east pediment made by Tren. From this restoration we have always dissented, and we are glad to see that Dr. Loeschke's theory sup-

ports, though quite incidentally, the restoration of Dr. Curtius. Into the merits of the two restorations it is not our purpose here to enter, except in so far as they necessarily affect the interpretation of the figures. We give a sketch of Dr. Curtius's restoration lettered so that the argument may be clear followed.

Dr. Loeschke begins by conceding that question of the original arrangement of twenty-one figures of the pediment is still part open. Only in part, however. Seventeen out of the twenty-one positions are fixed, either by their size in relation to the slope of the pediment, or by the description: Pausanias; or, again, by the exact spot to which they were found. These seventeen are the five middle figures standing in an upright position (which, though, as we shall see, they may be interchangeable among themselves, must occupy the centre), P, G, H, I, K, L, two groups of four horses, D and M, and, according to Dr. Loeschke, the much-disputed "brooding old man" (*sinnender greis*) and the squatting or crouching boy (*hockender knabe*) N and O. Of these last two, some authorities concede only the "brooding old man," who, by common consent, takes his place immediately behind the right hand (fronting the spectators) horses. Dr. Tren, whose arrangement followed at South Kensington, places the crouching boy in front of the left-hand horse and fills his place behind the "brooding old man" by the figure of the kneeling maiden.

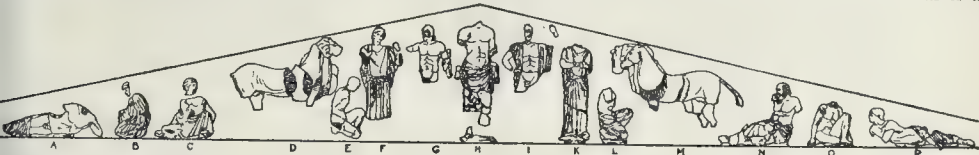
First, — and here he acknowledges the leading of Dr. Studniczka, of Vienna, — Dr. Loeschke attacks the commonly-accepted arrangement of the centre standing group. It will be remembered that the pediment represents the preparations for the race between Pelops and Oionomaios, king of Pisa: the place of Pelops win is to be the hand of Hippodameia, daughter of Oionomaios; the umpire in the contest is naturally the Olympian Zeus himself. He occupies the centre, H; on his right-hand, G, stands the winning man, Pelops — in the lucky right-hand place by his side, future bride, Hippodameia, F. On the left-hand (the losing place) stands Oionomaios, I, by his side his wife, Sterope. We are bound to note, however, that it seems to us possible that conventional etiquette may have placed Oionomaios, the full-grown king, on the right-hand in place of the luckier, but younger Pelops; a glance at the diagram will show, however, that the outstretched arms of G. I would thus be turned inwards and create an unpleasant artistic effect. Dr. Loeschke holds that Pelops occupied the right-hand place, but, following Studniczka, he thinks wrong figure has been placed by his side, Hippodameia. He would transplant K, the called Sterope, and call her Hippodameia. Studniczka chiefly supports the change, considerations of dress; the simple D, chiton of K he considers better fitted to the maiden figure. Dr. Loeschke, in addition, thinks that on artistic grounds K occupied the place of F more harmoniously, and that the folded arms and pensive droop of the figure suit the prospective bride. We cannot, however, prove the matter proven on either side.

We pass to the far more interesting, and, as we believe, convincing interpretation that Dr. Loeschke offers of the hitherto problematic figures intervening between the chariots and the river gods. The river gods, we should note in passing, are certain interpretation and position, the hand one, A, being the Alpheios, the other hand, P, Kladeos. Between the right-hand horses, M, and Kladeos, P, are two figures the far-famed "brooding old man," N, and crouching boy, O. We begin with N. Perhaps no figure dug up at Olympia excited so much surprise and such prompt controversy as Pausanias, never a very accurate observer, him for a groom; but if a groom, why, head resting on the hand, the furrowed forehead, the sunken, meditative eyes, the what senile face? The fashion of grooms of the past have strangely changed if this is the type of the oster of ancient days. The type of the old is so markedly realistic that its character cannot be unintentional, and it was the



derivation of these well-marked characteristics that led Mr. Newton to see in the impossible from a seer, present as was fitting to precede the rites that preceded the race. Dr. Loeschke gives the seer a name, a name of local might. From the beginning of time here dwelt in the plain the old god Kronos, the crooked counsels (*ἀγκυλομήτης*); his hill (Kronion) it was that overhung the plain on

gracious to her lover, but bade her maidens pelt his face with mud; but the sculpture, if Dr. Loeschke's interpretation be true, adopts a milder version of the story. The goddess seems bending down to the ground, or it may be that in the space between her and Alpheus there was a stag sculptured, with which she played, while the river-god watched her as she lay.



which the heroes raced, and he it was who his crafty soul decided the issue of the contest. We have no second contemporary figure of Kronos with which to compare N; known representations are of later Hellenic times; but, if an artist of the fifth century sized to depict the crafty ancient god, we can imagine no more likely embodiment than is "brooding old man." Any who may have followed us in recent discussions on the topographical interpretations of the east and west pediments of the Parthenon will find with us the great gain to the living interest the pediment in this interpretation of the merely accidental and abstracted group into a seer or the local divinity who, in actual essence, superintended the race.

We pass to the crouching boy, O. May he prove a local divinity? Was there any faithful god of local import whose shrine is high to the hill of Kronos? For we have not far to seek. On the very peak of Kronion towards the north, and not removed from the treasure-house, Pausanias (20, 1) tells us he saw a shrine where was worshipped the hero Sosipolis, by whom men are in affairs of the greatest moment. The ans, at one crisis of their history, had been d-pressed by the Arcadians; the boy Sosipolis as yet a child at his mother's breast, and mother dreamed the child should save the an state. They placed the child, naked, in the midst of their battle array, and, as the Arcadians came up, the child was changed into a snake, panic-stricken at the omen, the Arcadians came and fled. The Eleans consecrated a ne in their capital to their deliverer Sosipolis, saviour of the State, building it near the temple of the goddess Tyche (Fortune). No doubt, the story bears the impress of an etiological myth; but, none the less, it remains that on the hill Kronion was shipped the hero Sosipolis, and that by down to late days, the most solemn oaths taken: his worship has the appearance of old indigenous cult, and we may, with no nence to mythological chronology, suppose to have been present at the contest between Pelops and Oinomaos. The attitude of the ch seated crouching on the ground, and his tion between Kladeos and Kronion, suit ably with Dr. Loeschke's attribution. To balance this local triad, Kronion, Sosipolis, Kladeos, on the right hand, we must have sth less vague than mere nameless phs, and grooms, and seers, on the left. Does Dr. Loeschke fail to give us again a local ground whereon to set our feet. ing to the left end of the pediment, the -god (A) in the corner is already indis- bly Alpheios; names and personalities yet to be found for B and C, the maiden the full-grown seated man. For the en (B), Dr. Loeschke offers a charming ion. It had already been noted that she towards Alpheios, as if some marked con- were intended; she turns away from action in the centre as if the river-god to her more than all beside. There was maiden goddess much worshipped in nia, and not over-prone to love, but she wooed by the river-god, Alpheios, and d a shrine with him; Artemis, who bore urname, Alpheiousa. According to the in Pausanias, the goddess was not over-

It will not be forgotten that much of the worship at Olympia centred round the taking of oracles, and all modern interpreters of the pediment have wished to see, in one or other figure, a representative local view. The figure C remains a figure of dignified aspect with a broad band about the hair, and possibly having once carried a sceptre in the left hand. If the figure represents a seer, seated, as he is, on the ground, he must be of Chthonic origin. We scarcely need hesitate for the name,—Iamos, ancestor of the great race of seers, the Iamidae,—Iamos, son of Apollo and Evadne, the babe whom, "by the counsel of the gods," Pindar tells us, two bright-eyed serpents nursed, and fed him with the harmless venom of the bee; and when he grew to be a youth, at night, time beneath the heavens, he cried to Apollo, and the infallible voice of his father answered and said to him, "Arise, my son, and come hither, following my voice, into a place where all men shall meet together." So they came to the steep rock of lofty Kronion; there the god gave him a twofold treasure of prophecy that, for the time then being, he should hearken to his voice that cannot lie. Thus Iamos was at home in Olympia before the coming of Herakles, before the contest of Pelops and Oinomaos; he completes the assemblage of the primeval local gods, Kronion, Sosipolis, Kladeos, Iamos, Artemis Alpheiousa, Alpheios. It will be seen at once that this scheme of interpretation, hanging closely as it does on questions of topographical juxtaposition, necessitates the arrangement of Dr. Curtius; it will be seen also what a lively and beautifully real background of local scenery it lends to the scene of contest in the centre. Did space allow, we might also dwell on another point which Dr. Loeschke emphasises, i.e., the close parallel which the pediment, thus arranged and elucidated, presents to the west pediment of the Parthenon. For this interesting question we must commend the reader to the original pamphlet, which is the last Dorpat programme, "Ad Sollemniam Cæsarea universitatis Dorpatensis."

NOTES.

THE Social Science Association, it is understood, is about to retire from public appearances for a time, and there can be little doubt, we suppose, that this is really a preparatory move to winding up the concern. Latterly, it has been evident to those who attended its congresses that the interest in its meetings has been declining; but this is no excuse for the kind of requiem which some of the papers have been singing over it. It is undoubtedly true that your typical Social Science man was a formidable bore; but then the congresses were not solely made up of typical Social Science men. The name in itself of the Association assumes a great deal, and incites in the critical mind the question, is there a social "science" properly so-called? And it impresses on the more mercurial temperament of the artist and literary man the feeling which Mr. Matthew Arnold expressed so delightfully when he alluded to "those bold, bad men who attend Social Science Congresses." But with all this, there is no doubt, among those who know the past history of the Association and

of some of the subjects it dealt with, that it has done a great deal in calling attention to errors and neglect in such important subjects as sanitation, education, legal reform, &c.; and it is not too much to say that many of the most important improvements and advances which have been made in connexion with these and other departments of social organisation have had their initiative from the action of the

Social Science Association; and that far more public benefit is traceable to the agency of the Association than some of its light-hearted critics of to-day have the least notion of. In fact, the Social Science Association might, we think, not unreasonably claim that, if it is *de trop* now, this is because it has done its work so well in compelling public attention to evils which, when the Association was started, really required that some such organisation should be established for inciting the public mind to action.

THE report of the Inspector appointed by the Local Government Board to inquire into the sanitary condition of the hamlet of Mile End Old Town practically finds that the Mansion House Council was right in pointing out certain sanitary defects, and that the defence of the Vestry fails. As regards the first point, that a large number of houses mentioned by the Council were without proper water-closets, the Inspector finds that 367 of them were of this kind, and he adds:—"As regards the closets in the hamlet the whole must be considered water-closets, and they should be provided with a suitable water-supply and with water-supply apparatus." We take it, therefore, that the actual number of houses with no proper supply of water-closets was greater than stated by the Mansion House Council. As to the second point he says:—"I found the large number of 365 houses in which dustbins were either entirely wanting or dilapidated." The Inspector also finds there has been a request on the part of the Vestry to put in force sanitary regulations, that further action should be taken under the Artisans' Dwellings Act, and that the staff of sanitary inspectors is insufficient. Lastly, his attention was directed to a new block of artisans' dwellings on Stepney Green. Of these he says:—"I consider them as to some of the rooms quite unfit for habitation, being deficient in light and air and the necessary sanitary appliances, but they do not contravene the provisions of the Metropolitan Buildings Act." We have done no more than give the Inspector's findings. These are enough to show that some parts of London are ripe for an outbreak of cholera, that vestries are negligent, that the Building Acts require alteration, and that it is clearly useless to pull down blocks of houses and replace them by blocks of artisans' dwellings, unless the latter are properly built on recognised sanitary principles. We regret we can at present give no more prominence to this report, which shows how much energetic action is required by the Government, by Local Boards, and by the Legislature, in order to put the metropolis and our large cities into a proper sanitary condition.

AN interesting statement is given in a recent number of the *Revue Scientifique* as to the great development of tramways in the different parts of the world, especially when we consider that, as far as the Continent is concerned, the commencement of the system only dates from 1856, when the tramway from Paris to Versailles was opened, followed, in 1863, by one at Copenhagen. In proportion to its size, Holland has been the most active in this matter, possessing at the commencement of last year 625 kilomètres (1 kilomètre = about 5 furlongs), employing 712 cars and 305 mer-



chandise-wagons. The number of passengers carried in the year was 24,270,000. In Germany there are 48 towns and cities with tramways, with a total of 903 kilometres, employing 8,100 horses and 69 steam-engines. The number of passengers was 190 millions, and in Vienna 36 millions. France is rather more backward in tramway development, there being only about 700 kilometres, of which Paris contains 250, employing 5,000 horses. Italy has made great strides in this direction, possessing over 1,000 kilometres, principally in Turin, Milan, Florence, and Naples. In Florence and Milan, more especially, steam trams are in use, not so much for town work, but for the accommodation of adjoining towns and villages, to which trains run along the high road at regular intervals, for distances up to ten miles or so. Belgium possesses about 150 kilometres, of which the greater portion is found in Brussels. Russia has 600 kilometres, Spain 100, while Portugal has only one tramway, at Lisbon; Turkey one, at Constantinople; and Greece one, between Athens and the Piræus. The United States are, of course, the great home of the tramway system, without which the inhabitants of the cities of magnificent distances would come badly off for inter-communication. In 1882 North America had 5,000 kilometres, of which 800 were in New York, while South America had 1,500, principally at Buenos Ayres. In the States, however, the mileage must be very largely increased by this time, considering that the first duty on founding a city (and sometimes before) is to lay the rails for a tram-car.

FROM a passage in the *Sunderland Daily Echo*, it appears that the corporation of Sunderland, having promised the competitors for the new Municipal Buildings to appoint Mr. Waterhouse as assessor, are now disposed to back out of their promise, it being found that "this concession to a little local feeling" will cost the rate-payers 100l. The frankness of the following quotation from the correspondent of the local paper referred to is amusing, and will no doubt edify the competitors:—

"I have seen the plans, and have conversed with those who have inspected them officially, and think it just as well to proclaim the fact that the feeling in favour of one set of plans is simply unanimous, the only question of doubt in the minds of some of the gentlemen relating to the possibility of the building being carried out for the sum stipulated. Granted a guarantee on that point, and there is no necessity for paying anything like 100l. to any professional man for simply endorsing what has already been decided."

The idea that the professional assessor may not endorse the decision does not seem to occur to the candid writer. As to the "little local feeling," the *Sunderland Echo* is apparently ignorant of the fact that a great proportion of English architects have decided not to enter into competitions unless a professional adviser is employed to adjudicate. If corporations and other public bodies choose to say, "We can judge for ourselves perfectly well without professional assistance," they have, of course, the right to say so, only in that case a large number of the most able architects of the day will not compete. If things go as they seem to be going, in this case the Fuiham Vestry-hall case and others, the practical effect will be to deal a blow at the whole system of architectural competition, which, perhaps, would be a result little to be regretted. It would be interesting to know whether the author of the plans so "unanimously" admired is a Sunderland architect.

IN reference to our review of the life of the late Mr. John Dobson, in the *Builder* of April 17th, under the heading "A Fine Old English Architect," Miss Dobson, the author of the biography, writes:—"It may, perhaps, interest you to hear something more about Seaton Delaval. The first fire was about 1752; the second fire, 1820; my father's restoration, 1814, when he also added a new wing. He sent a coloured drawing to the Royal Academy in 1815 of this work, which created great interest at the time, and, no doubt, introduced the present artistic treatment of architectural perspec-

tive drawings. Until that time I believe they were treated in a different manner. After the fire of 1820 the building remained roofless. Some years ago my father added a roof and strengthened the walls. Before his final illness Lord Hastings, who succeeded Sir Jacob Astley, requested my father to make plans for the restoration of the building, which were never executed. Lord Hastings also died. No doubt the building will never be restored."

LAST year M. Tourtay carried out a series of experiments bearing on the influence of mortar joints upon the resistance of stone walls, which were described in the *Annales des Ponts et Chaussées*. He selected for trial three descriptions of stone, of which blocks and slabs were prepared, two of each being placed one upon another in the course of the trials. The spaces between were in some places not closed up, while in others liquid cement was poured into them, or they were filled with mortar (cement mortar or hydraulic lime mortar). In the tests the joints of cement mortar were  $\frac{1}{2}$  in.,  $\frac{3}{4}$  in., and  $1\frac{1}{2}$  in. in thickness, and those of hydraulic lime mortar  $\frac{3}{4}$  in. The proportion for mixing was about 10 cwt. of cement or hydraulic lime to 35 $\frac{1}{2}$  cubic feet of sand. Blocks of the mortars themselves were tested after twenty-one days hardening, with the result that cement mortar showed a resistance to pressure of 1038.3 lb. per square inch, and hydraulic lime mortar 284.46 lb. per square inch. The resistance to pressure of the stone varied, according to its description, from 5689.2 lb. to 12801 lb. per square inch, and that of the masonry was found to be from 1422.3 lb. to 4266.9 lb. less per square inch. At a pressure of 1991.2 lb. to 4266.9 lb. per square inch, the mortar at the edges of the joints began to exfoliate and fall out, and this occurred sooner in proportion to the thickness of the joints. The blocks which had been united by pure cement (without any filling of mortar), preserved their condition as if they had been made of one piece. The following general principles are deduced by M. Tourtay from his experiments, but would doubtless require further investigation and testing before they could be accepted as final:—1. The destruction of mortar takes place in masonry at a much higher pressure than in blocks of the mortar itself, but at a lower pressure than in the case of the stone separately. 2. The pressure which causes the destruction of the mortar is in an inverse ratio to its thickness, so that (under conditions otherwise equal) it is advisable to make joints of mortar as thin as may be consistent with proper execution of the work. 3. Trial blocks, simply placed on each other, and without any filling of the spaces between, gave results as to resistance to pressure which were inferior to those of the separate stones, but superior to those of the slabs joined by mortar. 4. The trial blocks, between which a thin layer of pure cement had been placed, maintained their efficiency like complete blocks, and gave results far superior to those obtained in cases where mortar had been used. Although the strength of cement mortar was found, on separate testing, to be more than three times that of hydraulic lime mortar, there was no important difference found in the trials of masonry constructed with the two kinds of mortar. Attention is finally called to the necessity of the horizontal joints being very exactly worked, in order to render them suitable for the mode of construction referred to above in paragraphs 3 and 4.

IN regard to foreign water supplies, it may be noted that the City of Rome is supplied by 204,000,000 litres of water every twenty-four hours (1 litre =  $1\frac{1}{2}$  pint), drawn from the following sources:—

	Litres.
Vergine or Trevi .....	80,000,000
Felice .....	24,000,000
Paola .....	40,000,000
Marcia .....	60,000,000
	204,000,000

The population of Rome being 345,036, the supply of water to each inhabitant per day is 591 litres.\* Paris, which contains 2,240,124

\* A litre is  $\frac{1}{6}$  of a gallon.

inhabitants, only gives 58 litres per head for drinking purposes and 169 for domestic and other requirements, or a total of 227 litres. Berlin, with a population of 1,302,283, supplies 140 litres per head daily. Vienna, with 770,014 souls, gives 100 litres. Naples gives 200 litres to its 463,172 inhabitants, and Turin 98 litres to a population of 278,598. It will, therefore, be seen that if immunity from epidemic diseases depends upon the supply of water, the Italian capital ought to be the most healthy city in the world.

ON the site of the ancient Mantinea a colossal statue has been excavated, representing a discus-thrower. The statue is about to be taken to the Central Museum at Athens. Material and style are as yet unreported. We can scarcely venture to hope that it may be a bronze, and thus furnish us with some accurate notion of the style of the great discus-thrower of Myron.

THE *Berliner Philologische Wochenschrift* reports that Dr. Dörpfeld has undertaken (on behalf of the German Archaeological Institute at Athens) to superintend the excavation of the ancient Doric temple at Corinth. So far the remains discovered have been scanty, but enough has been laid bare to make out the ground-plan of the building, one door, and the pedestal of a statue within the walls. Dr. Dörpfeld thinks that the building is an instance of the not uncommon custom among the Greeks of a joint temple, dedicated to two gods at the same time.

A NEW 48-in. main has been laid from the Pultah waterworks to Calcutta, which will supply that city with 12,000,000 gallons a day by gravitation alone. The *Pioneer*, an Indian newspaper, says:—"Tenders were invited for the work, but they were so high that Mr. Kimber, Engineer to the Corporation, resolved to frame estimates of his own, and the iron pipes having been contracted for in England, he was allowed to do the work. The result is that the pipes have been laid at an expense less by five lakhs than the lowest tender sent in for the work; and, moreover, the total cost is  $1\frac{1}{2}$  lakh less than Mr. Kimber originally estimated. This great saving has been due to careful management, and to some good fortune in the way of the physical difficulties of the ground being less than were anticipated. Mr. Kimber and his staff have well earned the gratitude of the Corporation, and of the ratepayers too; for the latter have to pay for works of this kind, and with heavy loans for other purposes having to be contracted, every lakh saved means so much less taxation. The five lakhs saved represent a sum more than sufficient to pay for the new pumping-engines, and the buildings to contain them, at Pultah."

THE series of articles in progress in the *Art Journal* on "The Revival of Decorative Needlework" and on "Suggestions in Decorative Design from the Works of Great Painters," are well worth the attention of architects and decorative designers. Among the illustrations to the former are four beautiful designs by Mr. Burne Jones for outline embroidery, emblematical of the four seasons. The second-named article is illustrated by engravings from portions of architectural designs from several pictures in the National Gallery, following out, in another branch of decoration, the ideas embodied in Mr. Sydney Vacher's fine work on suggestions for textile fabrics from the same source, which we recently reviewed.

THE "Society of British Artists" exhibition has more of variety and originality than usual, though this arises chiefly from the presence of some of the more eccentric elements in modern art. The most noteworthy work is a life-size figure study by Mr. Whistler, "Harmony in Blue and Gold" (296), which would send Mr. Horsley and the British Matron into hysterics, being a damsel leaning against the rail of a pier with a Japanese parasol over her head, but otherwise only transparent film of gauze in the way of clothing.



the weight of the body is thrown on one leg, the other foot crossed over it; and the leg which carries the weight of the body is, as a bit of expression of antinatural construction and action, like the Princess Katishka's left shoulder-blade, "worth going miles to see," and shows what a master of the figure Mr. Whistler is when he takes it into his head to let people know it. Among the works of the rebellious school is Mr. Stott's "Kissing Ring" (341), some very sad ghosts of children in the midst of a still sadder expanse of shore; a picture which is a piece of pure affectation, only saved by being not altogether commonplace. Affectation reaches its climax in "A Portrait Sketch" (104), by Mr. Munn, where the lady's hand and arm die away into a mist. We remember critics laughing a few years ago at one of Smirke's pictures at a loan exhibition at Burlington House,—"Nutting," with figures which Punch called "Ghosts at Play"; this was the kind of thing, we were told, from which Pre-Raphaelitism delivered us; and now here are the new reformers in painting coming round to the very same thing again, and thus the whirligig of Time brings in his revenges. There are some very pleasant pictures scattered up and down the rooms,—chiefly small works in landscape and "seascape." Mr. Fraser's "Fishing Boat passing Southend Pier" (464) is disappointing; it has his usual swing and movement of the sea, but is too muddy and opaque,—not without power of a kind, though.

WE have received the first number of a professional journal to be issued at Calcutta, under the title of the *Indian Engineer*. It appears likely to give a great deal of useful information as to what is doing in engineering work in India. The illustrations are not executed with anything like the finish we are accustomed to in English engineering papers, but there may be difficulties we do not know of in the way of procuring well-executed locks in India.

CONCERNING Mr. Whistler's Exhibition of "Notes—Harmonies—Nocturnes" at Messrs. Dowdeswell's Gallery we must speak next week, being only able to testify from our own knowledge that on the afternoon of the private view day (Thursday) there was such a rowd that to penetrate through the narrow front shop to the harmonious sanctum was impossible, except for those who had unlimited time at their disposal. The catalogue shows that there are seventy-five "Notes" and "Nocturnes" and "Arrangements," and other artistic evolutions to be seen; but whether they are worth the rush that was made to see them is a matter whereon we suspend judgment.

#### LETTER FROM PARIS.

The preparation for the Exhibition of 1889 already awaits the vote of the Senate to pass into a stage of active execution so long waited for. The Chamber of Deputies has approved, by 10 votes against 131, the agreement entered into between the State, the Prefecture of the Seine, and the Guarantee Association represented by M. Christophle, Governor of the Crédit Foncier. Unfortunately, the vote of the Chamber is not definitive; the Senate must ratify it. Parliament is adjourned to the 29th of May, and we have only three years to prepare for this gigantic work. The decision of the Chamber gives a practical character to the project by M. Georges Berger at the Société Nationale des Architectes this week on the exhibition.

A word about the necessary complement of the Exhibition,—the Metropolitan Railway. The Government, in regard to this matter, is in conflict with the representatives of the Municipal Administration, who wish to take it up as a matter affecting local interests, while the Government considers it a matter of general interests. It is a dispute of words only, for the Municipality must undoubtedly have a financial participation in the matter, and undertake some indispensable road works. The question thus presented may lead to further delay, for the Municipality is very jealous of its prerogatives, and will refuse to accept subsidies; but a solu-

tion of it becomes every day more imperative. The project of the Government seems very well conceived, and such as to conciliate the interests of all quarters of Paris. It includes four distinct lines, an inner circle running to 20 kilometres of line, partly on a viaduct, partly in tunnel, and partly in open cuttings, and three cross lines. The first of these is from the Gare St. Lazare to the Gare du Nord; the second from the Square Drouot to the Avenue Daumesnil; the third from the Place du Strasbourg to the Place Denfert Rochereau. These lines, which form one system, will have sixty-four stations at a distance of about 500 metres apart. Except in minor details, the project does not differ much from that which M. Haag, as mentioned in our last letter, has already traced out.

The military mind, formerly so adverse to the suppression of the fortifications, has at last accepted the decision for the demolition of the fortified enclosures between the Seine and the Porte de Romainville. According to the project submitted to the Municipal Council, and which will certainly be approved, the bastions will be replaced by a mere sunk fence between two large boulevards, which will mark also the limit for levelling the *cotéris* rates. It is estimated that it will take three years to carry out the change, and to establish, with the results of the sale of the lands of the "Zona Militaire," new forts around the circumference.

The Ministry of War, which in this matter has shown itself very favourable to the true interests of Paris, deserves besides the recognition of artists, for it is credited with the intention of having some important paintings executed; first, to adorn the *salons* of the Minister of War with the portraits of all his predecessors up to our own day; and, secondly, to decorate the various barracks with mural paintings recalling the great military deeds of the French army.\* A peevish criticism might question the utility of this latter intention, which reminds one of the disagreeable frescoes with which Benedict Masson decorated the court of the Hôtel des Invalides. But, as we have hitherto had no instance of a Ministry of War playing the Mæcenæ, while giving the news with a certain spice of incredulity, we offer up our devout prayers that General Boulanger may indeed give this pasturage to hungry artists looking for the official commissions which are now becoming less and less frequent.

On the eve of the *Salon* artistic news is scarce; artists are reposeing after their toils, and what there is going on may be briefly told. The competitors for the Prix de Rome, in the first place, are entering on their course of work. Here are the names of the ten young painters admitted by the Académie des Beaux Arts, and of whom six are from the atelier of M. Cabanel:—MM. Lavalley, Danger, Tollet, Letaille, Bourgonnier, Millocheau, Charpentier, Verdier, Sinibaldi, and Cabane. The ten sculptors are MM. Denan, Capellaro, Charpentier, Laroche, Ganquière, Gasq, Convert, Verlet, Desvergne, and Chavallard.

Speaking of the Académie we may mention that the architectural prize founded by Duc has been adjudged this year to M. Chancel, and that the subject was "a hall for lectures and public meetings."

The exhibition of the works of Baudry, opened at the École des Beaux Arts since the commencement of the month, fulfils all that it promised, and draws daily a large concourse of visitors. It is truly a remarkable collection, and we regret we have not space to pass in review this assemblage of works for the most part of so fine and original a character and so powerful and masterly in execution. M. Leneveu has, we may observe, the commission to execute the work at the Panthéon which the State has entrusted to Baudry, and which still remains unaccomplished.

The equestrian statue of Etienne Marcel, which was the subject some years ago of a public competition, has, during the last few days, been placed in the garden of the Hôtel de Paris, on the Quai de Gèvres. The work has been completed by M. Marqueste, who received the second premium, the death of the original artist having prevented his carrying out his design. The statue, cast in bronze at the foundry of MM. Thiébaud Frères, is a work of fine character and conception, and sufficiently decorative in style. But the pedestal erected

\* When would the English Government think of appealing to the chivalrous sentiment of Tommy Atkins in such a manner?—Ed.

from the designs of the late M. Ballu is far from lending itself to the exterior decoration of a municipal palace. It is indispensable that the Service des Beaux-Arts should have it modified and brought into scale, so as not to break the outline of the building and the general harmony of its architecture.

The second exhibition which the Pastellistes are opening this month in the Georges Petit Gallery, is a kind of preface to the *Salon*. The public find there the works of some of their favourite artists, and the success of this little exhibition increases every year, the rather since pastel is a very charming form of art, which declines grave and serious subjects, and confines itself to coquettish and *spirituelles* compositions, fugitive impressions rendered without labour, pretty portraits in the glitter of variously-coloured robes. The new exhibition presents a collection very agreeable to look at, and from which it would be difficult to select any work as deserving of higher praise than the rest. We may mention, as equally worthy of note, the exhibits of MM. Gervex, Guillaume, Emile Levy, Brune, Dues, Jacquet; and, with certain reserves, M. Besnard, whose real talent runs a little wild sometimes into a rather over-acted "impressionism."

In this interval of artistic quietude, Parisian painters will rejoice at the news that the Department of the Seine is about to put up to competition the work of decorating the new Mairie of Pantin, a pretty good building from the designs of M. Guelorget. This decoration (of which a portion will be given to the artists obtaining the second and third premiums) will include three great rooms and the ceiling of the grand staircase. The competition will be decided next November.

As the *Salon* will have opened its doors by the time these lines appear, it may be of interest to give now the names of the jury of architecture for this year, which includes MM. Bailly, Charles Garnier, Vandremere, Questel, Emile André, Diet, Pascal, Hénard, Daumet, Raulin, and Sédille, with MM. Normand, Rosswildwald, Gmain, Mayeux, and Deslinières, as "jurés suppléants."

We have to note, in conclusion, the death of M. Emile Laisné, architect, a modest and conscientious artist, who was a pupil of Blouet and of M. Questel. M. Bailly made him his collaborateur in the construction of the Mairie of the Fourth Arrondissement and in that of the Tribunal de Commerce. He held an official position under the Municipality as a director in the third section of architectural work, and leaves behind him unanimous regrets at the Administration and among his colleagues.

#### ROYAL INSTITUTE OF BRITISH ARCHITECTS.

##### ANNUAL REPORT OF THE COUNCIL.

The annual Report of the Council of the Institute, to be presented at the annual meeting on Monday next, and to which we briefly referred last week, contains the following paragraphs:—

"The proceedings of the past twelve months have possessed a more varied and important character than those of several previous years, and the Council believe that the Institute may congratulate itself upon the progress made in many matters which affect the profession of architecture quite as much as the corporate body of British Architects; though, at the same time, the official year has been marked by irreparable losses. A slight decrease, which is probably only temporary, in the total number of subscribing members, consequent upon the establishment of an educational test for admission to the class of Associates, was anticipated at the outset of the Obligatory Examination.

Five years ago (October, 1881) there were about 480 Associates; in October, 1885, there were more than 690 Associates; and at present (April, 1886) the number of Associates is 673. The number of Fellows has steadily increased from 370 in 1881, to 404 in 1885, and they are now 416. During the year 17 Associates have become Fellows; 27 new professional members have been elected, namely, 9 Fellows and 18 Associates; and 31 gentlemen who have passed the two recent Examinations in Architecture are eligible to become candidates for the Association.

The Hon. Associates elected during the year are Mr. Frank Holl, B.A.; Colonel Kingscote, a Commissioner of Her Majesty's Woods and Forests and Land Revenues; and Mr. William



Westgarth, well known in connexion with proposals for the amelioration of the poorer quarters of the metropolis. Eight foreign architects have been elected Hon. Corr. Members, two of them, MM. André and Daumet, being members of the Institut de France; and two being eminent Americans, Mr. H. Richardson, of Brookline, Mass.; with Signor Boni, of Venice; Professor Fenger, of Copenhagen; M. Hermant, of Paris; and Herr Ihne, of Berlin.

The losses by death among the Fellows are:—Professor Donaldson, the founder of the Institute, and his friend, George Alexander; James Fergusson, the historian of architecture; J. H. Good and Sancton Wood, two of the oldest members; Thomas Goodchild, of Teddington; and F. W. Ordish, of Queniborough. Among the Associates:—George Borer, Henry C. Harris, E. E. Hollis, and A. T. Ellison, the last-named only recently elected, after passing the Examination in 1885. An Hon. Fellow, Edward Akroyd, is also deceased; and the decease of five Hon. Associates has to be recorded, namely, the Duke of Abercorn, the Lord Houghton, Henry Simmonds, the Rev. Benjamin Webb, and Sir Watkin Williams Wynn. Three Hon. Corresponding Members have died during the official year, one a distinguished archaeologist of Athens, Lysandros Kastanioglou, a friend and contemporary of Professor Donaldson; another, Théodore Ballu, Member of the Institut de France, architect of the Church of the Trinity in Paris, and of other well-known works; and the third, Professor von Dehn Rottfeler, of Berlin, and formerly of Cassel.

The death of Professor Donaldson,—the sole survivor of fourteen architects who met on the 13th of May, 1834, at 14, Regent-street, and passed a resolution that it was desirable to form an institution for the promotion of architecture,—occurred on the 1st of August, 1885, at a time when most of the members were out of town. The Institute, nevertheless, was represented at the funeral by the President, several members of the Council, and a large gathering of Fellows, Associates, and Hon. Associates. A letter of condolence with the family of the deceased was addressed by the President to Mr. T. Olinthus Donaldson, the eldest son, and at the opening meeting of the current session the Hon. Secretary took the opportunity of expressing a deep sense of the loss sustained by the Institute through the death of the venerable Professor, and of sympathy with his family in their bereavement. One of the ordinary meetings was afterwards devoted to the reading of two memoirs relating respectively to Donaldson's professional career and to his connexion with the Institute.

The death of Mr. James Fergusson took place on the 9th of January, 1886, and on the day of the funeral, the President, with Mr. Waterhouse, R.A., Mr. Penrose, M.A., Mr. Hansard, the Secretaries, and other members of the Institute, attended to pay a last tribute of respect to the deceased architect and scholar.

[The revenue accounts and balance-sheets, divided into ordinary and trust funds, of the receipts and disbursements for the year ended the 31st of December, 1885, audited by Mr. Baillister Fletcher, M.P., and Mr. G. H. Blagrove, are submitted with the report, together with the estimate of income and expenditure for the current year. The estimated income for the present year is 3,650l.]

"Since the issue of the last Report two Examinations in Architecture have been held, to which forty-one applicants were admitted. The first was held last February at Leeds, under the charge of the Leeds and Yorkshire Architectural Society. Of the eight gentlemen examined, six have passed, and the remaining two were relegated to their studies, with the privilege of again presenting themselves without fee. The Questions set for this Examination were prepared by members of the London Board of Examiners, and the Chairman of the Board, Mr. Arthur Cates, who attended at Leeds during the whole week, presided at the Oral Examination. The candidates' answers to the several papers of Questions were distributed among Examiners (all members of the Institute) appointed by the Council of the Leeds and Yorkshire Society, namely, Mr. J. Wreghitt Connon, President of the Society, Messrs. E. Birchall, C. B. Chorley, J. B. Fraser, and W. H. Thorp, who ultimately reported to the London Board. For the Examination held in London all but one of the thirty-three gentle-

men admitted by the Board presented themselves. The Examiners who set the Questions and assigned the marks to the several candidates were Messrs. George Aitchison, E. A. Gruning, E. C. Lee, E. C. Robins, John Slater, Ernest Turner, and Aston Webb. The Moderators who superintended the written and graphic portions of the Examination, and two of whom were always present, were seven in number, namely, Mr. Walter L. Spiers, with Messrs. A. W. Anderson, F. R. Farrow, F. Hooper, H. Lovegrove, C. J. Tait, and E. P. Warren; and their report was of a satisfactory nature. The Oral Examination, which lasted three days, was conducted by the Board of Examiners, who reported that twenty-five of the thirty-two candidates had passed, and only one had not passed, while six were relegated to their studies for one year. No recommendation for the award of the Ashpitel Prize, which is given to the candidate who most distinguishes himself in the Examinations held during one year, has yet been made, seeing that another Examination is to be held in November next.

A pamphlet containing the regulations and programme of these Examinations, with a Memorandum of Advice to Candidates, published last October, was widely distributed throughout the country. The first edition being exhausted, a second, to be shortly issued, will include the Papers of Questions set at the recent Examination held in London, the Council having adopted the recommendation of the Board of Examiners to publish such Questions.

During the twelve months elapsed from April 1st, 1885, to March 31st of the present year, the number of volumes presented to the Library was seventy-four and to the Loan Collection six, exclusive of periodicals, reports and transactions of societies, and parts of works issued in a serial form.

A handsome bequest of the late Mr. Fergusson, of all the architectural works in his library not being duplicates of those already belonging to the Institute, will bring in a sudden addition of perhaps 150 volumes, and occupy all the available space in the present bookcases.

The works purchased comprise ninety-nine volumes and one pamphlet for the Library, and five volumes for the Loan Collection, together with several Parliamentary papers.

The attendance of readers in the Library is given in a tabular form. The day attendances show an increase of over 15 per cent., but the evening attendances a falling-off of 5 per cent., as compared with those of last year. Last year's figures were, however, from whatever cause arising, exceptionally high; and that the numbers are by no means lower than might be reasonably expected is evidenced by the fact that they show an increase of nearly 46 per cent. for day and nearly 33 per cent. for evening attendances over those of 1884.

The resolution passed at the opening meeting of the present session, authorising the Council to take certain steps in the matter of the site for the proposed Admiralty and War Offices, and to memorialise the Government in the name of the Institute, should they think fit so to do, was acted on at once, but, owing to the election of a new House of Commons, and the subsequent change of Ministry, the memorial was not presented to the First Commissioner of Works until the 1st March, 1886, when a considerable number of members of all classes of the Institute waited on the Earl of Morley, who courteously received their views on the subject of the memorial. The Council therein referred to the fact that as far back as June, 1882, they had submitted a suggestion for the proposed offices, and that their further suggestion comprised a scheme embodying (1) The widening of Whitehall by the removal of the whole of the buildings between the Horse Guards and Charing Cross; and (2) The opening-up of the Mall to Charing Cross; and the memorial laid stress upon the desirability of effecting these two improvements. A block plan of the Institute scheme, and a lithographed copy of the official scheme, were presented with the memorial, which was afterwards circulated to members of both Houses of Parliament and others.

The resolution agreed to at a business meeting held in March, 1885, with reference to the present condition of the *disjecta membra* of the colonnade of old Burlington House, now lying exposed on the Battersea bank of the Thames, was duly taken into consideration, and it was found that the matter had almost at the

very same time formed the subject of a question in the House of Commons, when it was stated on the part of the Government that no use had yet been discovered for the colonnade, and no site for its re-erection had been even suggested. The representations ordered at the same business meeting to be made to the proper authorities on the subject of the old water-gate, known as York Stairs, and of Temple Bar, the stones of which had been carefully numbered for the purpose of its re-erection, were addressed to the Metropolitan Board of Works and to the Corporation of London, and the answers received were published in the Journal of Proceedings on the 13th August, 1885.

Two special general meetings have been held to consider the draft of a new Charter, for the grant of which it is proposed in due course to humbly petition Her Majesty the Queen. The proposal was made at the beginning of Mr. Christian's presidency, and the appointment of a special committee, to take into consideration the practicability of a modification of the Charter, or the grant of a new Charter, was announced at a meeting of the Institute held on the 19th of May, 1884. The committee recommended that a new Charter, reciting the objects and maintaining the date and prestige of the original Charter, should be applied for and a draft, submitted to the Institute on the 30th of November, 1885, was considered. This draft was then referred to a larger special committee composed of the Council and nine representative members of all classes, with instructions to report to another general meeting. This committee's report, together with an amended draft, was issued on the 25th of February, 1886, and considered by the Institute on the 5th and 6th of April, 1886, when the draft was further amended and, after two sittings of more than nine hours in all, was adopted, with certain reservations, which were intrusted to the care of the Council.

The report of a special committee appointed to consider the subject of Departmental Academies suggested by Professor Kerr was submitted at the business meeting of the 29th of March, 1886, when a scheme was adopted for the establishment of four standing committees, for Architecture, Science, Literature, and Practice, to be elected at each annual meeting, whereby it is hoped that a large number of members may become increasingly interested in the work of the Institute.

The presentation of the Royal Gold Medal to Dr. Schiömann was made at the closing meeting of last session in the presence of a large assembly of members and their guests. The recent election of Monsieur Charles Garnier, the architect of the Opera House, Paris, a Royal Gold Medallist, has been graciously sanctioned by Her Majesty the Queen, and a letter has been received from Monsieur Garnier stating that he hopes to attend the meetings of the Institute at which the medal is formally presented.

The Metropolitan Board of Works having, in accordance with the provisions of the 11th Section of the Metropolis Management and Building Acts Amendment Act, 1878, given notice to the Institute that the Board proposed to apply to the Secretary of State for the Home Department to confirm certain new by-laws relating to the description and quality of concrete walls, and having forwarded a copy of the proposed by-laws, the Council appointed a special committee, consisting of Messrs. A. J. Blomfield, Charles Fowler, John Slater, and Roger Smith, with Mr. Alex. Payne, as secretary, to consider the same; and their report having been adopted was in due course sent to the Metropolitan Board.

The Competitions Committee have diligently proceeded with their work, and are now engaged, with the assistance of the librarian, preparing statistics of competitions held during the last four years, with a view of ascertaining what amount of success has attended their efforts to procure the appointment of a professional assessor. The committee will report on this, and on other matters of interest connected with competitions, as soon as possible.

The expressions of confidence in the Institute recently received from the various architectural bodies established in this country and in colonies, have been of a most gratifying character, more particularly those embodied in resolutions which have been passed by the Liverpool Society, the Nottingham Association, the Manchester Association, the Auckland (New Zealand) Institute, the Sydney (New So





Design for a Silk Brocade.

Vales) Institute, and others, and forwarded to the Council. An intimation, almost generally expressed, that efforts should be made to strengthen still further the excellent relations already existing between such local bodies and the Institute, has led to the appointment of a special committee, consisting of Fellows and associates, and representatives, being members of the Institute, of the provincial societies, to enquire into the question of Federation. The consideration of the best means of furthering professional education, with particular reference to the Examination in Architecture, has been entrusted to another special committee, consisting of members of Council and members of the Committee of the Architectural Association, and others. The question of facilitating the admission of members of the Institute and of architectural students into public edifices, both at home and abroad, for the purposes of study, has engaged the attention of a committee of the Council, and a report has been received on the desirability of furnishing a form of credential testifying to the character of its bearers and to the objects in view, such forms to be in French, German, and Italian, as well as English, and to bear the insignia of the Institute."

**Fulham.**—The first stone of the Waste Land and Lygon Almshouses, Fulham Palace-road, was laid by the Lord Bishop of London on the 1st inst. They contain accommodation for eight couples and six single persons, and there is a large room for divine service and governors' meetings. The buildings are of brick, with one dressing, and the style is Tudor. Messrs. Simpson & Co. are the builders, the amount of the contract is 2,650*l.*, and the architect is R. J. G. Hall, of West Kensington.

## DESIGN FOR A SILK BROCADE.

This design is an adaptation of a Sicilian pattern of the fourteenth century, on a small and much-decayed fragment in the South Kensington Museum. It has been woven in four colours, viz., cream, two reds, and a green, and has been registered by Messrs. Hilditch, of Cheapside, to whom it belongs. They have brought it out to supply some of their customers who have become tired of the patterns of this character at present in the market.

The grandest of their present patterns was taken from the dress of one of the figures on the Southwold Screen (St. Peter's, I think), and was brought out many years ago.

This kind of brocade is chiefly used for altarcloths and vestments, but it is quite as adaptable for secular purposes.

SIDNEY VACHER.

ARCHITECTURAL ASSOCIATION:  
ITALY EXCURSION.

A MEMBER of the party has forwarded us the following brief notes *en route* of their impressions of buildings visited:—

"The Italian excursion of the Architectural Association started on Friday, the 16th inst., from Charing Cross at 10.35, the total number of members joining being twenty-four.

The first journey was made to Milan via Calais, Laon, Terquin, through the St. Gothard Tunnel, Chiasso, arriving in Milan at 7.41 on the Saturday night. In Milan the buildings visited were,—first, the cathedral; the completion of the central lantern is still being proceeded with" [the proposed alteration of the Renaissance work in the west front is, as our

readers know, to be the subject of an important architectural competition]; "next, the churches of Sta. Maria delle Grazie, an interesting church, built externally with red brick and terra cotta; St. Ambrogio, a twelfth-century church, with open atrium at the west end, with very fine bronze doors in the west end; St. Lorenzo, built on the site of the old church in Milan in the sixteenth century,—the plan of this church is octagonal, with four apses on the principal sides in two stories: the dome, being a regular octagon, does not fit very well, but the general effect is good; St. Eustorgio, an uninteresting church in itself, but with a chapel at the back of the choir, with some good fifteenth-century detail, which also contains a splendid fourteenth-century tomb; the Ospedale Maggiore, a fifteenth-century building, with splendid terra-cotta detail, certainly one of the most remarkable buildings we visited in Milan; the old Piazza del Mercanti, in the centre of which is an old thirteenth-century brick building, formerly the Palazzo della Ragione. The buildings surrounding this are of fourteenth and seventeenth century date. The tower and apse of the Romanesque Church of St. Gosardo were carefully studied, but the building can only be well seen from the roof of the cathedral. From Milan an excursion was made to the Certosa, near Pavia, reputed to be the most richly furnished church in Italy. The monastery has been closed some five years and the remaining monks removed to Bologna, the Government having taken over the building as a national monument. The buildings are most carefully preserved, and access is given to every part. The principal façade of the church is fifteenth-century work of the most elaborate kind, the whole of the work being executed in marble; the other parts of the exterior are principally red brick and terra-cotta. The interior is completely covered with fresco, the fourteen chapels being complete museums of works of art, marble inlays, bronzes, frescoes, and pictures. The two cloisters have colonnades with marble shafts and terra-cotta arches; round the larger of the two are the twenty-four houses containing three rooms each, viz., dining-room and work-room on the ground floor and bedroom and dressing-room on the upper floor; each room has a small garden.

The most striking modern building in Milan is the Galleria Vittorio Emanuele, the archway opening into the Piazza del Duomo being a very dignified piece of work.

On Monday the Association went to Piacenza. The Palazzo del Comune is a handsome building, in brick and marble, of the thirteenth century, with an open arcade with pointed arches. The cathedral is Romanesque, of the twelfth century, with a very dignified western porch. The original cathedral, now the Church of St. Antonio, contains some interesting work of the tenth and eleventh centuries. The next town visited was Bologna. The principal church, dedicated to St. Petronio, and built in the fourteenth century, is an example of the ambitious designs of that period in Italy which have failed to be carried to completion. It is said to have been commenced as a rival to the cathedral at Florence, the width of the nave being 66 ft., the extended length being 750 ft., but only 384 ft. of this has been built. In the "Reverenda Fabbrica" of the church is an interesting collection of models and drawings for the completion of the building by Palladio, Giulio Romano, and Vignola. The church, though generally bare of ornament and void of interest, contains in one of the chapels an interesting early fresco, and on the pavement a meridian line, which showed that the church was not orientated truly. The Church of Sta. Maria Maggiore is an uninteresting Renaissance example, with some quaint canopied tombs built in the open square outside the church. The Church of St. Domenico contains little of interest beyond the tomb of St. Dominic, a Renaissance monument of the fifteenth century. The most interesting church in Bologna is undoubtedly the Church of St. Stefano, which is the name given to a group of seven churches. The first, on a level with the street, dedicated to St. Stefano, is a seventeenth-century church of no interest; the second, at a slightly lower level, built in the eleventh century on a very irregular plan, is dedicated to St. Sepolino; the third, the most interesting of all, is the well-known twelfth-century circular church with the tomb of St. Petronius, built in imitation of the Holy Sepulchre, the altar being built over the tomb; the fourth church, now being restored, of



SS. Pietro and Paolo, contains some interesting Classic columns and pilasters and a tomb of St. Vitale dated 382; the other churches are of little architectural interest. Adjoining the churches is a two-storied cloister of the tenth and thirteenth centuries. The interior of the Church of St. Petronius has some interesting ornamental brickwork. The Church of St. Alessandro is a Renaissance church effectively decorated in grey and gold. The numerous arcades, the peculiar feature of Bologna, afforded an unlimited field for the study of Romanesque carving.

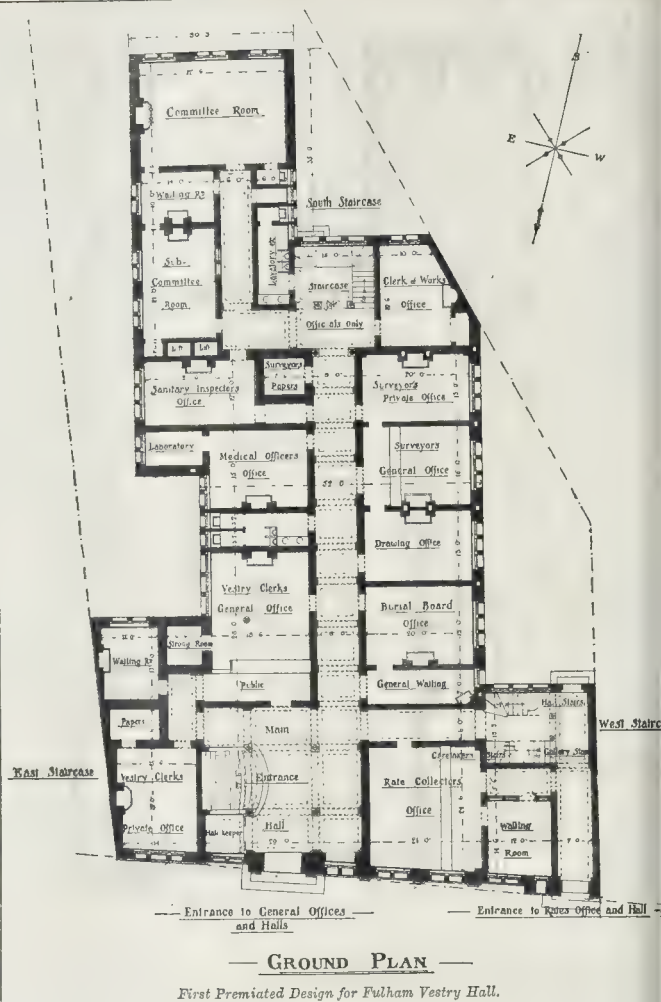
Florence was reached on the 21st, and a stay of four days gave a better opportunity of study than had hitherto been enjoyed. The first building visited was Santa Croce, which contains some monuments of great interest.\* The next building was the Duomo, the western façade of which has just been completed under the direction of Sig. Del. Moro, from the designs of the late Signor de Fabris, and is to be uncovered in about six months' time. The churches of Sta. Maria Novella, St. Lorenzo, St. Michele, St. Spirito, St. Mariato, and St. Annunziata, the Medici Chapel, the Baptistery, the Bigallo, the Bargello, the Palazzo Vecchio, and the galleries of the Belle Arti Uffizi and Pitti, the Palazzo Ricardi, Strozzi, Gondi, and Pandolfini, were all visited and carefully studied. Excursions were made to Fiesole and the Certosa, and on Monday morning at 5:55 a.m. the train was taken for Siena."

#### TENDERING AT SWANSEA.

At the last monthly meeting of the Swansea Town Council, reported in the *Cambrian*, the Water and Sewers Committee presented a report stating that they had received a letter from Messrs. Baldry & Yerburch to the effect that in making up their tender,—which was accepted at the previous meeting of the Council,—for sewerage works they had calculated that the bricks could be made from the same clay as that which will be used in the puddle trench, and that if the Committee insisted upon having a Staffordshire brick, a sum of 3,000l. must be added to their tender, making it 68,835l. instead of 65,835l., but that if a satisfactory brick could be made from the local clay, they were prepared to carry out the work for the lesser sum. Mr. Yerburch attended, and discussed the subject with the Committee, when the following arrangement was made:—That whatever sum be paid by the Corporation, calculated at 24s. per cubic yard, extra for brickwork up to 3,000l., the same is to be allowed by the contractors out of the price for any pugging of clay that may be required, calculated at a reduction in price of 2s. per cube yard up to the extra price paid brickwork, viz., to 3,000l.

Mr. Trew, Chairman of the Committee, in moving the adoption of the report, said he very much regretted to find that the firm whose tender had been accepted for the construction of the Upper Lliw reservoir had found some discrepancy in their tender. He believed this arose from the persistency with which some members of the Council had insisted that the amounts of the whole of the tenders should be read out at the last meeting of the Council. He had thought that was a most unwise course to pursue. The Council ought to have confidence in the committee in such matters as these, and that all the tenders should not be publicly reported. He said this because the next day after the amounts of the other tenders had been made public they received a note from the firm whose tender they had accepted, saying they had made a mistake with respect to the quality of the bricks required, and that if Staffordshire bricks were required the Council must give them 3,000l. more, bringing up their tender to within about a 1,000l. under that of the next tender. He believed if they had not read out the amounts of the other tenders (if they had only kept their own counsel) they would not have heard anything of this 3,000l. extra. The firm alleged that they had tendered on the understanding that the bricks which would be required could be made out of the clay found on the spot, and not Staffordshire bricks; and that if Staffordshire bricks were insisted upon, then they must have 3,000l. added to their contract price. They had taken care even then to come as near to the next tender as they safely could, and yet secure the contract. They had

\* We believe it does!—Ed.



thus succeeded, but as a set-off they had agreed to a rebatement of 2s. 6d. per yard on as much "pugging" as would not be required out of the quantity stated; so that although the firm had taken an advantage in one respect they had given it in another way, and the committee knowing that they were a firm in every respect most competent to carry out the works in a most satisfactory manner, now recommended that the contract be accepted.

Mr. Alderman Daniel seconded the resolution adopting the report of the committee.

Mr. Freeman inquired what was the price which the other parties who tendered required for the "pugging."

The Mayor put it to the meeting whether these details should be read out and made public or not, but not a single hand was held up in favour of the tenders being read.

Mr. Freeman said this to him was most unsatisfactory. He contended that when tenders were once before the committee, they became public property. He could not help expressing his surprise at the high tone of morality now taken by some members of the Council. Simply because of a clerical error which had been made by the firm whose tenders they accepted, they now wanted to cheat them out of this 3,000l.

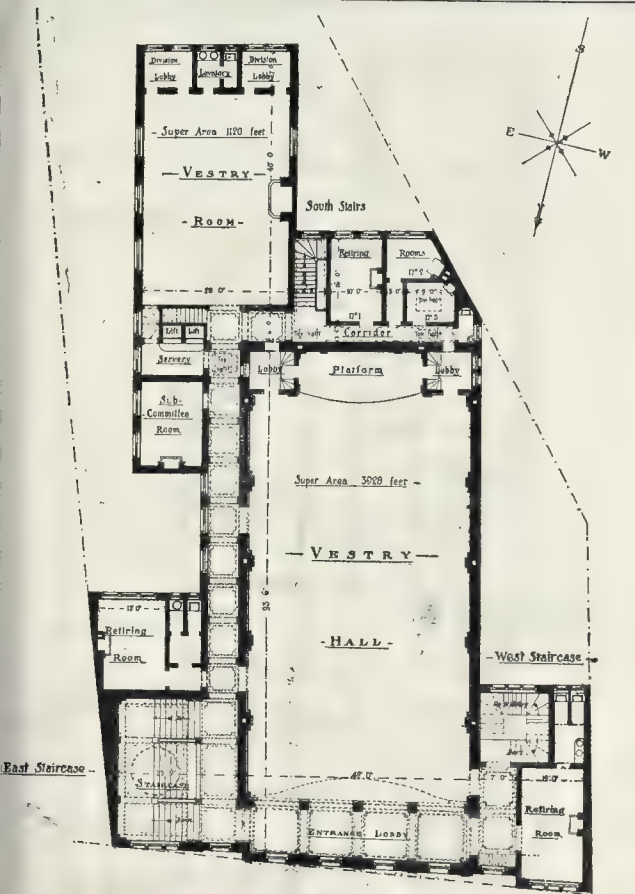
The Mayor said such was not the case. Every contractor tendering for the work was shown a brick, and it was distinctly said to each of them, "That is the brick we require"; and yet, after their tender had been accepted, they wrote down to say, "We tendered for a brick

made of the local clay,"—a name of a Staffordshire firm being on the brick shown them. In reply to a question from Dr. Rawlings, the Surveyor said that the word "Staffordshire" was not on the brick which was shown the first time.

The Mayor said that the firm whose tender had been accepted had taken three various samples of the clay found in the locality of the Lliw, and if they found that they could manufacture therefrom a sufficiently good brick for the purposes of the work, they would then save the additional 3,000l.; but if the Council insisted on Staffordshire bricks, then they would have to give them 24s. a yard more for as quantity required.

The resolution adopting the report of the committee was then carried.

**Japanese Art.**—Mr. Ernest Hart will commence, on Tuesday next, May 4, a series of three lectures at the Society of Arts, "Japanese Art Work," including metal work, old lac, porcelain, pottery, picture books, and drawings. The lectures will be illustrated by examples of the great Japanese masters, from the eleventh century to the present date, including many examples of the work of the Miöchin, Korin, Sesson, Hokusai, Kōzans, and others. A loan exhibition of specimens from Mr. Hart's collection of historic Japanese work of art will be on view in the library of the Society during the course of the lectures from May 4 to May 18th.



FIRST FLOOR PLAN

First Premiated Design for Fulham Vestry Hall.

builders, of Tredegar Works, Bow. In preparing the site to receive the superstructure great difficulties were encountered from the treacherous nature of the ground. To reach a solid foundation it was necessary to carry down the excavations for the principal walls to the unusual depth of 50 ft. A large quantity of running water was met with while these works were in progress, and this being traced was found to come from an old rivulet which had its rise in Highgate, and fell into the Thames about this point. To keep this in check, a 10-h.p. engine and powerful pump had to be kept at work night and day for six or seven months while a bed of concrete 6 ft. thick was being laid over the whole of the site. Before the walls had been raised much above the ground-floor level the works had to be suspended owing to the failure of the original company. Towards the end of 1884 the premises were acquired by the Building Securities Company, who arranged with Messrs. J. W. Hobbs & Co., of Croydon and Queen's Buildings, Southwark, to carry on the works. It had been the intention of the first company to erect an hotel with a frontage to the Avenue of 353 ft. On the failure of the company, however, 53 ft. of this was lost. The new owners retained the services of the architects, Messrs. Isaacs & Florence, from whose designs the building had already been commenced. To suit the contracted frontage of 300 ft. the original design had to be considerably modified and remodelled.

The building consists of nine floors and a lofty basement, and its roof rises to a height of 122 ft. above the roadway level of the Avenue. The front elevation is faced throughout with Portland stone, from the quarries of Messrs. Crickmay & Co. and Messrs. Steward & Co. The stone carving of the upper floors has been executed by Messrs. Daymond & Sons, and the whole of the remainder, including the central arch, which is surmounted by two emblematic figures illustrative of Day and Night, by Mr. Bookbinder. Of the ironwork used in the construction of the building, the cast-iron stanchions have been supplied by Messrs. Young & Co., and the wrought-iron girders and stanchions by Messrs. Dibley & Son. The ornamental iron balconettes to the front windows are from the Art Metal Works of Messrs. Starkie, Gardner, & Co. The floors throughout have been constructed of a concrete compounded of coke breeze and Portland cement, in the proportion of 4 to 1, and for all interior lintels solid slabs of the same fireproof material have been employed.

The internal planning has been devised to provide as compactly as possible all the accommodation required for a modern first-class hotel. The main entrance, which is in the centre of the building, leads into a large vestibule, and out of this a grand marble staircase, with return flights on each side, rises to the first floor. The upper floors can also be reached by a staircase at each end of the building, and by a double service of hydraulic lifts placed conveniently near the front entrance. In addition to the two passenger-cars, two additional cars have been provided for luggage purposes. These lifts will be worked by a Worthington pump in the basement; and the whole apparatus will be supplied and fixed by the American Standard Elevator Co. At a short distance from the entrance-hall, along the main corridor, an open vestibule affords access to the grand *salle-à-manger*, which is 100 ft. long by 42 ft. wide, exclusive of the apo at the further end and the wings at each side. This room rises through two floors, and is about 30 ft. in height. In addition to this spacious dining-hall there has also been provided on the ground-floor a coffee-room, 56 ft. by 30 ft.; smoking-room, 53 ft. by 37 ft.; reading-room, reception-room, ladies' drawing-room, several private sitting-rooms, general lavatory accommodation, and a range of bedrooms. Including those on the ground-floor there are about 500 bed and sitting rooms in the hotel. The electric light, in the form of incandescent lamps, will be used throughout the ground-floor and on all the upper floors. In some of the private sitting and reception rooms the Wenham light has been introduced. Beneath the marble staircase a wide flight of steps leads to a billiard-room in the basement, which is 80 ft. long, 40 ft. wide, and 16 ft. high. In this room there will be ample space for five billiard-tables. In close connexion there is a bar, and also a lavatory, for the use of players. The other rooms in the basement include bed rooms, bath-rooms, general servants' quarters

## Illustrations.

### FULHAM VESTRY-HALL COMPETITION DESIGNS.

WE give this week illustrations of the design submitted by Messrs. Newman & Newman for the proposed new vestry-hall at Fulham, to which the first prem was awarded by the professional adjudicator, Mr. Currey, whose decision has been so creditably thrown over by the Vestry, with as injustice to those who had competed on understanding that the decision of the professional adjudicator would be acted upon. The design is a suitable one for the neighbourhood, though it cannot be said to exhibit any originality; it consists of that mingling of old pilasters with mullioned windows which become fashionable of late, and which is here used out with sufficiently neat and finished effect. But of the plan much more than this may be said. The authors have succeeded very well in dealing with a very awkward site, with the difficulty of lighting involved in trying to arrange the ground floor rooms under the hall on the upper floor. The staircase is a good light, at the end of the long passage, very good point, and the committee-rooms well placed at the back and away from the eye of the street. The Vestry Clerks' general room would be rather deficient in light, and his committee-rooms are at a long distance from the Vestry-rooms; perhaps not a matter of much practical

importance. In the main, the authors are certainly to be congratulated on their plan, and on the credit of having been selected from so large a competition by so sound a judge as Mr. Currey. It is to be hoped this will afford them some gratification, as this seems to be all they are likely to get from it.

### FIRST SELECTED DESIGN FOR PUBLIC BUILDINGS, NEWCASTLE-UNDER-LYME.

WE give the perspective drawing of the design for these buildings as first selected in the original competition, and which the architects, Messrs. Sugden & Son, had (very naturally) wished to have published along with the modified design, of which we gave the geometrical drawings last week; but they did not contrive to make their wishes clear until too late for that arrangement.

As far as general picturesque effect is concerned, the original design by the one architect is certainly superior to that by the half a dozen architects, as given in our last.

### THE NORTHUMBERLAND AVENUE HOTEL.

THE erection of this building was commenced by the Northumberland Avenue Hotel Company in the summer of 1883. A contract was then entered into with Messrs. Perry & Co.,

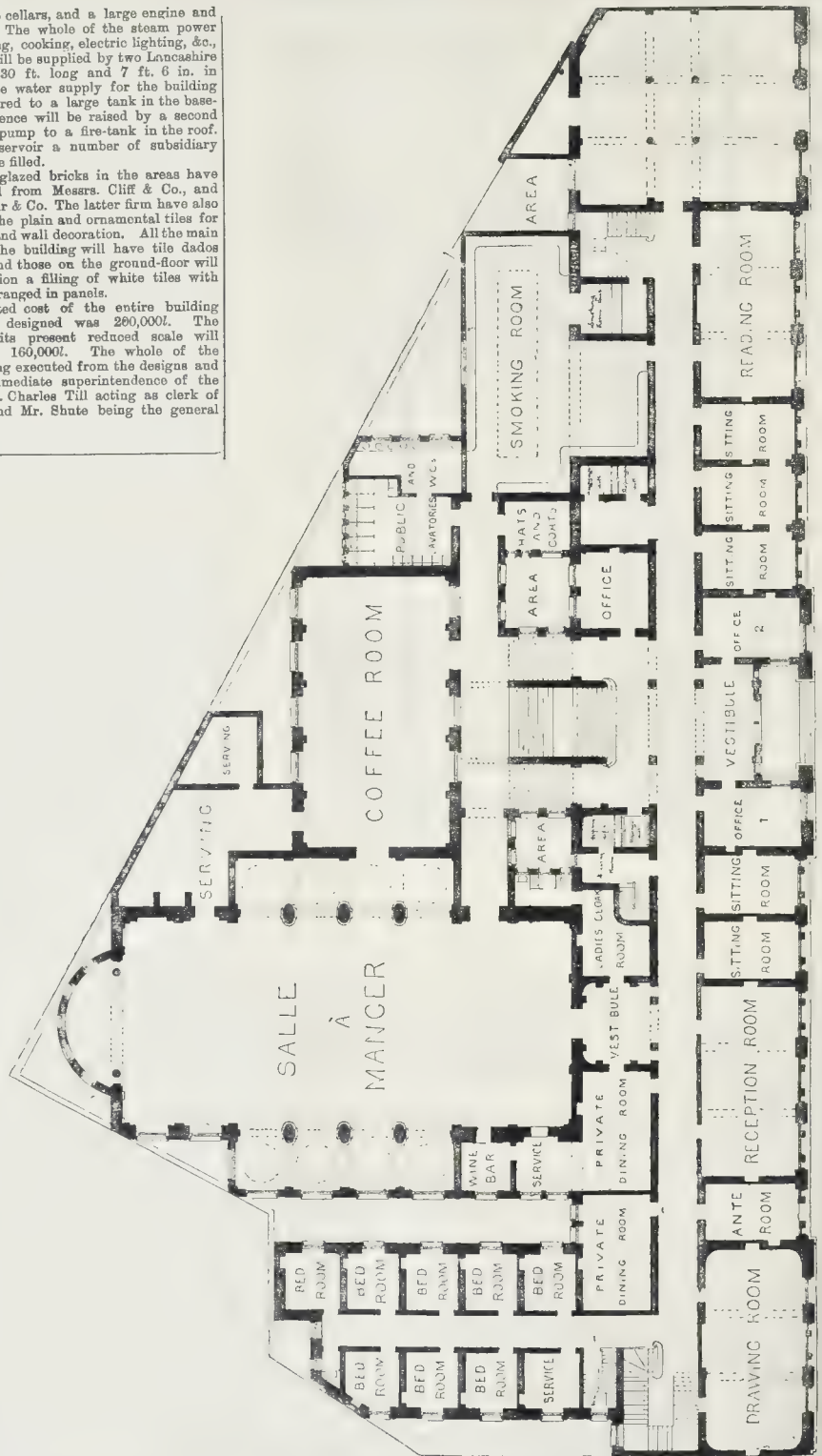


store and wine cellars, and a large engine and boiler house. The whole of the steam power for the heating, cooking, electric lighting, &c., of the hotel will be supplied by two Lancashire boilers, each 30 ft. long and 7 ft. 6 in. in diameter. The water supply for the building will be delivered to a large tank in the basement, and thence will be raised by a second Worthington pump to a fire-tank in the roof. From this reservoir a number of subsidiary cisterns will be filled.

The white glazed bricks in the areas have been obtained from Messrs. Cliff & Co., and Messrs. Balfour & Co. The latter firm have also supplied all the plain and ornamental tiles for interior floor and wall decoration. All the main corridors in the building will have tile dados and plinths, and those on the ground-floor will have in addition a filling of white tiles with gilded bars arranged in panels.

The estimated cost of the entire building as originally designed was 280,000*l.* The building on its present reduced scale will probably cost 160,000*l.* The whole of the works are being executed from the designs and under the immediate superintendence of the architects, Mr. Charles Till acting as clerk of the works, and Mr. Shute being the general foreman.

## THE DORCHUMBERLAND AVENUE HOTEL.



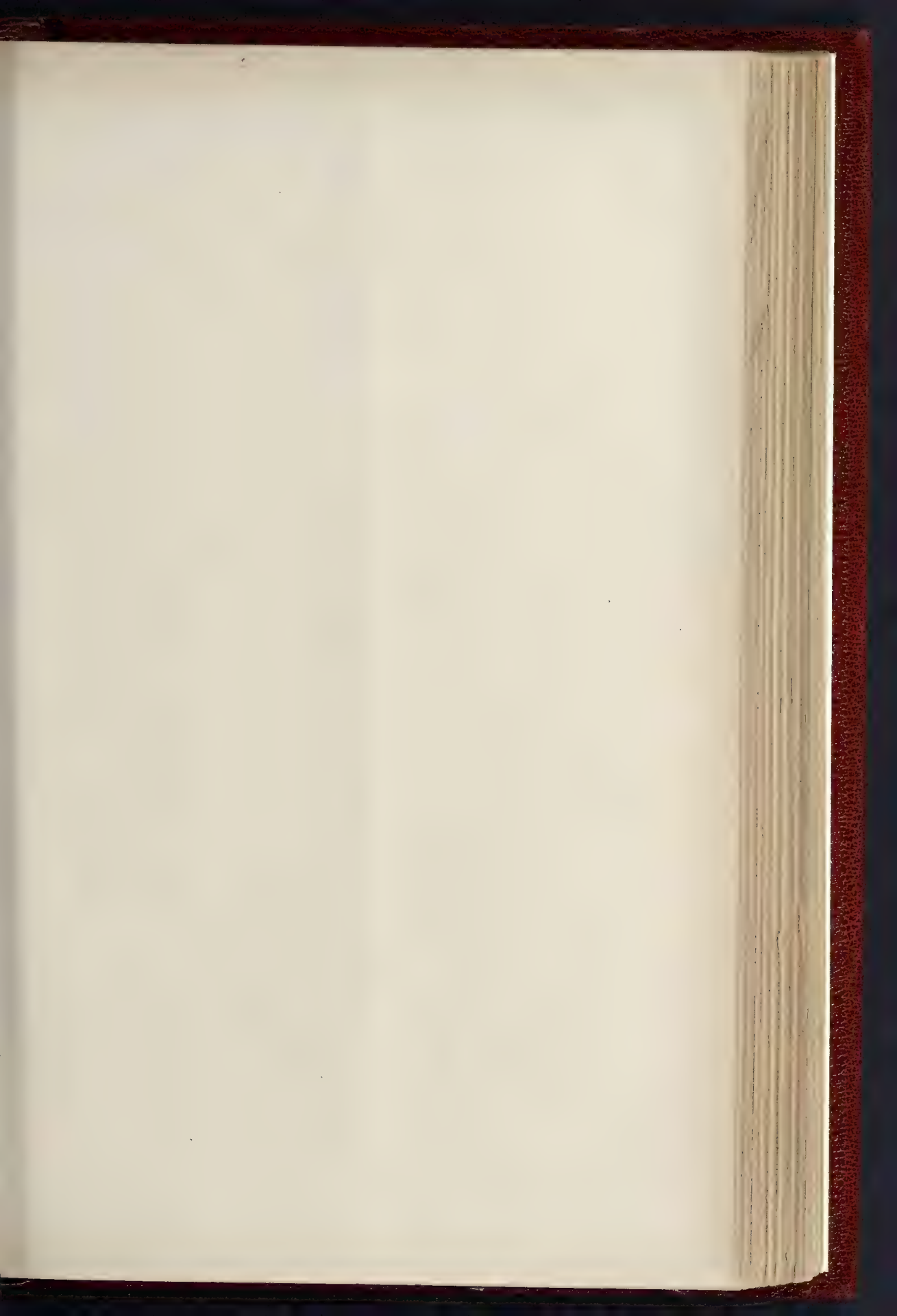
GROUND FLOOR PLAN





THE BUILDER, MAY 1, 1886.













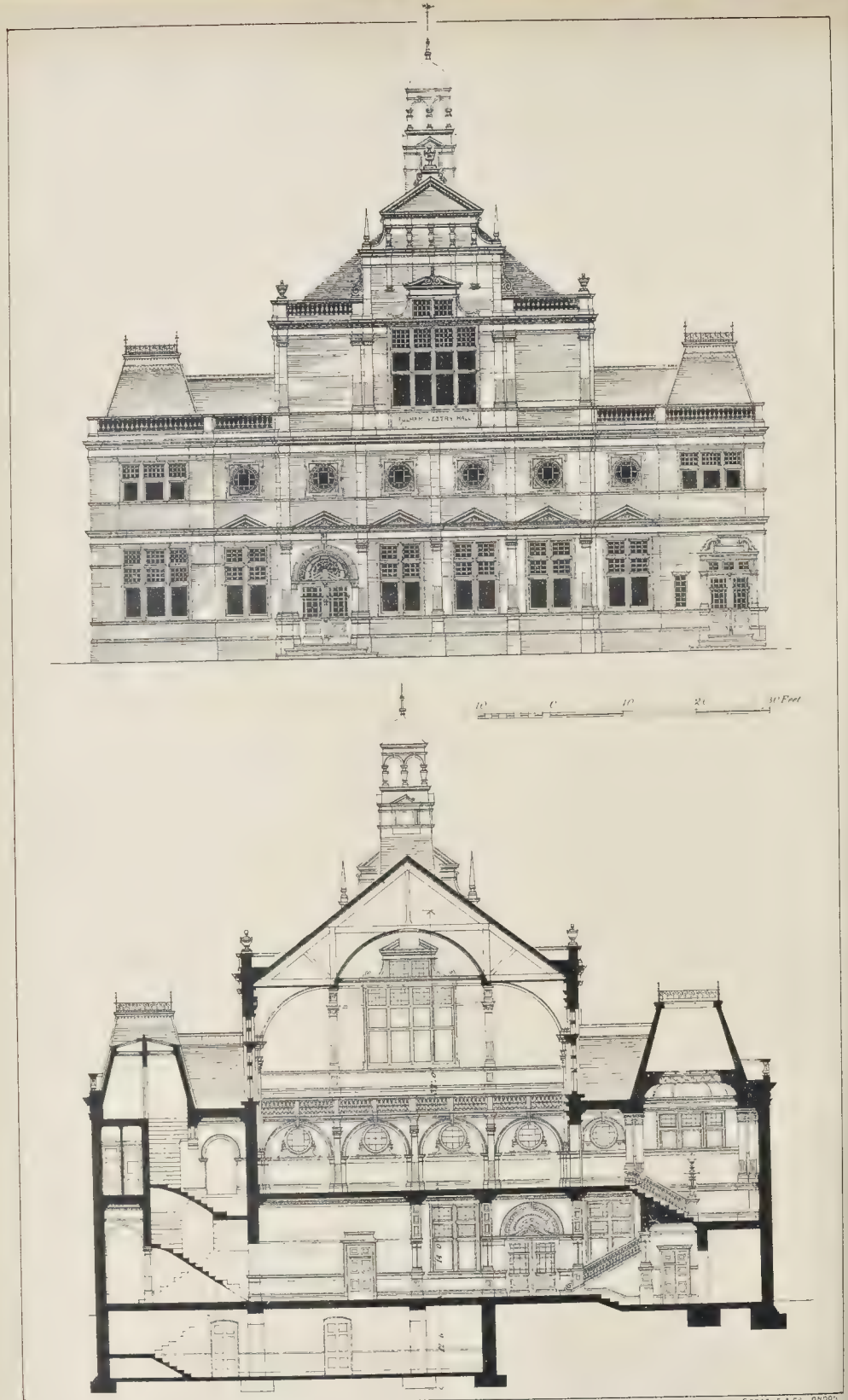
8 FIVE 1/2 IN. H. 10 FT. 1 IN. 10 IN.











FIRST PREMIATED DESIGN FOR FULHAM VESTRY HALL.—MESSRS. NEWMAN AND NEWMAN, ARCHITECTS.

FRONT ELEVATION AND SECTION ON LINE C.D.

DESIGN FOR NEW VESTRY HALL FULHAM

DETAIL OF FRONT



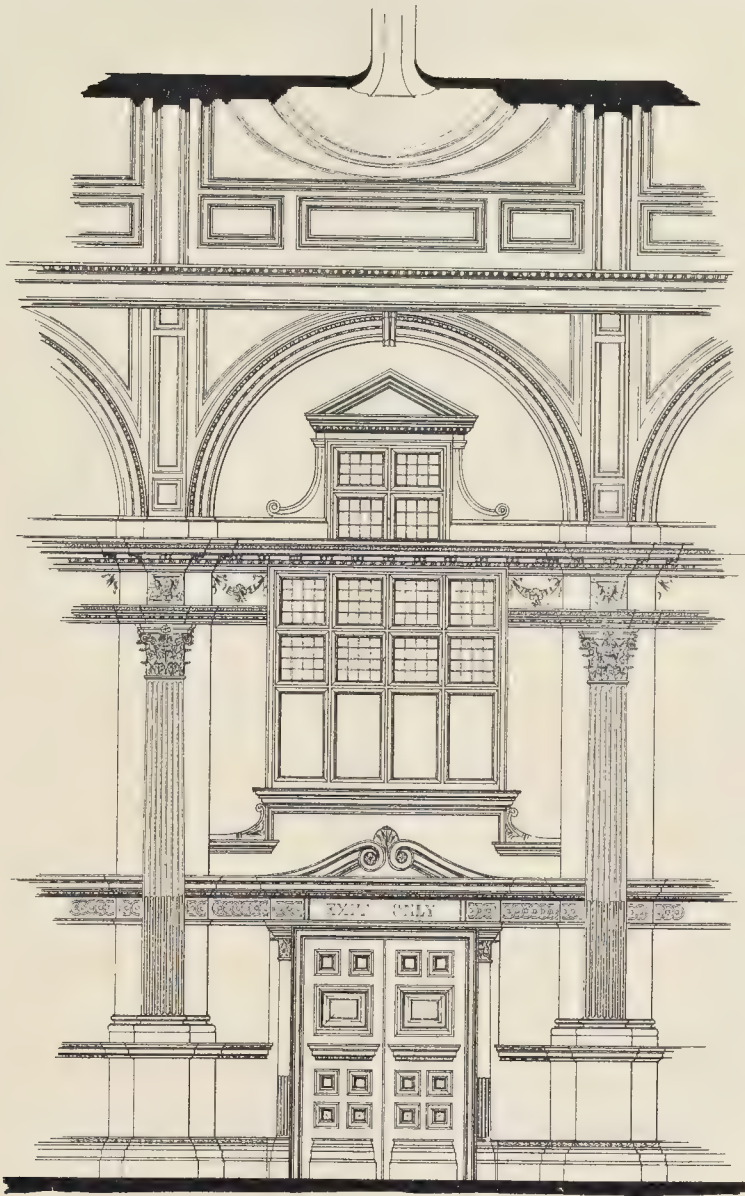
PHOTO. T. & O. SPRAGUE & CO. LONDON

FIRST PREMIATED DESIGN FOR FULHAM VESTRY HALL.—MESSRS. NEWMAN AND NEWMAN, ARCHITECTS.





— DESIGN FOR NEW VESTRY HALL FULHAM —



— — — — — DETAIL OF BAY — — — — —

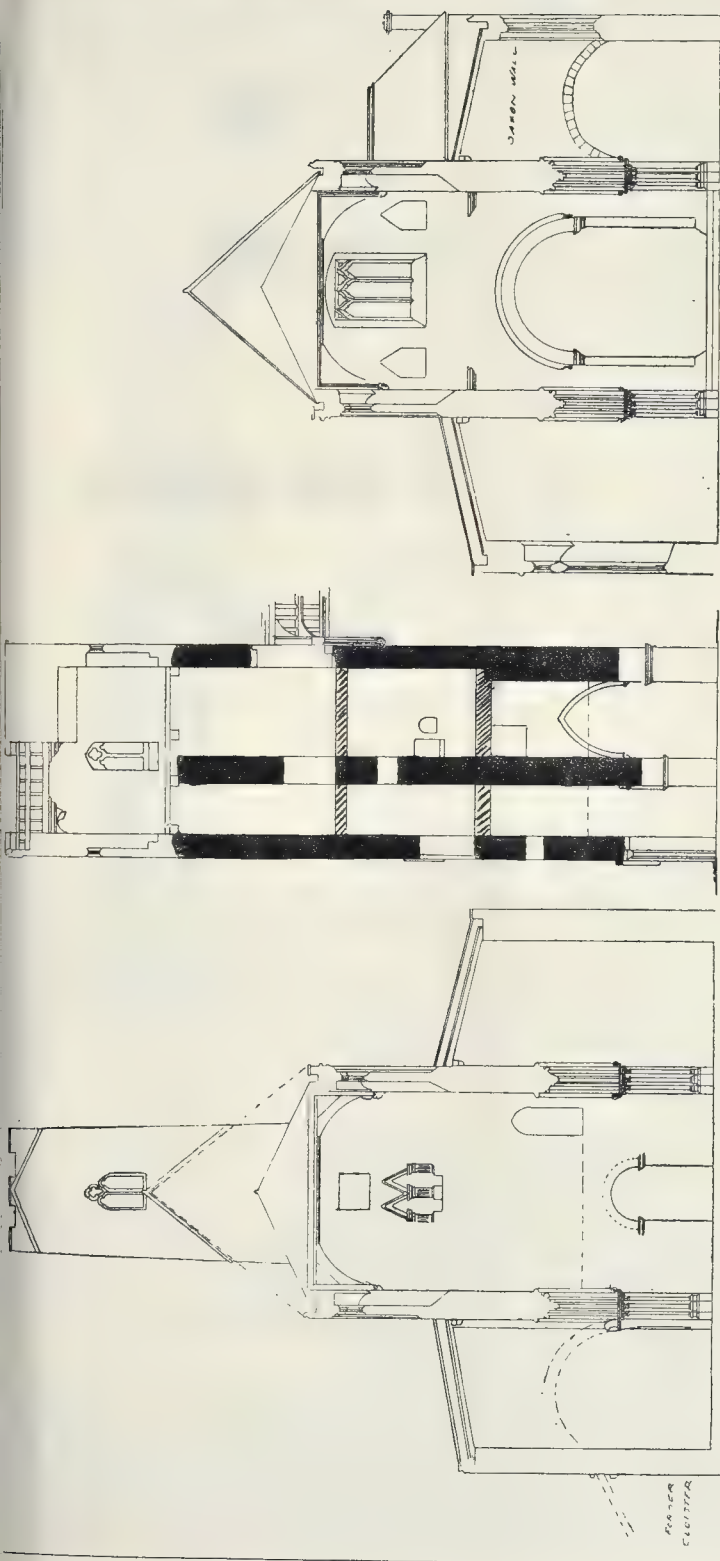
5 0 3 10 15 Feet

PHOTO LINDSAY & CO. LONDON

FIRST PREMIATED DESIGN FOR FULHAM VESTRY HALL.—MESSRS. NEWMAN AND NEWMAN, ARCHITECTS.







TRANSVERSE SECTION LOOKING EAST

SECTION FROM TOWER

SKETCH SECTIONS OF DEERHURST CHURCH.

## DEERHURST CHURCH.

Sir,—I read with much interest your description of the newly-discovered Saxon chapel, at Deerhurst, accompanied by a plan and other details [pp. 712, 819, last vol.]. In 1860, when plans were prepared by the late Mr. W. Slater for the restoration of the parish church of Deerhurst, situated not far from this chapel, I went down with a fellow pupil, Mr. S. Fry, and measured it, and afterwards made the drawings. I have referred to these, and have prepared a plan and sections showing the Anglo-Saxon work for purposes of comparison with the plans of the chapel.

It will be seen that this church is on a grand scale, and had in early days nave, chancel, apsidal sanctuary, western tower, and two aisles or chapels to the chancels. The proportions were also very lofty, as they are also in the Saxon churches of Bradford and Brigstock. The important question of the date is not easy to settle. Buckler is of opinion that as it now stands it was constructed about A.D. 1050, introducing features of earlier date; but the other theory commends itself more to my mind, viz., that "a restoration" only was carried out at that time, and that the lower part of the tower, and the nave and chancel and apse walls, are of an earlier date. I found in the course of the restoration of Brigstock Church that in the Saxon tower are numbers of burned stones irregularly placed, pointing to a restoration after burning by the Danes. The double window in the tower is, I believe (as does the Rev. C. Butterworth), *in situ*, and if, as Buckler thinks, the early church was low, this would have formerly been external.

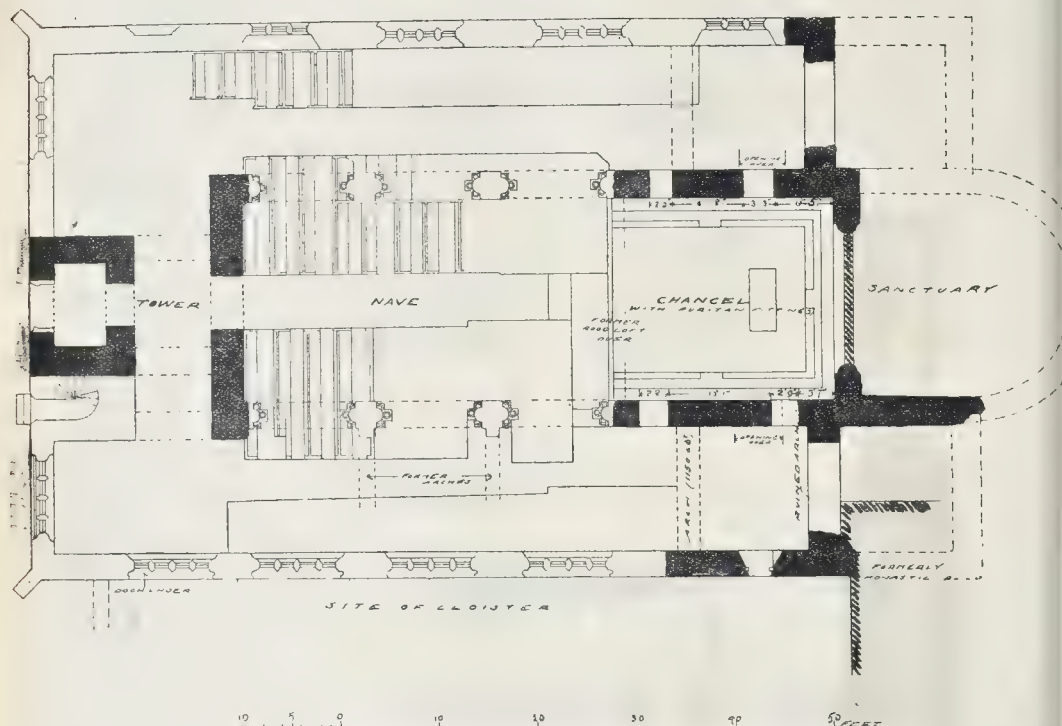
There seems no doubt that the curious aisles or chapels belong to the early date, and Buckler thinks that formerly they extended eastward to the dotted lines. The doors are both pointed (like the tower windows) and flat-headed, and there is an arched opening each side above them into the chapels. The present arch in the south aisle is in the Saxon wall, and was an alteration of about 1150 A.D. There are remains of a ruined Saxon arch in the present east wall, and Buckler considers that the same place existed on the north side.

The Saxon chancel arch is removed, but evidences exist of its position. The sanctuary arch is well preserved, and was filled in when the apse was destroyed,



PLAN AS MEASURED 1860 (R. H. CARPENTER)

SEATS WOODEN IN NAVE & AISLES



PLAN OF DEERHURST CHURCH.

—possibly the apse would be low, with windows over. The early church of Brixworth is a case in point, where the apse, with the sanctuary and chancel arch (or "arcus triumphalis"), all exist.

At Bradford and at Brigstock the chancel was narrower than the nave, proved at Brigstock by my finding the south-eastern quoin *in situ*. At Deerhurst they are equal in width, as at Brixworth.

The construction is an interesting point. The newly-discovered chapel has very fine narrowed angle quoins, as we find in most Saxon work, though they are not in the very regular "long and short" work, such as at Brigstock. The church, however, has the angles composed simply of small stones, like the walling stones, and one would infer an earlier date from this.

The existing clearstory walls are late in date, but there was evidently always a clearstory of great height, as indicated by the roof line in the tower and the windows in the east wall. The church at Bradford is an example of this Saxon lofty proportion.

The division of the tower into many floors and rooms would indicate that it was used for residence and defence, as that at Brigstock; it is likely a floor existed at the dotted line, and removed when the pointed arches were formed. The fourteenth-century finish to the tower is very peculiar. The Saxon tower being oblong in plan, the Medieval architect arranged a square on it, with corbels for a spire, and covered the remaining space with a pointed barrel vault of stone, sloped on the outside with an eastern gable.

The plan shows the fifteenth-century seats which remained in 1860, and are now worked in to the new arrangement. It also shows the very singular Puritan arrangement of seats in the chancel, for receiving the holy communion sitting round the table. Mr. Slater retained this as a curiosity; but the eastern seats are not, of course, used. The others do duty for choir-seats. There was formerly a rood-screen,

and the doorway to the loft still exists through the south wall.

The nave roof is a grand fifteenth-century one of elaborate detail, and the arcades are beautifully moulded, with carved capitals to the detached shafts.

I must acknowledge kind help given me in these notes by the vicar, the Rev. C. Butterworth. I have visited the church since the restoration when rowing down the Severn, which runs near its west end, but have not yet seen the interesting chapel recently discovered.

R. HERBERT CARPENTER.

#### DRY-ROT.

HERR GOTTFREY, one of the leading German authorities upon building materials, gives a comprehensive summary of facts bearing upon the above question in a recent number of the *Centralblatt für Bauverwaltung*. He considers the question as one still to be solved, and suggests that the germs of the dry-rot may exist in the living tree, illustrating this supposition by quoting circumstances where apparently dry and sound wood was attacked. In Russia there are whole forests from which no building wood is now taken, experience having shown that it has always been attacked by dry-rot. A concentrated solution of common salt has often been found an efficient preservative, when applied to the beams in a boiling state. Airing with dry air has also been found efficacious.

In connexion with this subject the researches of Professor Poleck are of interest. He instituted a series of experiments with a view of testing whether the germs of dry-rot become developed in wood felled during the winter. From three trees felled in January (grand pine) sections were taken on March 31st, in which were sown the germs of dry-rot. The sections were kept in covered vessels in a dark chamber at an average temperature of about 59° Fahr. The characteristic mycelium of the dry-rot became

visible during July and August in the three specimens. The wood of the previous winter had been found unsuitable for such experiments, although they succeeded with wood of the winter in question. A careful analysis of the wood showed that there was from 4 to 9 per cent. more potassium and phosphoric acid in the wood of the later season than in that of the previous one. The wood where the experiments had failed was supposed to have been floated wood, and experiments were consequently begun for the purpose of determining whether wood felled in the summer could be rendered safe against dry-rot by the removal of the bark, protracted drying, and steeping in water.

The *Industria Blätter* refers to the experiments made with progressive success by Professor Farsky, of Tabor (Bohemia), in the application of salicylic acid as a remedy for dry-rot. At first he had used it in dry form (probably, therefore, in combination with some base), but since discovered that a solution of 5-28ths oz. salicylic acid in 22 gallon of alcohol, if afterwards diluted, was sufficiently efficacious to protect a flooring of 800 square feet from the spread of dry-rot, and to remove it from the places where it had appeared. Rough salicylic acid can be used, and the action of this antiseptic agent can be heightened by a slight admixture of carbolic acid.

**Obituary.**—We record with much regret the death of a promising young engineer, Mr. Edwin Southey Beale, at the early age of twenty-four, and after a very short and sudden illness. Mr. Beale contributed several very useful articles on some of the important engineering works of the day to our columns, on various occasions, which showed very full and accurate knowledge, for so young a man, and on the subjects he specially undertook to deal with.

# THE ATMOSPHERIC COWL COMPANY'S EXHAUST VENTILATOR.

THIS ventilator differs from an immense number of exhaust or updraught ventilators that have been made in not depending entirely on the action of wind (though that assists it), but on the difference between the temperatures within and without the apartment to be ventilated.

The ventilating-shaft on which the exhaust is placed contains air warmer, and therefore relatively lighter, than the outer air of the surrounding atmosphere, and this is turned to advantage in the ventilator under our notice by providing continuous slits at the angle of a spiral worm (projecting slightly in the interior of the shaft so as to be more affected by the heat) and by enclosing the portion of the shaft

Where the ventilator is exposed to the heat of the sun, the bottom of the jacket is to be closed, and a special supply of cold air is to be led into it by a pipe from a cellar or other cold-air reservoir. This is ingenious, but we should rather doubt the exhaust having as efficient action under these circumstances as when the normal temperature of the outer air is low. In fact, it would appear that the ventilator would have to be altered for hot or cold weather, so that to this extent it would be affected by varying temperature in the air, like other exhaust cowl.

It has the merit of being a small and unobtrusive-looking thing, without anything like the large and variously-shaped cowls which are to be seen on exhausts intended to act solely by wind force; and the idea is certainly ingenious and scientific so far as its action in direct relation to the heat of the apartment is concerned. As an assistance to the draught of a chimney, and a safeguard against down-draught, it ought always to be efficient, on its principles; and we have found it so on actual experiment. As an exhaust from a room, apart from the chimney-shaft, it would not be equally effective, we surmise, in all states of the weather; but it would be, or should be, superior to those exhausts which are actuated by wind-currents only.

## WATER SUPPLY.

**Leamington.**—The Local Government Board have given their consent to the borrowing, by the Leamington Town Council, of 1,600*l.* for the extension of the water-mains and the driving of the addit in the new artesian well.

**Stafford.**—At the meeting of the Stafford Town Council on the 20th ult., Mr. J. C. Mycock moved "that the sanction of the Local Government Board be asked for the raising of a loan of 4,500*l.* to cover the outlay on the pumping shaft or well at Enson Moor, in carrying out the agreement entered into with Lord Harrowby, and for defraying the estimated cost of the proposed experimental boring from the bottom of the pumping-shaft." The Mayor seconded the motion, which was unanimously carried, the Town Clerk stating, in the course of the discussion, that, assuming water was found successfully, another 15,000*l.* beyond the amount already expended or sanctioned, would complete everything. That was altogether 35,000*l.*, and that meant practically a little over 30*s.* a head for the population of the borough and the fringe round it to be supplied. Statistics as relating to other towns showed that a water supply had seldom, if ever, been got at a lower rate.

## STONE FOR THE NEW GOVERNMENT OFFICES.

SIR,—I do not know whether you will agree with me that the answer of the Government to the Member for the Forest of Dean, that the only reason for rejecting the stone he inquired about was that the colour is unsatisfactory, is not much to the point. In my own opinion, the answer was singular, if not absurd, as emanating from a practical department of the Government, the members of which are, of course, resident in London, and must, therefore, know from ocular demonstration and every-day experience that the natural colour of all freestones is changed immediately in the sooty and noxious atmosphere of the metropolis. If the building of the new offices must wait till a freestone is discovered that will not change colour, they will never be built at all. As you have more than once allowed me to urge, a material exists possessing this important quality, and another even more important,—durability in London. Granite has yet another recommendation. It can be obtained in all colours that the architect can possibly require,—from white through yellow, red, green, gray, blue, black. And taking into account the excessive and rather discreditable expenditures upon the restoration of recently-built Government structures in London,—70,000*l.* in one case alone,—its adoption for the New Government Offices would not cost an extra 6*d.*

Yet although this material,—in great variety,—is in daily use, the Government has not the enterprise to adopt it on a grand scale, and for ever set at rest the simple question, Is it possible to erect permanent edifices in London?

ARCHÆUS.

## STAIRCASE, ALBANY CAPITOL.

SIR,—Will you permit me to correct an unintentional error of statement which occurs in a note accompanying the drawing of Mr. H. H. Richardson's design for the grand stairway in the new Capitol at Albany, New York, which is published in the *Builder* for the 17th of April [p. 574]. It is there stated that because of political action on the part of Government authorities, Mr. Fuller, whose design was chosen in open competition, resigned, and Mr. Edlitz and Mr. Richardson were selected to carry on his work. I believe that for once in America, politics entered not at all into the consideration. The facts are these:—In accordance with a long-established custom in the United States, the terms of the competition were such as to prevent nearly all American architects of established reputation from having anything whatever to do with it. As a result the drawings submitted were of little value. Doubtless the design chosen was the best. When the building had progressed as far as the tops of the third story windows, the money already expended exceeded by several hundred thousand pounds the estimates of the architect himself for the entire structure. Moreover, it was seen that when completed the building would be a positive artistic offence, even in the country which counts more vulgar pieces of architecture than any other pseudo-civilised community whatever. Therefore, both by reason of pecuniary and artistic considerations, the entire control of the work for the future was given to three of the most prominent of American architects, Mr. Richardson, Mr. Edlitz, and Mr. Hunt.

No attempt was made by the new architects to harmonise the new and the old work; any compromise was artistically impossible. Therefore, the entire interior was reconstructed and the exterior completed in a style of extreme originality and beauty. Instead, therefore, of the new work seeming out of place, it is the remnant of first work that is offensive. Should the time ever come when the exterior work of the first and second stories is replaced by something nobler and purer, the building will be a most harmonious and beautiful piece of design, although Mr. Edlitz and Mr. Richardson were so handicapped at the start.

The original design may have been "Italian Renaissance," but in America we call it "American Renaissance," or "Builder's Classic." There is no English work with which it may be compared. The designs executed by Mr. Richardson and Mr. Edlitz are Byzantine Romanesque, and a very rich round-arched Gothic, remarkably effective and of unusual originality.

RALPH ADAMS CRAIN.

## ANCIENT GREEK SCULPTORS.

SIR,—In last week's issue of your paper, under the head of "Recent Excavations in Boeotia," p. 603, you state, in reference to an incomplete inscription on a fragment of a xoanon, that "literary record gives us no sculptor's name ending in 'oreg' to supply the deficiency."

On p. 601 in the same issue, referring to a colossal statue found at Gortyna at Crete, you state that "the great interest of it lies in the fact that it is inscribed with the name of the sculptor, 'Eleidorec' 'Aḡnialoc' tricit." This seems to me to furnish the very clue which you require.

CHARLES G. CRESSWELL.

\* \* The first quoted remark referred to sculptors of the archaic period, of the Boeotian territory, and, therefore, likely to use Boeotian characters. Eleidotos, especially with his affix, 'Aḡnialoc', could not come under this category. There are several known sculptors of the classical period whose names end in "oreg." It was not, we admit, put quite as clearly as it should have been.

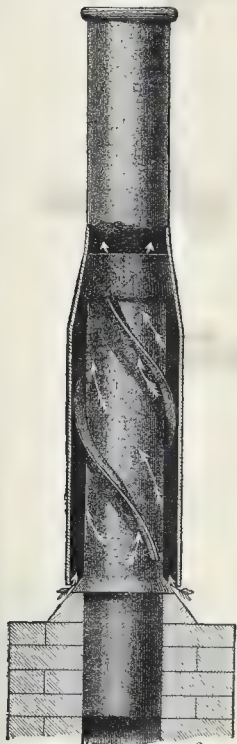
## STONE-SAWING MACHINERY.

SIR,—I see in your issue of the 24th ult., p. 624, a letter from E. P. Bastin & Co., stating they are makers of side lever saw-frames, but they omitted to state that they were using my patent under a royalty from me.

With regard to the statement of Mr. Powis Bale that side lever machines were used in Belgium years before my patent came out, that I question; or why was not my specification challenged when I brought it out in 1874, or when I renewed it in 1881?

RICHARD COX.

**Park Foundry, Weymouth.**  
SIR,—My letter to you of the 10th ult. [p. 593, ante] will not bear the construction which Mr. Powis Bale puts upon it. I should be the last person to advocate "sitting at home." In the course of my business it has been my lot to travel through Belgium, France, and Italy, and I have spent many months in the examination of the manner in which marble and stone are sawn and worked in these countries. I do not know who are the manufacturers of the machines which Mr. Bale mentions, but I do know that the description of them given by Mr. Bale himself exactly answers the description of the machines made by Mr. Cox under his patent. If they are not



SECTION.



PLAN.

furnished with the spiral worm in a jacket open at the bottom, so that the external air forces its way in at the bottom of the jacket to supply, through the slits, the partial vacuum in the shaft, and, coming in contact with the comparatively warm metal, expands and rises in the jacket, entering the slits with greater force of consequence, and giving the effect of a continuous jet into the interior.

Care is taken to give a special direction to the incoming jets of air, so that they pass one after the other near the centre of the shaft (as shown in the plan), and communicate to its contents a rotary ascensional motion, whereby the draught is quickened, and the vitiated and heated air attracted in greater proportion than the mere difference of temperature between the shaft and the outer air would effect. This is, therefore, theoretically at all events, an automatic draught, calculated to draw more rapidly the greater the temperature rises in the room to be ventilated.



the same, will Mr. Bale tell us in what the difference consists? In his description of the Belgian machines, he says they are driven "by a crank attached to a countershaft in the usual manner; but in place of the connecting-rod being attached to the end of the saw-frame a pair of side levers are arranged to take hold of the frame at about the centre on either side, thus giving a longer connecting-rod, and increased steadiness in working." The conclusion which will be naturally drawn from such a statement is that this principle is peculiar to the Belgian machines. This is not the case, and in justice to our own manufacturers it should be so stated. If I have misunderstood Mr. Bale's description, I should be exceedingly glad to be put right. I can assure him that English manufacturers are only too anxious to learn from any source open to them.

ARTHUR LEE.

#### ROBINSON'S CEMENT.

SIR,—With reference to the letter from Messrs. John Howe & Co. (plaster makers) on the above subject, which appeared in your columns on the 23rd inst. [p. 624], we are not disposed, for obvious reasons, to give them any further information than that which they have already obtained or can obtain from the patent. We also decline to be drawn into a correspondence on the subject, but take this opportunity of stating that if they or anybody else do manufacture or sell "Robinson's Cement," or an article identical with "Robinson's Cement," they infringe our patent, and do so at their risk.

JOSEPH ROBINSON & CO.

Knoxhill Cement Works, Carlisle,  
April 28.

#### "HASKELL v. BRADBEER."

SIR,—My attention has been called to the excellent report of the trial of this action in your paper of the 24th ult. [p. 624]. There is, however, one little error which perhaps you will kindly allow me to correct, i.e., the name of the learned counsel who appeared for my client, the plaintiff, was "Willes," and not "Wills." F. A. WHITMORE LOWE.

### The Student's Column.

#### OUR BUILDING STONES.—VIII.

##### THE PREPARATION OF MICROSCOPIC SECTIONS OF STONE.



AS before mentioned, in order to examine stones with the microscope it is necessary that they should be ground down until they are transparent. As so much depends on the proper treatment of sections, considerable care and delicacy of manipulation must be bestowed on them. If the section is not uniformly ground,—one part of it being thicker than another,—or not reduced thin enough, the accuracy of determination is much impaired.

It is not so difficult to cut and grind sections of granite, and such hard rocks used in building, thin enough for the purpose, as they are so compact. But with some sandstones and limestones it is quite another thing. Many fairly durable building-stones are not so compact as to enable sections to be made thin enough by the ordinary method, for examination. Just as the final stages are being completed, they frequently break up and go to powder. We shall point out, however, how these refractory stones are to be dealt with, in order that they may be successfully investigated.

The method of preparing thin slices of rock for the microscope is well explained by Messrs. A. Geikie\* and F. Rutley.†

The preparation of a great number of sections for the purposes of these articles, however, enables us to see that the special circumstances of the case require a somewhat different method from that usually practised.

No very costly or unwieldy set of apparatus need be procured, every appliance used being of the simplest character.

The first thing to do is to select the usual average piece of stone, which is to be ground down. A dexterous blow with a hammer should sever a thin chip from it. If the stone is very hard, this chip should be as thin as possible, as it saves a great deal of work in grinding; but if, on the contrary, it should not be very compact, a piece not less than  $\frac{1}{4}$  in. in thickness, should be struck off, as thinner pieces are liable to be fractured internally. Much trouble might be saved if the stone be taken to a lapidary, who, for a penny or two per section, is willing

to slice it with his machine. This produces two even surfaces on the thin piece to be ground, besides making it of a uniform thickness. The following is a list of the apparatus required in the grinding and finishing:—

1. Two zinc plates  $\frac{1}{4}$  in. thick, 10 in. square. Iron is sometimes recommended, but we prefer zinc because it does not rust. One zinc plate is used for coarse emery, the other for flour emery. It is particularly necessary to keep these plates apart from each other, as, if any of the coarse emery finds its way to the flour plate, the section on being rubbed on the latter will be cut to pieces.

2. A Water of Ayr stone, 5 in. square  $1\frac{1}{2}$  in. thick. The sides of the stone should be painted with oil colour to keep the wet out, and so prevent the stone from rotting. Water of Ayr stones 6 in. long by  $2\frac{1}{2}$  in. broad are generally used, but the fact that they soon become worn by the rubbing process into hollow surfaces is a sufficient reason for using a larger stone where the rotary motion causes it to wear away more evenly.

3. Emery powder for rough grinding. That known as No. 60 is very suitable.

4. Flour emery.

5. Canada balsam. This is often used for fixing the specimen whilst grinding as well as finally mounting it, but for the former process we have found a shellac cement more useful. This cement is made of about  $\frac{3}{4}$  lb. shellac to  $\frac{1}{4}$  lb. Venetian turpentine. Put the shellac in an earthenware pot and place it in an oven. When about half melted, add the Venetian turpentine and mix both together. It may be stirred with a stiff wire, with a loop at one end. When sufficiently mixed, pull the wire out and when cool enough, catch hold of the cement adhering to it and roll the cement between the hands into a stick, like sealing-wax.

6. Two American wooden paper clips, forceps, and some needles. One of these last should be stout and strong.

7. Some pieces of thick glass,  $1\frac{1}{2}$  in. or 2 in. square.

8. Glasses with ground edges, 3 by 1 in., may be obtained of almost any optician. They are for finally mounting the ground slices upon.

9. Thin covering glasses, shape immaterial. Square ones are cheapest.

10.  $\frac{1}{2}$  oz. oil of cloves, and a small bottle of spirits of wine.

11. A small spirit-lamp, and a nest of small saucers.

a. The first part of the process is to grind the chip of stone flat on one side, rubbing it on one of the zinc plates with emery powder (3). Then wash the chip in water, taking care that all the emery is removed. Next, grind the same side of the chip with flour emery on the other zinc plate, which should remove the rough scratches made with the emery powder. Wash it again. By this time the piece of stone should be quite smooth on one side.

b. Then polish it on the Water of Ayr stone, using a little water. Wash again. It will be found that many soft sandstones and limestones will not polish well. This does not particularly matter, but in all cases they should be ground as smooth as possible.

c. The polished side should now be fixed to one of the pieces of thick glass mentioned (7). This is done by clamping the glass with one of the paper clips (6), and holding it over the lighted spirit-lamp (11), gently moving it to and fro, until it is warm. A stick of shellac (5) should then be rubbed on the warm glass, when it will be found to melt. As the shellac melts, a rotary motion is applied to get an even surface, and distribute it fairly over the centre of the piece of glass.

d. The smooth side of the chip should then be warmed a little, and placed on the piece of glass with the shellac. A paper clip may be used at this stage to press the chip firmly on the glass, and care should be taken to see that the part of the shellac which cements it is equally distributed. Throughout the whole of this part of the process, the glass with the chip affixed should be slightly warmed, and if any air-bubbles appear,—as they very often do,—the chip should be moved about until they disappear.

When a few minutes have elapsed, and the one side of the chip is firmly cemented to the glass, the other side should be ground down in exactly the same manner as described in a, b. This time, however the chip requires more watching, to see that the stone is being evenly ground, no one part being thicker than another.

It must be remembered that the object is to make as thin and transparent as possible. So hard stones may be reduced to as thin as, if thinner than, a sheet of tissue paper; but others are attempted to be so finely ground, before stated, they go to pieces. No rule can be laid down as to what the actual thickness of each chip should be: nothing but a little experience can determine it.

Heat should now be applied to the glass, the shellac cement re-melted, the object being to remove the chip from the glass. This may be done by gradually sliding it off the edge, with the stout needle, but great care must be exercised, or the slender piece of stone will break. The slice of rock is now gently placed in alcohol spirit (10) in a small saucer (11), and allowed to remain some hours. It should then be taken out with a small brush, and placed in a saucer with some fresh spirit, where it may remain some hours. Take it out again, and place it in a saucer, with a little oil of cloves (10), keeping it there five minutes only.

The section is now ready for the final mounting on the glass with ground edges (8). One of these pieces of glass should be cleaned, a little Canada balsam dropped on the centre of it. The thin section should then be very carefully placed on the balsam, and under influence of the heat of the spirit-lamp, moved gently about to ensure the removal of any air-bubbles which may appear, and to firmly cement it to the glass. A little balsam may then be drawn with a needle over the section, and all of the thin glass coverings (9) carefully fixed to prevent dust from spoiling it.

A label is afterwards affixed to the slide, with the name of the stone, quarry, and bed written on it.

As before stated, many stones used in building are very soft. Sections of them cannot be handled about in the manner just described. We treat them partly by the method recommended by Mr. E. T. Newton, F.G.S.\* We rub the chip on an ordinary grindstone, polish as well as possible with the Water of Ayr stone. It should afterwards be soaked in a solution of shellac in spirits of wine. It absorbs this mixture, and, when dried, becomes very hard. It is then cemented with the marine glue to a piece of thin glass, with ground edges (used in the final stages of the method). The other side must then be ground in a similar manner, and the section reduced to the required thickness. In consequence of the soft nature of the stone it should not be removed from the glass. This latter will not likely be scratched in the grinding process, and look a little unsightly, but beauty must in this instance be sacrificed to utility.

Instead of fixing one of the thin glass coverings on the section at the final stage, as before the best plan is to put it away in a place where the dust will not get at it. To fix the glass covering heat must be applied, consequently unless extreme care is taken, the section will be spoiled by falling to pieces.

All this may seem rather tedious, but it is astonishing how practice facilitates the operation. A good plan is to have several pieces of stone ready at each stage of the process. In this way, a few hours may be employed in grinding several, as described in a and b. The whole of the pieces are then ready for c, so on. In this way, twelve sections can be ground, and mounted in about the same time as four or five done separately.

#### RECENT PATENTS. ABSTRACTS OF SPECIFICATIONS.

17,011, Conduits for Underground Wiring.  
J. B. PASE.

These conduits are constructed of glazed earthenware in sections, and coated internally with paraffin oil and shellac. The sections fit together with gaskets and sockets, and have longitudinal ribs; sockets are provided to receive pipes to carry branches to the mains. Drainage wells are provided in suitable positions. These may also be used as testing-bells. The conduits are about two-thirds filled with insulators, the remaining portion being left for ventilation produced by the air being drawn through enclosed fire at the base of a suitably enclosed shaft.

16,993, Furnace Bricks and Concrete Work.  
J. GILLESPIE.

These bricks or their outer faces only are of clay, and for the purpose of affording a holocaust or other silicious lining, they are provided with projecting pins or ridges, which may be

\* "Outlines of Field Geology," 1882, pp. 203-211; and  
† "Text-book of Geology," 1892, pp. 182-187.  
† "The Study of Rocks," 1894, pp. 58-74.

\* See Rutley, *op. cit.*, p. 71.



old with the brick, or made separately and afterwards inserted. In the latter case, when the ridges are longitudinal, they take the form of tiles inserted in grooves; this may be modified by letting the tiles in between the bricks instead of into a groove, the ridges being formed so that the tile enters half into each brick; or the rebate may be dispensed with, and the tiles fitted in snugly through the joint, in place of the projecting pieces, holes in the bricks may be employed to effect the same object, these holes may be extended right through, and the bricks then by using only one hole are caused to take the form of tubes. Linings built of these tubes in connexion with tiles, consist of a skeleton, which is filled in with the plastic lining. This use of hollow bricks is also applicable to the building of concrete walls.

16,111, Door Locks. J. Edwards.  
The tumblers of the lock engage with a pin upon longitudinal slot. In the act of locking an extension of the tumbler passes over the keyhole and prevents the insertion of any pointed instrument or the purpose of picking the lock.

NEW APPLICATIONS FOR PATENTS.

April 16.—5,286, E. Staples, Attaching Door Knobs to Spindles.—5,316, W. Allen, Syphon for self-flushing Water-closets.—5,317, W. Wesley and J. Peers, Ventilators.—5,321, M. Hussey, Roofing Systems, &c.—5,324, G. Oulton, Syphon Flushing Systems.—5,345, G. Johnson, Machines for Making Tongue and Groove Flooring.  
April 17.—5,351, R. Bradshaw, Carrying off Waste from Brick Machines, &c.—5,371, J. Macneikan, Metal Ventilators.—5,387, A. Seeffels, Rendering Wood, &c., Fireproof.  
April 19.—5,391, W. Baldwin, Waste Prevention Systems, &c.—5,410, W. Green, Lifts and Caissons.—5,438, J. Lorrain, Chimney Flues, &c.  
April 20.—5,442, J. Stacey, Turning Newells, Lathe, &c.—5,454, C. Meyer, Combined Wardrobe, Bookcase, and Secretaire.—5,457, J. Piffing, Leads for Stained Glass.  
April 21.—5,504, G. Newman, Sash or Window Frames.—5,510, W. W. Water, Cooking-ranges.—5,516, W. White, Paving Blocks.  
April 22.—5,553, J. Dyson, Cows, Chimney-tops, &c.—5,556, J. Smith, Stoves, Firegrates, &c.—5,574, H. Glendinning, Springlocks and Latches.—5,581, R. Rastick and G. Hughes, Mitrering and Completing Machine.

PROVISIONAL SPECIFICATIONS ACCEPTED.

3,259, H. Penrice, Rock Tunnelling Machinery.—3,420, S. Jarvis, Basic Bricks.—3,421, S. Jarvis, Basic Bricks.—3,480, G. Newman, Pneumatic Door Springs and Checks.—3,544, J. & J. Mason, Hanging Window-cases.—3,569, J. Dyson, Wall Bonded Bricks for Pump Walls.—3,597, J. Lawson, Self-closing Water-closet.—3,626, W. Berridge, Water-closets, Urinals, &c.—3,694, H. Pennell, Window Fastening.—3,874, T. Ford, Suspended Hydraulic Differential Power Lifts.—4,153, T. & J. Holt, Flushing Apparatus for Water-closets, &c.—4,435, W. Rowe, Plough and Sash Filling Plane.—5,354, J. Price, Sash-fasteners.—3,944, T. Hampage and J. Shaw, Screws.—3,961, S. Frankenberg, Cement for Mosaic Work, Wood Paving, &c.—4,288, J. Walker and H. Worsley, Sash Casement and Door Fasteners.—4,361, J. Walker, Door Knobs, &c.—4,430, J. Sharp, Chimney Cowl and Ventilator.—4,482, C. Harton, Automatic Window-sash Fastener.—4,603, J. Rawlings, Bench Plugs and Pins.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to opposition for two months.

7,208, A. Hogg, Adjusting and Attaching Door Knobs to Spindles.—7,483, J. Hamond, Mortising Machine.—7,743, T. Worthington, Imitating Wood, Marble, &c., on Painted Surfaces.—7,834, J. Hamond, Door Fastening.—8,094, G. Andrews, Balance for Hydraulic Lifts.—8,183, H. Williams, Window-sash Fastener.—8,254, W. Shorland, Weather Board and Draught Excluder.—13,247, T. Hendland, Chimney Pot.—1,912, G. Woollicroft and T. Freeman, Tiles.—3,283, S. Mower and T. Fowler, Machines for Making Saws.—3,459, J. Leuty, Glazed Structures and Skylights.—8,364, J. Wood, Producing a Glazed Surface on Stone.—10,514, E. Wood, Ventilators.—3,665, H. Allison, Floor and Wall Covering.

RECENT SALES OF PROPERTY.  
ESTATE EXCHANGE REPORT.

By DYER, SON, & HILTON.  
Lham, High-street—Turrington Lodge and Meadow View, freehold ..... £3,750  
By KEYNOLDS & EASON.  
Walthamstow—2, 3, and 4, Hope Cottages, freehold ..... 410  
Latham—Loate-road—Holly Lodge, 22 years, ground-rent 21 ..... 545  
Ingham—35, 40, and 42, High-street, 19 years, ground-rent 64 ..... 510  
Latham—2 and 3, Lewis-street, 49 years, ground-rent 81 ..... 490  
By RICHARDSON & BODDIE.  
Greenwich—4, Lorne-terrace, 78 years, ground-rent 44, 8s. .... 220  
By TOLLE & HARRING.  
Ethel Green-road—Nos. 120 to 126 even, and 1, George-street, 70 years, ground-rent 654 ..... 810

By MATTHEWMAN, EVANS, & CO.  
Wanted—The Elephant and Castle Beer-house, copyhold ..... £470  
By A. WATSON.  
Dulwich—56, Elsie-road, 88 years, ground-rent 71, 6s. .... 340  
By WOOD & SEXTON.  
Brixton—45 and 69, Arlington-road, 88 years, ground-rent 171 ..... 490  
By R. J. COLLIER.  
Pepler—1, Newby-place, freehold ..... 275  
By COLLETT & COLLETT.  
Notting Hill—70, Bevering-road, 80 years, ground-rent 71 ..... 360  
By DRYER & CO.  
Claygate, near Esher—A Plot of Freehold Land, 2a. 1r. 19p. .... 600  
Egham, Surrey—Seven freehold houses ..... 1,100  
Wandsworth-place—Ground-rents of 61, a year, reversion in 64 years ..... 1,550  
Elmfield, near Horsham—Gaskin's Farm, 68a. 0r. 12p. freehold ..... 2,350  
By D. J. CUNTELL.  
Chislehurst—The Residence called Park View, freehold ..... 2,220  
By TOWERS, WILLIAMSON, & CO.  
Notting Hill—13 and 14, Addison-road North, 54 years, ground-rent 201, 14s. .... 960  
Hyde Park—6, Connaught-street, 30 years, ground-rent 181, 18s. .... 1,380  
By DALE & SON.  
St. George's-in-East—97 and 99, Martha-street, 4 years, ground-rent 51, 12s. .... 50  
3, 9, and 11, Dean-street, 10 years, ground-rent 141 ..... 215  
Mile End—61, Smith-street, 27 years, ground-rent 21 ..... 285  
5, Patterson-street, 14 years, ground-rent 41 ..... 140  
Belsah Green—30, Fidelity-street, 70 years, ground-rent 71, 10s. .... 260  
St. George's-in-East—34, Cable-street, freehold ..... 650  
Limehouse—34, 36, and 38, Turner's-road, 78 years, ground-rent 121, 10s. .... 780  
Poplar—8, Eldon-street, freehold ..... 470  
23, Rook-street, freehold ..... 105  
25, Tetley-street, freehold ..... 210  
Brixton—15, Whitelamb-street, 27 years, ground-rent 24, 2s. .... 147  
22, 24, and 26, Whitelamb-street, freehold ..... 515

MEETINGS.

SATURDAY, MAY 1.

Association of Public Sanitary Inspectors.—Address by Mr. Edwin Chadwick, C.B., President. 6.30 p.m.  
St. Paul's Ecclesiastical Society.—Visit to the Church of West Ham. 3.45 p.m.

MONDAY, MAY 3.

Royal Institute of British Architects.—Annual General Meeting. 8 p.m.  
Surveyors' Institution.—Professor W. Freeman on "The Geology of the Surface in its Practical Aspects." 8 p.m.  
Society of Engineers.—Mr. W. A. Martin on "Induced versus Forced Draught for Marine Boilers." 7.30 p.m.  
Clerks of Works' Association.—Mr. J. R. Cruickshank on "The Decoration of Public Buildings." 8 p.m.  
Inventors' Institute.—8 p.m.  
Victoria Institute.—8 p.m.  
Society of Chemical Industry (London Section).—(1) Mr. A. G. Salomon on "The Purification of Water." (2) Messrs. Macnab and Beckett on "The Treatment of Water for Technical Purposes." 8 p.m.  
Society of Antiquaries of Scotland.—Mr. J. Romilly Allen on "Early Christian Symbolism in Great Britain and Ireland" (Rhind Lectures in Archaeology), Masonic Hall, Edinburgh. 4 p.m.

TUESDAY, MAY 4.

Art Union of London.—Annual Meeting and Distribution, Adelphi Theatre. 11.45 a.m.  
Institution of Civil Engineers.—(1) Mr. Francis Fox on "The Mersey Railway." (2) Mr. W. E. Biss on "The Hydraulic Passenger Lifts at the Underground Stations of the Mersey Railway." 8 p.m.  
Society of Antiquaries.—Anniversary Meeting. 2 p.m.  
Society of Biblical Archaeology.—8 p.m.  
Society of Arts (Special Lectures).—Mr. Ernest Hart on "Japanese Art Work."—I. 8 p.m.

WEDNESDAY, MAY 5.

Society of Arts.—Adjourned Discussion on Dr. C. Meymott Tidy's paper on "The Treatment of Sewage." 8 p.m.  
British Archaeological Association.—Annual Meeting. 4.30 p.m.  
Civil and Mechanical Engineers' Society.—Annual General Meeting. 7 p.m.  
Builders' Foremen and Clerks of Works' Institution.—Ordinary Meeting. 8.30 p.m.  
Society of Antiquaries of Scotland.—Mr. J. Romilly Allen on "Early Christian Symbolism in Great Britain and Ireland." 4 p.m.

THURSDAY, MAY 6.

Royal Archaeological Institute.—Mr. R. S. Poole on "The Value of Archaeology in the Study of the Bible." 4 p.m.  
Society for the Encouragement of the Fine Arts.—Conversations at the Galleries of the Institute of Painters in Water Colours. 8 p.m.  
Institution of Mechanical Engineers.—General Meeting. 7.30 p.m.

FRIDAY, MAY 7.

Architectural Association.—Mr. W. J. N. Millard on "Architectural Traveling." 7.30 p.m.  
University College.—Professor C. T. Newton, on "Greek Inscriptions."—I. 4 p.m.  
Institution of Mechanical Engineers.—General Meeting continued. 3 p.m.  
Lincoln Diocesan Architectural Society.—12.15 p.m.

SATURDAY, MAY 8.

Architectural Association.—Visit to the National Liberal Club, Victoria Embankment. 3 p.m.  
Edinburgh Architectural Association.—Visits: (1) to Ancient Chapel, Church, and Rosend Castle, Burnside; (2) to Sinclairtown Wacloch and Lincolne Works.

Miscellaneous.

**Plumbers' Company.**—The Ordinances of this Company, dating from A.D. 1365, fix St. Mark's Day as the first quarterly meeting of the year. The observance of this Ordinance has continued unbroken since that date, and by reason of St. Mark's Day falling this year upon the Bank Holiday, arrangements had to be made for holding the meeting at the Guildhall Tavern, Gresham-street, which was opened specially for the purpose. The Court assembled at half-past three, Mr. George Shaw, C.C. (the Master), presiding, supported by Mr. Alderman Knill, Prime Warden; Mr. F. Machin, Renter Warden; Mr. W. Digby Seymour, Q.C.; Mr. Philip Wilkinson, Mr. Chas. Hudson, Mr. R. Cooke, Mr. W. H. Bishop, Members of the Court. Among the aged women admitted to the annual pension, and relieved by a grant of 51. 5s., was Charlotte Hardcastle, who produced the indentures of apprenticeship and freedom of her father, a Liveryman of the Company, dated 1765. It was reported to the Court that the registry for qualified plumbers, opened by the Company at the Guildhall on the 1st of March, was very generally approved, not only by the plumbers of the London district, but that plumbers (both masters and journeymen) in various parts of England and Wales, as well as Scotland and Ireland, had applied to be admitted to the London Register pending the establishment of offices of registry in the provinces. The quarterly returns of the United Operative Plumbers' Association of Great Britain and Ireland (numbering 3,000 plumbers in various parts of the kingdom) were submitted to the Court, with a communication from Mr. Geo. B. Cherrry, the General Secretary (Sheffield), expressing the satisfaction of the Executive Council of the Association with the system of registration established by the Plumbers' Company.

**The Resistance of Building Stone to Frost.**—Herr Frangenheim (in the *Deutsche Bauzeitung*) remarks that most books upon tests of building materials recommend the glauber-salt process for arriving at the resistance of building stones to frost. He disputes, however, the analogy between a test applied to a sample of stone and the actual effects of frost upon large stones exposed to humidity, and with surfaces which have been more or less affected in their structure by dressing with various instruments. From Professor Tetmajer's investigations it would seem that contraction takes place during the crystallisation of glauber salt instead of extension, so that the value of this test has become much depreciated in technical circles. The Berlin testing station has tried the actual effects of frost by a comprehensive series of experiments, the results of which have been indicated by the loosening of the structure of the stone, as illustrated by diminished resistance to pressure. Herr Frangenheim considers, however, that further experiments are necessary before conclusions of definite value can be arrived at. His own investigations have led to the result that stone of acknowledged and tried durability has been injuriously affected by glauber salt, while inferior stone has not suffered. He considers that the tests hitherto made are not sufficient for arriving at a reliable opinion as to whether the structure or the composition of the various descriptions of stone experimented upon has led to the conclusions arrived at.

**The Hunting Castle of the Empress of Austria.**—This new structure, near Spessing, is described by the Vienna *Gewerbe Zeitung* as doing credit to the artistic skill of Baron Haesener, who has been entrusted with the work. The relative simplicity which characterises the other Imperial residences has in this instance given place to rich decoration, in which architecture, painting, and sculpture, have been fully employed. The road from the station of Spessing is illuminated by 115 electric lights. The castle stands on the site of a wood which had to be removed, the excavations being performed by the Union Building Association. Mannersdorf and Almas stone have been principally used. In the flooring of the entrance-hall polished white slabs of Belgian and Carrara marble have been employed.

**Nineteenth Century Art Society.**—Thursday, the 29th inst., has been appointed for the reception of works of art intended for the Summer Exhibition of this Society, at the Conduit-street Galleries.



**British Archaeological Association.**—On Wednesday, April 21st, Mr. Thos. Morgan, F.S.A., in the chair, a series of ancient views of Rheims were exhibited by Mr. Loftus Brock, F.S.A., illustrative of the visit of the Leland Club to that city, which is to take place in course of the present week. These views indicate the aspect of many of the buildings which have since been demolished. Among these was the Church of St. Nicaise, an elegant building of the thirteenth century, of which a view of the west front was exhibited, while an ancient plan showed the positions of a singular group of churches close to it, also a similar group around the neighbouring Church of St. Remi. The division of the city into squares of unequal size appears to show the continuance of the plan of the Roman city to Medieval times, similar in this respect to Gloucester and some other cities in England which were referred to. Mr. Romilly Allen, F.S.A. Scot., exhibited a remarkable powder-disk of horn illustrated with quaint subjects of most archaic design, representing scenes of New Testament history. The workmanship is Scandinavian, and the date that of the seventeenth century, showing a singular survival of older forms. A paper was read by the Chairman on Haslemere and its locality, and another by Mr. J. T. Irvine, on the Saxon Tower of Barnack Church, the architectural features being described in detail. The meagre historical evidences were referred to, and a late Saxon date was assigned to the work, the tower having been added probably to an older wooden church, an opinion which was demurred to by some of the members.

**St. Alban's and Milan.**—There is a splendid chance of more distinction for the amateur architect who is said by the curious to have made himself noble by making the west front of St. Alban's Abbey ignoble. One of the most magnificent cathedrals in the world, the Duomo of Milan, is to be provided with a new façade. The prize-jury appointed by the conscript fathers of the old Lombard capital offer four premiums of considerable amount to the senders of the four best "projects of restoration." The competition is open to architects of all nations. A programme, with the conditions and a set of illustrative plates, at the cost of four francs, including postage, may be obtained by any applicant who will send his name and address to Signor Ulrico Huelpli, bookseller to the King of Italy, Milan. Possibly the Italians might like to have their church of St. Ambrose, like our church of St. Alban's, subjected to the process wickedly known as "a Becketting."—*Pall Mall Gazette.*

**Edward Alleyn's Almshouses.**—The foundation-stone of Alleyn's Almshouses was, on Monday last, in the presence of a representative gathering of the inhabitants of Southwark, laid by Mr. F. Sandman, the College Warden, at Hamilton-road, Lower Norwood. The buildings provide accommodation for ten persons, each of whom will have a suite of rooms, consisting of living and bed room, kitchen with sink and dust-shoot, and water-closet and coal-cellar. The plans have been prepared by Mr. C. N. McIntyre North, of 15, Borough-street, S.E., and the buildings are being erected, under his superintendence, by Mr. Wm. Marriage, of Croydon.

**The Atmosphere of Railway Carriages.** A contemporary expresses a preference for death by "naphyia," to death by cold from sitting in a draught. We are not quite sure that, even granting the somewhat shaky use of a technical term, this preference is well grounded; but, however that may be, there is no sort of reason for making a selection. It is not necessary to choose between closed and open windows in travelling by rail. Nothing could possibly be easier than to ventilate a carriage moving rapidly, by a very simple and obvious contrivance of air-chambers in the roof. There need be no down-draught, and certainly no difficulty exists in providing effectually for the egress of impure air and the introduction of pure air. The fact of movement overcomes the obstacle to ventilation which exists in the case of a fixed chamber.—*Lancet.*

**New Railway Station at Norwich.**—On Monday next, May 3rd, the Great Eastern Railway Company intend to open the new passenger station at Thorpe for traffic. This station is, next to Liverpool-street, the largest owned by the company. It has been constructed by Messrs. Youngs, contractors, Norwich. The building faces the river. The want of a new station has long been felt in Norwich. The old one, it is stated, is to be turned into a goods station.

**Board Schools, Clyde Bank, Dumbarton-shire, N.B.**—The School Board of the parish of Old Kilpatrick recently decided to erect a new school at Clydebank, and invited architects to send in competitive plans. Fourteen architects responded, and sent in twenty designs. At a meeting of the Board held on the 23rd ult., these were carefully examined, and the design marked "Science" was adopted. This school will be one of the largest and most complete in the West of Scotland, and has accommodation, on the ground and first floors, for 1,500 scholars. The upper floor is specially designed and arranged for technical classes, and accommodates between 300 and 400 pupils. The class-rooms are large, lofty apartments, thoroughly well lighted and ventilated. The stairs are broad and easy, the steps all radiating to one common centre. There are masters' and pupil teachers' rooms on each floor, and convenient cloak-rooms for the children. The janitor's house is at the principal entrance. Messrs. A. Thomson & Turnbull, of Glasgow, are the architects, and they have been instructed to proceed with the work.

**Utilisation of Gas Residuals.**—At a recent meeting of the Stafford Town Council, the Gas Committee reported that they had instructed the manager to use the tar for heating the retorts in lieu of coke, and to purchase Mr. Simon's apparatus for manufacturing sulphate of ammonia and to erect the necessary buildings, the total cost not to exceed £600. Alderman Dudley, in moving the adoption of the report, referred to the great fall that had taken place in the value of these residuals, which would amount at the present market price to no less than 1,400*l.* during the next twelve months. They had been selling the tar for five years at 3*s.* per ton, and the liquor at 1*s.* 5*d.* Now, in answer to their advertisement for tenders, the highest tender received had been 8*s.* for tar and 3*s.* 11*d.* for the liquor. If they had accepted this price, the amount they would realise would only be 430*l.* instead of 1,837*l.*, which they received last year. The committee, therefore, felt this was a matter of such serious importance that they deferred its consideration until they had ascertained if there was any better method of using the residuals than selling them at so low a price. After careful consideration of the whole matter the manager was now in a position to assure them that by adopting the manufacture of sulphate of ammonia he could realise a profit of about 450*l.* or 500*l.* a year over and above the present market price for the article. With regard to the tar, after careful study and testing they had ascertained that the tar would be worth 12*s.* 9*d.* a ton to them to burn, whereas they had only had an offer under pressure of 10*s.* a ton for it, and therefore they intended to burn it instead of selling it at that low price. The opinion of the committee was that no tar should be sold for less than 20*s.* a ton. They would not have much to dispose of after burning what they required, and he had no doubt if every gas-works adopted the same plan they would soon see the price go up to something like its old figure. The report was adopted.

**The Turners' Company.**—This Company is offering, and has before offered, various prizes for the best examples of turning in wood and pottery, in special classes. Works in competition are to be sent in during the week ending October 23. Particulars may be obtained on application to Mr. Edgar Sydney, the honorary secretary to the Competition Committee, at 4, Hare-court, Temple.

**Artists' Benevolent Fund.**—Lord Chief Justice Coleridge will preside at the seventy-seventh anniversary dinner of the Artists' Benevolent Fund, on the 4th of June next, at the Freemasons' Tavern. The fund was founded in 1810, and incorporated by Royal Charter in 1827, and has given to widows and orphan artists above 50,000*l.* since its foundation.

**Lectures at the British Museum.**—Miss J. E. Harrison intends to give a course of four lectures on the "Topography and Monuments of Modern Athens," in the Archæo Room of the British Museum, on Wednesday, May 12th, and the three following Wednesdays, at 11.45 a.m. precisely. Letters in regard to admission to the lectures can be addressed to Miss Wilson, No. 45, Colville-gardens, W.

**Lincrosta-Walton Decoration.**—Some important exhibits of this class of work are in preparation for various rooms or stands in the Edinburgh, the Liverpool, and the Indian and Colonial exhibitions.

**Horwich New Railway Works.**—Rapid progress is being made with these extensive works, in course of construction by the Lancashire and Yorkshire Railway Company, to relieve the great pressure at their large establishments in Miles Platting. Two-thirds of the locomotive erecting shops have now been completed, and the building will be 1,520*l.* long by 115 ft. wide, and 30 ft. high, and be furnished with a score of travelling cranes, each of 30-ton lifting power. The contract for these has been let to Messrs. Etherington, Manchester, at an estimated cost of 18,000*l.* and the delivery of the cranes is expected to commence almost immediately. Mr. Meadows of Stockport, is the contractor for the locomotive works. Half-a-dozen exceedingly large carriage-sheltering sheds, of corrugated iron with semicircular roofs, have been erected by Messrs. Fish of Preston; and Mr. Riley, of Fleetwood, is engaged in the construction of large ranges of offices for the Company. These will have a frontage to the highway of 350 ft. Since the Railway Company commenced to lay down their works here, the little village has developed by leaps and bounds upon rows of house and shop properties springing up in all parts of the township. The demand the Local Board are expected to largely increase their water supply and they are also engaged in an extensive sewerage scheme, the cost of which is estimated at 10,000*l.* Mr. James Lomax, of Bolton, is the engineer for the latter, which will be carried out on his quiescent precipitation principle.

**The Battersea Dust-yard.**—We are glad to learn that there is at last a prospect of a scandal of the Battersea Dust-yard, against which we have so often inveighed, being satisfactorily and finally settled. Attempts have more than once been made to get rid of the nuisance, and the Southwark and Vauxhall Water Company in particular have striven to free their filter-beds from the danger involved in the too close proximity of the dust-yard to them. In the Water Company's Bill of session is a clause authorising the compulsory purchase by them of the dust-yard site, the object, of course, of abolishing forthwith the storage of refuse there. An agreement has, however, now been entered into between the Water Company and the London, Brighton and South-Coast Railway Company, by which the railway company, being anxious not to part with the land, have undertaken to discontinue the use of the land for dust-sifting for any other noxious purpose, upon condition that the compulsory powers are withdrawn from the Bill. The Local Government Board, it is understood, have agreed conditionally to this arrangement, as it permanently removes the danger which they complain.—*The Sanitary Record.*

**The Corinth Canal.**—The work of cutting a ship canal across the Isthmus of Corinth is making fair, though not very rapid, progress. At the present time there are upwards of 1,000 workmen employed on the excavations. The total quantity of earth which it was necessary to dig out was over twelve million cubic feet, and of this two and a half million cubic feet have already been removed. The depth of the canal will be 8 metres, or 26 ft. The width of the surface of the water will be 22 metres, 72 ft., except at the entrance, where it will be from two and a half to three times the width. Already the water of the adjacent sea penetrates to a distance of about 1,600 ft. on the land on each side, the depth being not less than 17 ft. At the rate at which the work is being accomplished, the canal will be completed within five years from the present date.

**Burma.**—With a view to encourage enterprise among the indigenous races in Burma the Local Government have been pleased to offer a scholarship of Rs. 60 per mensem, available for five years, to youths of Burmese or Indo-Burmese origin. Applications from suitable candidates to be sent in to the Director of Public Instruction before the 31st of May 1886. The successful candidate will be sent to the Engineering College at Calcutta, where he will be trained in the profession, and ultimately join the superior service of the D. P. W. Burma.—*Indian Engineer.*

**Indian and Colonial Exhibition.**—Understand the Wilkes's Patent Metallic Pavé Company have received instructions to pave the Indian Village at the Colonial and Indian Exhibition at South Kensington, the paving to be the same as that laid in the Old London Street at the Inventions Exhibition last year.



**Gift of Pictures to the Wolverhampton Art Gallery.**—At the last meeting of the Wolverhampton Town Council, the Mayor read letter stating that Mr. P. Horsman, the donor of the art gallery, had authorised the inscription on some valuable paintings he had sent in the art gallery to be altered from "Presented" to "Presented." The pictures, eleven number, were estimated to be worth 2,500l. vote of thanks to Mr. Horsman was carried, and it was referred to the General Purposes Committee to consider how Mr. Horsman's vast liberality to the town could be best acknowledged.

**More Exhibitions.**—We shall soon witness the opening of three large exhibitions almost simultaneously, viz., the Colonial and Indian South Kensington; the "Shippers" at the perip; and the International Art and Industrial Exhibition at Edinburgh. In connection with the "Shippers" Exhibition Liverpool, or, as it is officially styled, the International Exhibition of Navigation, Travelling, Commerce, and Manufacture, it may be mentioned that Mr. Frank Leslie, one of the Honorary Secretaries, engaged in delivering lectures in Liverpool, Chester, and other neighbouring towns, descriptive of the building and its chief exhibits. These lectures are illustrated by lantern views, and are free with the exception that a large fee is made in some cases for front seats. The foretaste of the exhibition is intended, of course, to whet the appetite of possible visitors to the exhibition to such an extent as induce them to go there to feast their eyes on its contents. But there are other inducements to come. We have received the prospectus of the Decorative Art Exhibition, which will be opened on July 12th at the Royal Aquarium, Westminster, and will remain open till the 31st of that month. There are to be twenty-two classes, each of which will comprise sections, "trade and professional" and "amateur." We must also acknowledge the receipt of the preliminary prospectus of the Newcastle-upon-Tyne Mining, Engineering, and Industrial Exhibition (International and Colonial) which is to be held next year. It is intimated that "a complete full-sized working del of a mine shall form a special feature" of the Exhibition.

**PRICES CURRENT OF MATERIALS.**

TIMBER.			
Nature of Work, or Materials.	By whom required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
er Works	Newmark Watraks Co.	E. Easton & Co.	May 3rd
ing-up Carriageways and Footways	Chelsea Vestry	G. R. Strachan	May 4th
ilding Boundary Wall	Lambeth Guardians	Catt & Smith	May 5th
d Paving	Westminster Bd. of Wks	C. R. V. Wheeler	May 6th
ing and Painting Works	Midland Railway Co.	A. A. Langley	May 7th
ing Apparatus	County of Stafford	R. Griffiths	May 8th
ing, Larning, &c.	Swansea Union	Official	May 11th
Works	War Department	H. Saxon Snell & Son	May 12th
ing and Fittings for Schools	Holborn Union	Official	May 13th
ing, Repairs, and Materials	School Bnd for London	Official	May 14th
Station at Stratford	War Department	do.	May 15th
ing Improvements	Great Eastern Ry. Co.	do.	May 16th
	Chepping Wycombe	do.	May 17th
	U. S. A.	J. Bowen	May 18th
ing Lamp Columns and Brackets	Liverpool Corporation	Official	May 19th
ing, Repairs, and Building Materials	War Department	do.	May 20th
ing of Kitchen of Infirmary	Chelsea Guardians	do.	May 21st
ing Works	Vestry of St. George	do.	May 22nd
ing Granite, Flints, and Tar Paving	Martyr, Southdawk	do.	May 23rd
ing Sewers and other Works	Chiswick Local Board	do.	May 24th

**CONTRACTS AND PUBLIC APPOINTMENTS.**

*Epitome of Advertisements in this Number.*

CONTRACTS.			
Nature of Work, or Materials.	By whom required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
er Works	Newmark Watraks Co.	E. Easton & Co.	May 3rd
ing-up Carriageways and Footways	Chelsea Vestry	G. R. Strachan	May 4th
ilding Boundary Wall	Lambeth Guardians	Catt & Smith	May 5th
d Paving	Westminster Bd. of Wks	C. R. V. Wheeler	May 6th
ing and Painting Works	Midland Railway Co.	A. A. Langley	May 7th
ing Apparatus	County of Stafford	R. Griffiths	May 8th
ing, Larning, &c.	Swansea Union	Official	May 11th
Works	War Department	H. Saxon Snell & Son	May 12th
ing and Fittings for Schools	Holborn Union	Official	May 13th
ing, Repairs, and Materials	School Bnd for London	Official	May 14th
Station at Stratford	War Department	do.	May 15th
ing Improvements	Great Eastern Ry. Co.	do.	May 16th
	Chepping Wycombe	do.	May 17th
	U. S. A.	J. Bowen	May 18th
ing Lamp Columns and Brackets	Liverpool Corporation	Official	May 19th
ing, Repairs, and Building Materials	War Department	do.	May 20th
ing of Kitchen of Infirmary	Chelsea Guardians	do.	May 21st
ing Works	Vestry of St. George	do.	May 22nd
ing Granite, Flints, and Tar Paving	Martyr, Southdawk	do.	May 23rd
ing Sewers and other Works	Chiswick Local Board	do.	May 24th

**PUBLIC APPOINTMENTS.**

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page.
ty Surveyorship, Ireland	Civil Service Com.	Not stated	Not stated	xvi.

TIMBER (continued).			
Nature of Work, or Materials.	By whom required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
Wainscot, Rigs.	log	2 15 0	4 10 0
Dead, Finland, 2nd and 1st. std. 100		3 12 6	5 10 0
4th and 3rd		8 0 0	7 10 0
Rigs		8 0 0	10 0 0
St. Petersburg, 1st yellow		8 0 0	14 0 0
2nd		7 0 0	8 15 0
white		7 0 0	10 0 0
Sweden		7 0 0	10 0 0
White Sea		7 0 0	17 10 0
Canada, Pine 1st		17 0 0	80 0 0
2nd		13 0 0	17 0 0
3rd		8 0 0	10 0 0
Spruce 1st		8 0 0	11 0 0
3rd and 2nd		8 0 0	7 10 0
New Brunswick, &c.		5 0 0	7 0 0
Battens, all kinds		4 0 0	13 0 0
Flooring Boards, sq. 1 in.—Prepared, first		0 9 0	0 13 0
Second		0 5 0	0 7 0
Other qualities		0 0 3 1/2	0 0 4
Cedar, Cuba		0 0 3	0 0 4
Honduras, &c.		0 0 3	0 0 4
Australia		0 0 5	0 0 7 1/2
Malagasy, Cuba		0 0 5	0 0 7 1/2
St. Domingo, cargo average		0 0 5	0 0 7 1/2
Mexican		0 0 5	0 0 7 1/2
Tobacco		0 0 5	0 0 7 1/2
Honduras		0 0 4 1/2	0 0 6 1/2
Maple, Bird's-eye		0 0 6	0 0 8
Rose, Rio		7 0 0	10 0 0
Bahia		10 0 0	10 0 0
Box, Turkey		5 0 0	18 0 0
Satin, St. Domingo		0 0 7	0 0 11
For Rigs		0 0 8	0 0 1 1/2
Walnut, Italian		0 0 4	0 0 6

METALS.			
Nature of Work, or Materials.	By whom required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
Iron—Pig, Scotland		0 0 0	0 0 0
Bar, Welsh, in London		4 10 0	4 17 0
" " in Wales		4 5 0	4 10 0
" Staffordshire, London		5 15 0	6 10 0
Sheets, single, in London		6 15 0	8 10 0
Hoops		6 0 0	7 0 0
Nail-roads		5 15 0	6 10 0
Copper—			
British, cake and ingot		44 0 0	45 10 0
Best selected		46 0 0	46 10 0
Sheets, strong		63 0 0	0 0 0
" India		49 0 0	50 0 0
Copra		47 0 0	47 10 0
Chili, bars		41 15 0	42 3 6
Yellow Metal		0 0 4 1/2	0 0 4 1/2
Lead—Pig, Spanish		13 2 6	13 5 0
English, common brands		13 15 0	0 0 0
Sheet, English		14 5 0	14 10 0
Spelter—			
Siemens, special		14 7 6	14 10 0
Ordinary brands		13 2 6	14 5 0
Tin—			
Banca		0 0 0	0 0 0
Bilkinson		0 0 0	0 0 0
Straits		83 10 0	94 0 0
Australian		83 17 6	94 7 6
English ingots		98 10 0	97 0 0
Zinc—			
English sheet		0 0 0	0 0 0

OILS.			
Nature of Work, or Materials.	By whom required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
Linseed		19 10 0	20 0 0
Cocconut, Cochiti		28 10 0	29 0 0
Ceylon		24 15 0	0 0 0
Palm, Lagos		0 0 0	0 0 0
Palm-nut Kernel		0 0 0	0 0 0
Rapeseed, English pale		21 10 0	22 0 0
" brown		22 0 0	0 0 0
Cottonseed, refined		16 10 0	17 10 0
Tallow and Oleine		25 0 0	45 0 0
Lubricating, U.S.		8 0 0	10 0 0
Refined		8 0 0	13 0 0
Turpentine—			
American, in casks		1 9 6	1 10 3
Tar—Stockholm		0 18 0	0 19 0
Archangel		0 10 6	0 11 6

**TENDERS.**

**ACTON.**—For the erection of Parish Hall at South Acton, W., for the Rev. A. Hunter Dunn, M.A. Mr. Edward Monson, jun., Grocerhouse, Acton, architect. Quantities supplied:—  
F. Bray, Acton ..... £1,543 14 0  
Penry & Co., Ealing ..... 2,235 0 0  
Steel Bros., Dalston ..... 2,181 0 0  
T. Nye, Ealing ..... 2,130 0 0  
S. Hunt, Chiswick ..... 2,068 0 0  
P. L. Green, Holborn ..... 2,749 0 0  
W. Woodward, Finsbury ..... 2,050 0 0  
T. Anthony, Brentford ..... 2,023 0 0  
P. Brown, Southall ..... 1,867 0 0  
Hann & Co., Windsor ..... 1,879 0 0  
G. Lifford, Shepherd's Bush ..... 1,900 0 0  
G. Hooper, Acton (accepted) ..... 1,87 12 0

**BREDE Sussex.**—For alterations and additions and part rebuilding the Rectory, Breda, Sussex. Mr. Lacy W. Ridge, architect, London:—  
W. Comfort, Northiam ..... £1,207 13 0  
R. Nokes, Breda ..... 1,332 10 0  
A. Neaves, Udimore ..... 1,348 0 0  
H. J. Rodda, St. Leonard's-on-Sea ..... 1,350 0 0  
J. Longley, Crawley ..... 1,361 0 0  
G. Harmer, Hurlingham ..... 1,362 13 0  
Eldridge L. Crutenden, St. Leonard's-on-Sea ..... 1,387 0 0  
W. Colman, Stone Link, Breda ..... 1,420 0 0  
W. E. Warnam, Hastings ..... 1,453 0 0

**BRENTFORD.**—For making-up and sewerage Spring-grove. F. W. Lacey, A.M.I.C.E., surveyor, Brentford:—  
Treherne & Co. .... £270 0 0  
Brundson & Co. .... 216 0 0  
William Parker ..... 219 0 0  
Nowell & Robson ..... 215 0 0  
Mowlem & Co. (accepted) ..... 201 0 0

**BRISTOL.**—For the erection of the Parish Church, Ashton Gate, Bristol, from the finished level of the foundation work. Mr. John Evans, architect, Unity-street, Bristol:—  
Section 2. Section 3. Total.  
Brook & Bruce ..... £2,549 ..... £1,804 ..... £4,353  
W. Cowlin & Son ..... 3,386 ..... 1,765 ..... 5,151  
H. A. Forde ..... 3,320 ..... 1,720 ..... 5,040  
E. Walters ..... 3,000 ..... 1,676 ..... 4,676  
A. J. Beaver ..... 3,050 ..... 1,450 ..... 4,500  
W. Church ..... 2,883 ..... 1,499 ..... 4,381  
Stephens & Bastow ..... 2,949 ..... 1,449 ..... 4,398  
C. A. Hayes ..... 2,737 ..... 1,559 ..... 4,297  
R. Wilkins & Sons ..... 2,880 ..... 1,494 ..... 4,374  
J. Wilkins ..... 2,800 ..... 1,420 ..... 4,220  
\* Accepted.

**CARDIFF.**—For additional buildings at existing tramway depot, for the Provincial Tramways Company. Messrs. Davis & Emanuel, architects, London:—  
C. Fox ..... £2,653 0 0  
Jones Bros. .... 2,180 0 0  
C. Burton ..... 2,147 0 0  
Shepton & Son ..... 2,065 0 0  
F. S. Lock ..... 1,767 0 0  
[All of Cardiff.]

**CARDIFF.**—For new tramway depot at Cathays, for the Provincial Tramway Company. Messrs. Davis & Emanuel, architects, London:—  
C. Fox ..... £4,437 0 0  
Jones Bros. .... 3,998 0 0  
C. Burton ..... 3,582 0 0  
Shepton & Son ..... 3,773 0 0  
F. S. Lock ..... 3,482 0 0  
[All of Cardiff.]

**CROYDON.**—For finishing Tower House, Birdhurst Rise, Croydon. Mr. F. West, architect:—  
F. R. Docking ..... £384 0 0  
T. Brinley ..... 333 0 0  
S. Page ..... 323 0 0  
Goulder & Glascock ..... 315 10 0  
M. Taylor ..... 315 0 0  
J. Horrocks ..... 288 0 0  
Bridge (accepted) ..... 226 10 0  
[All of Croydon.]


**CROYDON.**—For the erection of house at the junction of the Kidderminster and Stanton roads, Croydon. Mr. F. West, architect:—  
W. Marriage, Croydon ..... £360 0 0  
Smith & Bullard, Croydon ..... 325 0 0  
Smith & Sons, South Norwood ..... 889 0 0  
E. J. Saunders, Croydon ..... 870 0 0  
M. Taylor, Croydon ..... 850 0 0  
S. Page, Croydon ..... 825 0 0

**CROYDON.**—For alterations and additions to premises, North End, Croydon, for Mr. D. H. Weston. Mr. F. West, architect, Croydon:—  
Smith & Sons, South Norwood ..... £280 0 0  
W. Marriage, Croydon ..... 270 0 0  
S. Page, Croydon ..... 256 0 0  
M. Taylor, Croydon ..... 247 0 0  
F. R. Docking (accepted) ..... 225 0 0

**CROYDON.**—For the erection of house in the Waddon-road, Croydon, for Mr. W. P. Wenham. Mr. R. W. Price, architect, Cedar-road, Sutton:—  
Smith & Sons, South Norwood ..... £1,347 0 0  
M. Taylor, Croydon ..... 1,075 0 0  
W. Marriage, Croydon ..... 1,060 0 0  
S. Page, Croydon ..... 863 0 0  
Smith & Bullard (accepted) ..... 837 0 0

**DUTTON (Cheshire).**—For alterations and additions to the Union Farm at Dutton, near Preston Brock, Cheshire, for Mr. Algernon Charles Talbot. Messrs. C. E. Linaker & S. Davies, architects, Frodsham:—  
Stelfox & Carter, Northwich ..... £789 0 0  
Executors of late John Heave, Frodsham (accepted) ..... 719 0 0



 COLLINGE'S PATENT HINGE  
LEVER, SCREW, & BARREL BOLT  
Self-Acting "FALL DOWN" GATE STOPS, &  
and IMPROVED GATE FITTINGS of every Description  
36A, BOROUGH ROAD  
DISCOUNT TO BUILDERS. LONDON, S.E.

- MODELS AND SECTIONS ON VIEW. -  
LONDON: LIVERPOOL: GLASGOW:  
356 to 362, EUSTON ROAD. 6 and 8, HATTON GARDEN. 335, ARGYLE STREET.



## ILLUSTRATIONS.

Church of St. Bartholomew the Great, West Smithfield.—View showing proposed Completion of the East End.—Mr. Aston Webb, Architect...	674-675
Monuments lately discovered in the Crypt of the old Parish Church, Clapham .....	678
Sections of the Church of St. Bartholomew the Great, West Smithfield .....	679
Accepted Design for the Cheltenham Grammar School.—Mr. Henry Hall, Architect .....	682
A Porch in Terra-Cotta, East Sheen.—Mr. T. E. Colcutt, Architect .....	683
West Window, Tickhill Church, Yorks.—Executed in Stained Glass by Messrs. Powell Bros., Leeds .....	686-687

## CONTENTS.

St. Bartholomew the Great, West Smithfield .....	682	Cheltenham Grammar School .....	672	The Art-Union of London: Annual Meeting and Prize Distribution .....	682
The Indian and Colonial Exhibition .....	685	West Window, Tickhill Church, Yorkshire .....	672	An Improved Bath .....	682
Notes .....	686	Architectural Societies .....	672	A New Disconnector (Illustrated) .....	683
The Royal Academy Exhibition.—I. ....	688	Chair, St. Nicholas Church, Rye (Illustrated) .....	689	New Buildings for Poor Law Administration .....	683
The Royal Academy Exhibition .....	688	Competitions .....	689	"Robinson's Census" .....	683
The Grosvenor Gallery .....	670	Exhibition of Japanese Art Work .....	689	Newcastle-under-Lyme Public Buildings .....	683
A Social Reform Conference .....	670	Architectural Association: Italian Excursion .....	689	Truro Cathedral Central Tower Fund .....	683
The Edinburgh Exhibition .....	671	The Freeman's Exhibition .....	689	Brewery Chimney-Shaft .....	684
The St. Paul's Railway Station: London, Chatham, and Dover Railway .....	671	Examinations for Municipal and Sanitary Engineers and Surveyors .....	690	The Student's Column: Our Building Stones.—IX. ....	684
Royal Institute of British Architects: Election of President and Council .....	671	Loan Exhibition of Pictures at the Walker Art Gallery, Liverpool .....	690	Recent Patents .....	685
The Church of St. Bartholomew the Great .....	672	pool .....	690	Recent Sales of Property .....	685
The Atkins Monuments, Clapham .....	672	Delays in Sanitary Legislation .....	690	Meetings .....	685
Church at East Sheen, Surrey .....	672	The Geology of the Earth's Surface in its Sanitary Aspect .....	691	Miscellaneous .....	685
		The Proposed Mutation of the Charterhouse Buildings .....	691	Prices Current of Building Materials .....	197

### St. Bartholomew the Great, West Smithfield.



HE works designed for the preservation of this noble church form an important incident in current architectural history, partly on account of the intrinsic beauty and high antiquity of the fabric, and partly because they bring to a head many of the vexed questions which perplex those who are engaged in rescuing the works of our forefathers from desecration and decay, while respecting their present and future usefulness.

To begin at the beginning,—the history of the foundation of the church is unusually clear and singularly interesting. By a most fortunate chance, a Latin MS. entitled, "Liber Indacionis Ecclesie Sancti Bartholomei, Londoniarum," written between the years 1174 and 1189,—and probably more exactly about the year 1180,—by a monk of the priory, who had himself talked with those who remembered the founder, is still extant. It covers eighty-six leaves of vellum, measuring 10½ in. by 7½ in., and is preserved in the British Museum, and numbered "Vespasian B. IX." An English translation was made about the year 1400,—the date, it will be noted, of Chaucer's death,—and this is almost more interesting than the original, as being an example of English prose at a time when it was first assuming a settled form. The translation is much contracted, and has recently been most carefully and learnedly edited by Dr. Norman Moore, Warden of the College of St. Bartholomew's Hospital.

To recite shortly the material part of the record it is only necessary to say that the founder of the church and hospital was one Rahere, or Rayer, who, born of humble parents, possessed a pleasant wit, by the exercise of which he gained admittance to the households of princes and nobles, diverting their leisure by his antics and buffoonery, and "annoying thir eerys with jays and atterynges," pandering in fact to all their vices. From this useless,—perhaps sinful,—life he was miraculously called, and like so many others in those strange times when vice and virtue, like sun and shadow, stood out in old contrast, he became first an exemplary tenant, and afterwards almost a saint, pious, contemplative, and devoted body and soul to works of practical charity. During a visit to Rome "wepyng hys dedis, and reducing to mynde the scapis of hys yowth," he fell into serious illness and vowed to the service of

God whatever might remain to him of life. He recovered, and most religiously kept his vow. Of course he had a vision, which is set out by his admiring biographer with elaborate detail and devout unction. The blessed Apostle appeared to Rahere, and counselled him to build a church in a certain spot "yn the subbarbis," which should be more particularly indicated; while for the due performance of the holy work the needful help, he was assured, should not be wanting. A whole chapter is given to the "exposition" of this vision, over which we must not linger.

Rahere prudently disclosed his purpose to his bishop, and secured that prelate's good offices with the king. The chosen site was in Smithfield, which was then so very much "yn the subbarbis" that it was a waste marsh,—a sort of no man's land,—"dunge and fenny," defiled with all manner of ordure, and bearing aloft the common gallows whereon were hanged "theyrs and those dampned by iudiciale auctortye." He called to his aid a certain old man named Alfene, who had in his youth been employed in the building of St. Giles's Church in Cripplegate, and set valiantly to work. Church builders appear from the first to have met with their share of discouragement and opposition. Envious men conspired to thwart and annoy him, destroying nightly his daily work. The critic of the period was down upon him heavily, some "begiled hym with synulate frendschippes," and others "provoked hym with despitis," while from others again he went in fear of his life. Nevertheless, he struggled manfully against all difficulties, and gradually attracting to his side many faithful souls, he at last successfully accomplished his self-imposed task. The foundation-stone was laid in the month of March, 1123. The first portion of the work was consecrated in 1133 by Richard of Beauvais, and Rahere was elected the first Prior of the Community of Augustinian Canons, who were then and there established. On the 20th of September, 1144, their founder passed peacefully away, "forsaking the cley house of thys worlde that in the house of his fadir he myghte be crownyd." He ruled his convent with firmness and discretion, and it grew and prospered under his wise guidance: some at least of his solid, sturdy work may still be seen pretty much as it left his hands: it has survived most of the additions of his successors, and will, with reasonable care, endure for centuries, a witness at once to the good prior's simple faith and ardent charity.

The full extent which the ecclesiastical and monastic buildings eventually assumed may be seen in the plan on the following page.

The order of their edification appears to have been somewhat as follows:—

First the choir and choir aisle, the north and south transepts, and the tower at their intersection, and an eastern Lady-chapel. As this is referred to in the MS. as an "oratory," it was probably of much less extent than the handsome Lady-chapel afterwards built, the enclosing walls of which remain. Even the original Lady-chapel would appear to have been somewhat of an after-thought, for its junction with the choir aisle is marked by a certain awkwardness in the apsidal groining, which was evidently no part of the original scheme. A point of some interest is connected with the central tower, which was not a perfect square, owing to a variation in the widths of the nave and transepts respectively. The arches carrying the tower have, however, their springings and crowns level, and as the wider arches are semicircular it follows that the narrower ones are pointed,—and thus we see the pointed arch adopted *ex necessitate* by Norman builders. It is perhaps doubtful whether a Norman nave was ever built, the one Norman eastern bay having probably been erected as a counterfort to the thrust of the tower arches. The excavations now in progress or contemplated, will no doubt throw some light on this question. In any case an Early English nave was built in the succeeding century, and the earlier choir clear-story was replaced by one of later date. A fine Early English doorway still stands exactly in the prolongation of the south aisle; but whether this formed an entrance to the church or to the precincts it is not easy to determine at present. The fourteenth century was one of great building activity at St. Bartholomew's. A new Lady-chapel of splendid proportions was erected. The apsidal east end of the choir was converted into the square east end, which was always the favourite with English architects, a wall being built from the foundations upwards at the points in the side slightly east of the full diameter of the apse. This of course hid the Norman piers, and the space between them and the new east walls was used as a receptacle for human remains, and long known as "Purgatory." Early in the fifteenth century further extensions of the priory were in progress,—the cloisters, chapter-house, refectory, dormitory, and accessory buildings were erected, and the fortunes of the convent appear to have reached their zenith. Prior Bolton, 1506-32, effected some further alterations and embellishments which cannot all be with certainty traced. He raised the whole floor of the church some 2 ft. 6 in., altered in some way the central tower, and added the watching chamber on the south side of the



choir, which has ever since formed one of the peculiar features in the church. With the close of his rule the clouds began to gather about the priory, and its dis-edification but too quickly followed. Robert Fuller, the last prior, surrendered his charge into the hands of the king on the 15th October, 1540, who thereupon devised the prior's house, infirmary, dormitory, chapter-house, hall, kitchen, stables, &c., to Sir Richard Rich, the Lord Chancellor, for the sum of 1,064*l.* 11*s.* 3*d.* The nave of the church was destroyed, and the choir was decreed to be used thereafter as a parish church "for ever."

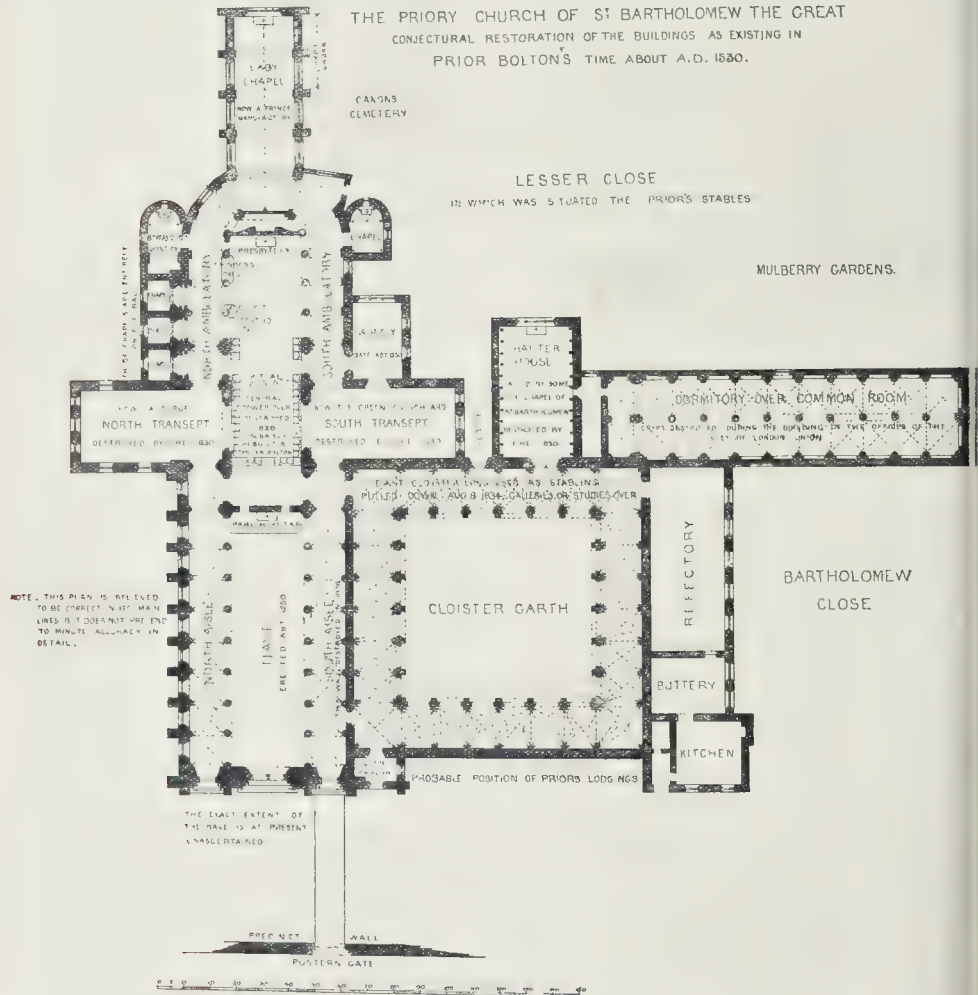
A change in the fortunes of the Priory took

custodians of the church have reduced it to a sorry plight indeed. Secular buildings of all sorts have clustered round the exterior walls so thickly that the casual visitor might pass within a few feet of this fragment of this noble but desecrated church without suspecting its existence. A blacksmith's forge occupies the site of the north transept, and, as a crowning calamity, a fringe factory, which has usurped the site of the Lady-chapel, has been allowed to protrude westward into the sanctuary itself and overhang the very altar. The force of indignity cannot further go!

Strenuous efforts were made about a quarter of a century ago to remedy this scandalous condition of things, and, although something

trustees, who hold it in reversion to the church authorities if within a reasonable time the purchase-money is forthcoming. So that the prospects of the church, if not very bright, are yet fairly hopeful. Its structural condition calls for immediate action, for the rain pouring through the roof, which has been patched until it can be patched no more, and the contiguity of the disused factory, with its complicated network of floors and partitions, is a standing work of fire, a cause of destruction from which the church has already frequently suffered.

The work of preserving what remains of the sacred fabric, and adapting it more perfectly for its proper use, has been entrusted to Mr. Aston Webb, and his proposals may be ascer-



place in Mary's reign, and the Dominicans, to whom the church was granted, commenced to restore the nave, but little appears to have been accomplished by them. In 1622-8 the steeple was pulled down and a western brick tower was erected, wherein the bells, which are of special interest as being the only pre-Reformation peal in London, have been fortunately ever since retained. About this time, or possibly a little later, the large and handsome eastern windows were, for some inscrutable reason, destroyed, and the present characterless semicircular headed openings substituted. Since then the course of degradation and spoliation has been continuous and rapid, and the greed or supineness of the

was done in the right direction, the bulk of the evils were at that time insurmountable.

A recent effort has met with more success. The fringe business appears to have gone bodily to France, and the vested interests which stood in the way of improving the choir became purchaseable. By the generous aid of the patron, the Rev. F. P. Phillips, and the energy of the rector, the Rev. W. Panckridge, and churchwardens, assisted by the parishioners, and in a limited sense by the public, those interests have been in part acquired. The freehold of the factory has been purchased and the accretions which conceal the north wall of the choir have come into the hands of the committee. Further, the blacksmith's shop has been bought by

tained from his published Report to the Executive Committee. They are divided in sections in the order of urgency:—

1. The completion of the apse, consequent upon the removal of the intruding factory.
2. The re-roofing of the church (which should have thought should have come first but he has no doubt good reason for giving a second place).
3. The removal of the boys' school, now he in the north triforium.
4. The removal of the forge and of the present vestry, and the rebuilding of shall north and south transepts.
5. Repairs to the west end, and uncovering the remains of the nave.



6. Re-seating and furniture.  
7. Restoration of the Lady-chapel, which it is hoped may some day be used as a Guild Chapel in connexion with a community associated with the hospital.

The interior view, which is reproduced in this number from a drawing in the present Royal Academy Exhibition, shows the general effect of the proposed works so far as the choir is concerned. The jambs of the fourteenth-century east window have been retained, and an elliptical arch turned from side to side, carrying a wall, and preserving the tradition of the square east end. The polygonal triforium and clearestory are carried round behind this sanctuary arch, and revive what must have been the general effect of the original design,—thus preserving “all the present traces of the architectural history of that portion of the building.”

The laying bare of the remains of the nave would, no doubt, “add very greatly to the architectural and historical interest of the church”; and it might be formed into a pleasant approach, a bright and quiet spot in a crowded and noisy neighbourhood.

We confess that, looking to all the conditions of the problem, we cannot see a better solution of it than that proposed by Mr. Webb. It is, of course, arguable that, having obtained possession of the church and its more immediate surroundings, we should leave it to tell its own tale of the changes and vicissitudes through which it has passed; that everything but it is of historic interest, and, therefore, sacred. This is an intelligible view of the case. But it is attended with some inconveniences. For it would not only extend to be ugly and incongruous cast-iron columns and wrought-iron girder, erected with an avowedly temporary object a quarter of a century ago; but to be quite logical, to the dust deposited yesterday, and the rain-stains in floor and walls. They have now all become historical, and there would appear to be nothing for it but to enclose the whole in a huge case, protect it from the weather, and let it sink into, by no means “unperceived,” decay.

But there is another side to the medal. This arch is far from being a mere curiosity fitly for a museum. It is the centre of a remarkably active ecclesiastical life. Shall its power for spiritual good be paralysed out of a sentimental regard for the structure as a mere work of art, or, rather, of those portions which have no art to recommend them? That would, indeed, be giving the devout parishioners stones for bread. The builders of the church did not do this. They never hesitated to destroy the material church if they could enlarge the sphere of its spiritual usefulness, and we find the fragments of their Norman choir built to the body of the Lady-chapel, which they tried to do.

We take the common-sense view of the situation to be that which the responsible authorities have adopted. To maintain every ancient feature; to repair what is repairable, and to replace what is not; and to fit the whole, according to our lights, to the needs of decent Christian worship.


The present proposals do not appear to stir the really ancient work. The new work will be distinctly new, and carefully differentiated from the old, and it can scarcely be contended, in the face of Mr. Webb's designs, that we or our posterity will be the loser by substitution of his nice art for the uncouth barbarism which it will replace.

It happens that in 1791 Mr. Thomas Hardwick prepared a series of careful drawings, owing to the then existing state of the church and its allied buildings, and these drawings have been preserved in the library of the Society of Antiquaries. The present state of the buildings has been delineated with equal accuracy, and these drawings will be placed in the same study. The history of the church will thus be preserved and recorded with exceptional accuracy.\* It is very sincerely to be wished

\* On the 3rd of May the Lord Mayor, sheriffs, and a distinguished company visited the church, and listened to short lectures on its history and peculiarities. Immediately after that it was handed over to Messrs. Dove, well-known church builders, for the commencement of the first portion of the work.

that the works now happily commenced may not languish for want of funds, which are sorely needed if all is to be done which it is desirable to do. St. Bartholomew was once very popular, dear to all Englishmen, and especially mariners. His life and martyrdom were the constant theme of preacher, painter, and moralist, and countless churches throughout the land are dedicated in his honour. May we, without suspicion of profanity, commend the work to the particular consideration of the Worshipful Company of Skinners, and in sober seriousness to every worshipful City Company whatever. There are many reasons why Englishmen of all shades should combine to help the work. Associations of all kinds cluster round the spot. Hogarth was baptised here, and Milton lived in the close hard by. It was not his wont to join in public worship, but the solemn swell of the organ and the melody of the bells must have fallen gratefully on his ear in his time of trial and seclusion. We have, however, not half the necessary space to touch upon all that might be said on this side of the subject. We heartily sympathise with those who are engaged in this difficult work, and hope at no distant date to congratulate them on its successful accomplishment.

### THE INDIAN AND COLONIAL EXHIBITION.

ONSIDERING the unfinished state, or even almost uncommenced state, of the arrangement of a great part of the Exhibition only two or three weeks ago, the stage of completeness which it had reached on the day of the opening speaks strongly indeed for the energy and industry of those who have been occupied in the preparations for the opening ceremony, which has been fully described in the daily papers. Those who have already visited it will, we have no doubt, consider that our prediction as to its high interest and beauty is fully borne out, as regards the Indian section to which we especially referred, and which forms by far the largest department of the Exhibition. The Colonial courts contain an immense amount of matter of practical interest, with which, so far as it touches on the subjects in which our readers are specially interested, we shall be able to deal from time to time during the progress of the Exhibition. The section of primary interest, however, is the series of Indian courts, which in themselves include a wealth of objects of art of all kinds, many of which it is impossible even to glance at in a general article; and perhaps the best thing we can do this week is to devote a few remarks to the exceedingly interesting series of screens which line the great avenue of the Exhibition, and which approach more nearly to the subject of architecture than anything else in the Exhibition, except the Indian Palace, of which a word hereafter.

The main avenue is entered through the arcade of a transverse screen or gateway, contributed by the Maharaja of Jeypore, and carved by his subjects; a wooden erection, of which almost every portion of the construction is covered with carved ornament, and side bays filled in with carved open work of foliated patterns. Among inscriptions carved on the beams is one, on the side facing the avenue, “*Ex Oriente lux*,” a motto which comes in appropriately in face of the array of varied and beautiful work stretching before the spectator.

The avenue is classified into “courts” of the districts represented, but not divided by any cross lines of screens except those at the top and bottom. On the left, after entering through the gateway, we find the Jeypore side screen, an erection of Saracenic character (which character naturally pervades a good deal of the work exhibited in the architectural screens) of dark wood elaborately carved, and further decorated by tile paintings let in as panels. The various workmen, we are told, were left to exercise their own individual taste in the portions on which they were employed, subject to general control of a master-workman, being only directed to employ as great a variety of

patterns as possible, and to work on traditional lines. Opposite to this is the Kotah screen, of a general design copied from old buildings in the city of Kotah, a beautiful piece of work, with ivory inlay on dark Shisham wood; the main feature is a many-foliated arch, with the spandrels filled with inlaid flower-work of rather naturalistic type; the whole forms a charming example of modern Hindu work, delicate and graceful in its detail, and very rich in its general effect. Returning to the left, we find next the Bhartpur, Karauli, and Dholpur screen, a red sandstone architrave and false arch (there comes in the “false note” of so much Eastern architectural detail), a low-centred arch with small foliations near the springing only; over this is a frieze of pierced panels of geometrical design. The style is the result of a combination of details from various buildings in the neighbourhood, “a representation of local architecture in details, but not as a whole.” It is of red sandstone from the quarries near Karauli, and is executed by local masons under the supervision of the State Public Works Department. The Ulwar screen, next to these, is of marble, with bracket capitals, of Hindu design, and taken from the Ulwar Palace. A dark-veined marble lintel supports a frieze of marble panels of perforated designs.

Returning to the north side, the next screen to that of Kotah is that of Ajmere, a model, and carved in wood and painted white to represent as nearly as possible the ordinary street architecture of the town, which is in marble or plaster, the special feature being a two-storied over-hanging cornice, with rows of pendent bud-like ornaments. Executed as it is and painted, it looks rather gimcrack, and the forms and details are not very beautiful. Below this comes the Bikanir screen, a wooden structure, which shows a brilliant effect of gold arabesque on white and red grounds, of the method of forming which the following description is given in the catalogue:—

“On the surface of the wood, which had been previously well scrubbed with liquid clay and allowed to dry, the outlines of a flower-pattern were stencilled with a bag of powdered charcoal through perforated paper. Successive layers of liquid clay were then applied with small squirrel's-hair brushes within the outlines of the pattern, each layer being allowed to dry before the next application, until a raised surface bringing out the stalks, leaves, and petals with sufficient distinctness had been produced. The whole surface was then fixed by a coat of paint, and when this was dry, gold leaf was applied over all. The ground-work, black, with a red border, on the portion intended to face the central avenue and the adjacent courts of Central India and Ajmere, and red, with a black border, in the interior of the Bikanir bays, was then painted in, the flower-pattern standing out in gilt relief.”

After this we come to Central India, whose screens appear on both sides of the avenue. This embraces a district of about 75,000 square miles, but does not send contributions of proportional interest to its area. The screen is in a mixture of styles, exhibiting a good many figures in niches, some of them Buddhist, some Hindu in style; the supports and lintels are of wood, but on these are carried carved marble panels, containing some beautifully-executed floral ornament, intermixed with figures of a rather primitive kind. Attached to the side portions of this screen on the right are perforated panels of stone from Gwalior, better, on the whole, in design than in workmanship, which does not seem to represent the best that Indian carvers can accomplish.

The Bombay screen, next to this, which was constructed from a general design made by Mr. Griffiths, the Superintendent of the Bombay School of Art, was designed to illustrate the wood-carving of the Bombay Presidency; it is very flat work, constructionally, containing panels of geometrical ornament and also some very beautiful and delicately carved open-work panels of floral design; it is rather bare in appearance, and one of the least architectural looking of the screens. The contrary may be said of the Bhavnagar screen, which is a solid erection of rather a “lych-gate” type, with details taken from the mosques of Ahmedabad; the superstructure is a tolerably massive erection overhanging the supporting columns boldly, and steadied by straight-lined brackets



projecting on either side transversely from the pillars; these brackets, however, though constructional features, are one mass of carving, rich to look at, but entirely destroying their expression as pieces of construction: the "false note" again. The Baroda screen, opposite, is very similar in general character, but the brackets are not straight-lined; they are curved members, branching out into buds, and remind one rather of the ordinary bracket-capital placed transversely. On the Bhavnagar side should be noticed the curious and effective cornice ornaments, evidently suggested by the elephant's trunk as a hint, but conventionalised into a very effective and suitable feature of ornamentation. From Bengal comes a screen of imitation brickwork, arranged in an arcade form, and decorated with plates of *repoussé* metal-work fixed on the walls at intervals, and according to a symmetrical scheme; the effect is rather unsatisfactory, the metal decorations seem an after-thought. On the right-hand side, opposite this, Bengal is also represented by an imitation brick erection of very peculiar but also clumsy type, at least as far as the piers are concerned, which are nearly all cap and base projections; the archivolt is decorated with a triple row of cusped ornamentation; the whole is lined out in white on the background. Next, on the left side, come the screens of Agra and Lucknow, of dark, elaborately-carved wood with foliated arches, and the open panels of the frieze decorated by richly-coloured stuffs draped on them. Opposite to these, on the right, the Nepal Court shows one of the most beautiful of all the screens; columns with capitals of quasi-Classical form, with angle volutes, the shafts ornamented with vertical bands of delicate and minute carving; the panels above finely carved, especially two which show designs formed of intertwined "dragons" in low relief. Near this stands, in the centre of the avenue, the Baroda pigeon-house, which attracted so much admiration from "Robert" in *Punch*; an erection carried on a tapered octagonal column covered with carving, the base also carved; the pigeon-house is an arcaded erection, very pretty in design, steadied by long brackets from the column, which are, as in other cases, too much carved for true constructional expression. But the whole affair is a remarkably fine piece of work, and one is not surprised to learn that it is not intended as a mere piece of farmyard furniture, but for the delectation of pigeons which have the good luck to be considered "sacred"; in fact its elaboration springs from just the same pious fervour as that which led to the beautifying of our own mediæval shrines.

In the Punjab screens, which occupy both sides of the way below this point, is to be seen some very rich and beautiful work. The screen on one side is in Shisham wood, and that on the other hand in deodar. Both are the work of Sikh carpenters; they are carried on elegant columns, with brackets, and the upper portion presents a long series of very delicately-wrought panels perforated in geometric patterns, almost exactly like Arabic work. Some of the other wood-work exhibited in this Section is splendidly rich; there are one or two doors fixed on the walls behind, showing arch over arch, spandrel over spandrel, all covered with rich and minute carving. The Kashmir screen is similar in general style, but not quite equal in design, except the brackets, which are the weak point of the Punjab screen. The following details in regard to it are extracted from the catalogue:—

"The screen for the Kashmir and Frontier States' Court is copied from the verandah of an old wooden mosque near Chakoti, on the Kashmir Murree Road, to which the attention of travellers is invited in Ince's handbook. The date of its erection was not, as far as I could find, anywhere marked on the building, but tradition and the character of the carving seem to point to the earlier part of the last century. The pillars, brackets, and architrave beam of the screen are almost an exact copy of the original, both in design and proportion. The side bays, 6 ft. 3 in. each, are identical, and the front bays differ only in that the original arches, each 5 ft. 2½ in. span, have become pillars 10 ft. apart, surmounted by brackets. The railing at the top is

pinja work, such as is commonly made and used throughout Kashmir at the present day. The material is deodar wood."

After this follow the screens of the central provinces, carved in wood, and the work of Nagpur native carpenters. These are very rich, heavy, and elaborate erections, in teak, supported by what may be called square rusticated pillars (only that the rusticated surfaces are carved), with graceful columns in front of them; the upper part is carried on very heavy brackets, both transverse and longitudinal (as in Japanese construction), in double tiers, and with carved lions between the upper and lower brackets; the cornice contains some beautiful floral carving in low relief.

The Assam screen is an exception to the rest in being rustic work, formed of bamboo supports grouped in fours, with light woven cane patterns in the superstructure. Burnah shows a peculiar and barbaric-looking structure, on red and gold columns with black bases; carved brackets forming a straight line, parallel with the lintel, at the top; the frieze is decorated with embroidery and figures on a red ground. The best part of this screen is the carved floral ornament, which is fine and bold, and with a remarkable resemblance to good Renaissance work in feeling. Madras, which, like Burnah, occupies both sides of the avenue, shows a curious type of column, octagonal, and with no projections beyond the shaft line; just beneath the capital the shaft is cut into a round knob form with pendant wreaths leaving clear-cut open spaces behind them: rather fragile looking. The columns are fluted, interrupted by bands of carved ornament; the cornice is very elaborately carved; the whole is intended as a representation of the Dravidian style of architecture. It is executed in teak by Madras carpenters, from a design prepared by the Superintendent of the Madras School of Arts.

On the left, below this, comes the sumptuous screen of Hyderabad, the least architectural of all, as it is only a framework carried by plain gilded stiles and transoms. The interspaces are occupied by panels, some showing dwarf foliated arches, some square, some with a circular dished panel in the centre, all filled with metal or lacquered flower ornament of varied and beautiful detail. The second and sixth arches are of Bidri ware, blackened pewter inlaid with gold, silver, and copper; the third and fifth are entirely of lacquer work. The Mysore screen, opposite to this, is a curious contrast, mostly of plain wood surfaces, the frieze ornamented with paintings. Hyderabad furnishes the screen closing the vista, an erection gilt all over, of very Moorish character, on columns ornamented with chevrons in red, green, and gold; the spandrels of the foliated arches are ornamented with, on the contrary, very Renaissance-looking scroll wreaths on a light blue ground. The thing is a little gewgaw, and there is a made-up look about it.

The central point of the Indian work, opposite the end of Old London, is the Indian palace and courtyard, entered by the splendid marble gateway, originally designed by Major Keith for the Calcutta Exhibition, and executed under his superintendence by native masons, at Gwalior. It is a large archway, with carved engaged columns, and an archivolt decorated by pendent bud ornaments, the spandrels filled with elaborate conventional floral ornament, with an elephant in bas-relief, as if entangled among the ornament, in each spandrel. Within this is the courtyard, surrounded by an arcade, and from this a pillared porch gives entrance to the octagon hall, formerly occupied by the water companies' exhibits, but which is now seen in a subdued but rich glory of beautiful textiles, not only on the walls but overhead, a soft light being admitted through thin hangings covering the centre space. In the centre is a fountain or cistern, the water bubbling up in the centre, but always kept at a level with the star-shaped rim, so that it looks like a large crystal set in an ornamental border in the centre of the apartment. Steps lead from this to the highly-decorated room overlooking the courtyard, the elaborate woodwork of which

was made by two natives of Bhara (Punjab) in the Exhibition. We must describe this more in detail another time. The whole makes a singularly beautiful interior, conveying a sense of repose which cheats one into the belief of being far away from the rattle and bustle of London.

#### NOTES.

**T**HE railway companies are, to say the least, ill-advised as to the tactics they are adopting in order to defeat the Railway and Canal Traffic Bill. They persist in speaking of the measure as an attack upon their property, while it is really directed against their method of management. Indeed, it may fairly be said that the long-felt desire for reform, which has at last found definite expression, is not so much of an attack as it is represented to be. It is certain that Mr. Mundella never had that idea in framing the Bill, but desired rather to legally remedy an unsatisfactory state of things which has grown up through the vague and insufficient character of previous legislation. It appears that railway *employés* have been told that the Bill is aimed against them as well as the proprietors, and mass meetings have recently been held at various stations protesting against it. It is very certain that the passing of the measure would not reduce the volume of traffic, and, as the reverse of this would, in all probability, happen, and the staff would have to be increased rather than reduced, the talk about their employment being imperilled is altogether beside the mark. If it should unfortunately happen that the directors considered it necessary to reduce the rate of wages, such a step would certainly emphasise their statement that this result would follow the passing of the Bill, but it would be no proof that such a result was "aimed at," or even contemplated. Indeed, Mr. Mundella takes every opportunity of repeating that his aim is justice to all; and Lord Henniker, who is one of the foremost champions of the Bill, has, like Sir B. Samuelson, a considerable stake in the railways, and will not be likely to uphold anything of a "confiscatory" nature.

**T**HE Queen's Bench Division has just decided that Sec. 156 of the Public Health Act, 1875, does not apply to new buildings upon land never before built on. That section enacts that it shall not be lawful, "without the written consent of the urban authority," to bring forward any house or building forming part of any street or any part thereof, beyond the front wall of the house or building on either side thereof, nor to build any addition thereto beyond the front of the house or building on either side of the same." In the case of *Williams v. The Wallasey Local Board*, which we are now noticing, the Local Board approved of a certain line on plans of the erection of a new street as its frontage line. Some of the houses were built further back than such line, and the next proprietor built his up to the line. He was then proceeded against under this section, and the justices convicted him of offending against it. This decision the Queen's Bench Division reversed, on the ground that if it were upheld "the person who first erects buildings in such a place as this can, in fact, prescribe the line frontage to be followed by other persons who may begin to build at a subsequent time. This decision seems to be reasonable, for it is local authority fix the frontage line, but if person chooses to build at a distance behind such line, that is clearly no reason why neighbours should lose the advantage of a ground which is available for their building."

**W**HEN a Local Board gives over a road or highway, or any part of it, for any purpose of, and during the time it is, repaired under contract, that Board very properly does not relieve itself for one moment of the responsibility to the public for any accident or damages which may arise in consequence of the condition of the road. The Board must, and very often does, specify that the contractor



shall be liable to the Board, and indemnify it against loss through any carelessness on his part. Matters would, indeed, get into a very confused state if a Board could relegate to a contractor for any time its duty to the public of maintaining in a good and safe condition the roads within its jurisdiction. But there is in the Public Health Act another point interesting to contractors, but evidently not generally well known, and that is that no action for damages through accident on a road against a Local Board can be instituted if six months have expired from the date of the occurrence of the accruing cause in the case. The application of this provision was illustrated in a case which was entered for hearing in the Brentford County Court. A butcher in Chiswick claimed damages from the Local Board for injury to a horse which had, in February, 1885, slipped at a hole in the road, which was being repaired by the contractor. At the last moment it was discovered that he had failed to comply with the requirement of the Public Health Act, viz., to institute proceedings within six months of the accident or accruing cause, and he very wisely, on the advice of his solicitor, withdrew the case. Not a few persons are acquainted with the law's delays; but here the danger or fault lay in delaying to set the legal machinery in motion.

**A** CORRESPONDENT of the *Times* last week attacked strongly the reality of Dr. Schliemann's pre-historic discoveries at Mycenae and Tiryns, quoting in support of his views Mr. Penrose and a mysterious "Oxford man," whose connexion with that University seems to have been considered conclusive as to his archaeological infallibility. From what we have heard direct from Mr. Penrose, however, we gather that he considers there are good grounds for questioning the antiquity attributed to the walls uncovered at the top of the hill or citadel of Tiryns. The chapter on these in the work on Tiryns was not written, as our readers may remember, by Dr. Schliemann himself, but by Dr. Dörpfeld, who is one of the most learned architectural archaeologists in Germany, but probably liable to be carried away by that desire to make remarkable discoveries to which German archaeological enthusiasm is somewhat prone. We declined to accept some of his theories about objects found at Tiryns at the first, though regarding him as a safe and credible witness in the main. Mr. Penrose's reason for doubting the Pelagic date of the Tiryns excavated walls is founded on the nature of the masonry, containing many small stones mingled with bricks, the presence of sawn stone instead of the rough-hewn finish of the undoubted Pelagic structures, and the evidence of the use of iron tools in drilling holes in the stone. We are certainly ready to accept Mr. Penrose as an exceptionally competent and unprejudiced witness, with probably a much cooler judgment than Dr. Dörpfeld; and the idea that the walls of a pre-historic palace have been unearthed must, at all events, be held to be matter for a suspension of opinion. It does not necessarily follow, however, that the plan of the habitations at Tiryns may not be in great measure in accord with that of an older structure previous to the walls that have been uncovered, the remains of which may lie deeper. Dr. Schliemann and Dr. Dörpfeld had better excavate to a lower stratum, and see what that produces.

**T**HE subject of Dr. Dörpfeld's essay was taken up by Dr. Jebb in an able paper read before the Hellenic Society on Thursday afternoon, not in regard to the archaeological questions of date, nature of the walling, &c., but in regard to the degree in which Dr. Dörpfeld's plan and explanation of the Tiryns remains could be reconciled with the description of the Homeric house in the *Odyssey*. By a series of carefully-arranged quotations Dr. Jebb made out a very strong, if not unanswerable case, in favour of the idea that the women's apartment in the archaic Greek house opened from the back and directly out of the great hall or men's apartment, and not by the circuitous route neces-

sary on Dr. Dörpfeld's theory. Eurycleia is called out from the women's apartment, for instance, by a speaker in the hall, and immediately appears; Odysseus, at the entry of the hall (while still in disguise), is summoned to the presence of Penelope, as a humble guest who has been wronged, and scruples to pass the crowd of insolent suitors in the hall,—as if he must do so to get to the women's apartments. These were only one or two of the passages cited, the whole of which go to make up a very strong body of evidence in favour of Dr. Jebb's view.

**T**HE scene at St. Bartholomew's Church on Monday afternoon, where the Lord Mayor went to give the countenance of the municipal authorities to the project for the preservation and partial restoration of the old church, was a very interesting and striking one. The church was crowded, and Dr. Norman Moore gave a short account of its foundation and history, and the names of some of those who had been connected with or interested in it, including that of Henry Fitzwilliam, the first Mayor of London, whose signature is appended as a witness to the ordinance of Richard de Ely, Bishop of London, in the year 1198, laying down rules for the guidance of the master or proctor of the hospital connected with the priory. Mr. Aston Webb then gave a short lecture on the architectural points in the building, explaining what was proposed to be done. A collection for the fund was made at the conclusion. We hope that the Rector, who has shown so much energy in endeavouring to arouse public interest in the safety and preservation of this remarkable church, is about to see the reward of his labours.

**I**N reference to the threatened destruction, or partial destruction, of the Roman Baths at Bath, the Leicester Literary and Philosophical Society has passed the following resolution:—"The members of the Archaeological section of the Leicester Literary and Philosophical Society hear with surprise and regret that the Roman Baths at Bath are threatened with partial destruction in consequence of some new scheme of public works; and they beg most earnestly to express a hope that the Corporation of Bath may be able to modify their plans, and save these unique and interesting memorials of their Roman predecessors." We entirely agree with the spirit of the resolution. It is not always desirable or possible to allow ancient remains to stand in the way of modern improvements, but the Roman remains at Bath are of such peculiar and almost unique interest that every effort should be made to preserve them, even at the cost of some sacrifice of public convenience.

**T**HE restoration of the beautiful cloisters of St. Juan de los Reyes at Toledo, in Spain, which were brutally mutilated by the French, is progressing most satisfactorily, under the skilful supervision of the architect, Señor Arturo Melida. The north wall, which suffered more than any other part, is already completely restored, the workmen now being busy on the north and west arcades. In one of the bays on the western side, an important addition has been made in place of the present projecting eaves, viz., an elegant traceried balustrade, with pinnacles running up at each of the buttresses between the openings. When this is carried round all four sides, as Señor Melida intends to do, and the carving and tracery of the other sides are completed, these cloisters will be able to vie with any others in the world for grace of composition and beauty of detail. The stone being used for the new work is a dazzling white limestone, which, when fresh from the quarry, is of a soft chalky nature; but the architect is confident that it will harden by exposure to the air, asserting, as his opinion, that the old stone was as soft when first carved,—a theory which is supported by the extreme delicacy of the original carving.

**W**E learn from a paragraph in the *Venice News* (an English newspaper published in Venice) that the crypt of the Basilica of St. Mark is showing signs of serious injury

from the infiltration of water, and a committee of architects has been appointed to investigate the circumstance and provide some remedy. It is proposed to undertake the restoration of the central portion of the pavement of the crypt, preserving, it is said, its ancient character, in order to repair the settlements, which have become, it is alleged, both serious and dangerous. The editor of the *Venice News* reports that he has made a careful examination of the pavement in question, and that he can find no ground for the apprehensions entertained by the Restoration Committee; the well-known undulations of the flooring resulting, in his opinion, from settlements which are not recent, and which do not appear to be increasing to any serious extent. He further points out that if the pavement is taken up and relaid, its ancient character must be necessarily destroyed, and that, if it is to be tampered with at all, it may just as well be replaced by a pavement of entirely modern design,—an opinion in which we concur.

**T**HE "Société Centrale des Architectes" of France has formed a commission for inquiry into the causes of the present unfortunate condition of the Building Industries in France. The President of the Society is M. Bailly, and the chief secretary M. Paul Wallon; MM. Hamant and Paul Sédille are the vice-presidents, and the Commission includes other well-known French architects.

**I**T is proposed to erect a large block of residential chambers on the south side of Piccadilly, between the Bath Hotel, at the corner of Arlington-street, and the Green Park, extending back to Arlington-street, on ground belonging to Lord Walsingham. Mr. W. O. Milne is the architect.

**T**HE exhibition of the Royal Society of Painters in Water Colours, in spite of the gap made by the absence of any contributions by Mrs. Allingham, is one of the best which the Society has ever opened. Mr. Alfred Hunt sends several works in his highest style; two especially to be noted, "On the North-East Coast" (120), and "Warkworth Castle" (80), a distant view of the castle, with a wonderful bit of distant sea; the idea of space and distance conveyed in these two small drawings is remarkable. Mr. G. P. Boyce has two or three scenes from Vézelay and its neighbourhood, which are in his best manner. Mr. Eyre Walker's drawings, especially "The Edge of the Combe" (21), are among the finest he has exhibited. Mr. Poynter has a very interesting study of a riverside town with a picturesque entanglement of buildings of all kinds, under the title "The Ferry" (62). Mr. Naftel has surpassed himself in various small but exquisite drawings, "A Golden Dream" (87), and two drawings framed together, "Bridge on the Road to Idwall" and "Dun-geon Ghyll" (56). Mr. Herbert Marshall has an exceptionally fine London picture of St. Botolph's churchyard, Aldersgate. Among others may be mentioned, "At the Foot of Ben Nevis" (72), and "Sunset Glow on the Torridon Hills" (161), by Mr. Colin Bent Phillips, a new name to us, and that of an artist of power, with a style of his own. "The Jungfrau" (190), by Mr. W. Collingwood; "On the Cliffs, Cornwall" (194), by Mr. Otto Weber; "The Ponte alle Grazie before its Demolition, Florence" (121), by Mr. Albert Goodwin; "Early Morning at the Bathing Ghats, Benares" (100), by Mr. Walter Duncan; "Holiday Folk" (69), figures in a garden full of poppies, by Mr. E. K. Johnson, with much more character and refinement in the figures than we have often noticed in this artist's works; "Pont Aberglaslyn, North Wales" (150), by Mr. Clarence White, a little theatrical in effect of light, but a remarkable drawing. It is interesting to find Mr. H. Moore appearing on this occasion as a flower-painter, with two or three very good examples. Many more might be mentioned; the exhibition is full of good work.



If things go on at their present rate, there will soon be an end of national artistic style, and we must be content to see the art of the whole world little by little Europeanised. Japanese art was hailed, not so many years ago, as a hitherto neglected source of fresh, spontaneous, and indigenous art. It soon appeared that the Japanese, in some matters, were as ready to imitate us as we were to imitate them; but it would hardly have been expected a few years ago that the Japanese Government would have taken such a revolutionary step as to invite architects from Berlin to design and plan their new public buildings and palaces. This, however, we are informed, is the case; so we presume that is the knell of Japanese architecture as a national style. It is possible, however, that local developments from Classic and Gothic materials may arise in different countries in time. This appears to be, to some extent, the case in America already.

HAVING looked into the Whistler Exhibition, at Messrs. Dowdeswell's, which, as we said, was too crowded to get into last week, we can record that the "Harmony in Brown and Gold" in the decoration of the room is exceedingly tasteful and pleasant to the eye, and that the frames of the drawings are uniformly tasteful and well executed, and ample in size. For the drawings themselves, there are some pretty outline sketches of figures from the life, and a number of ideas for landscapes in a very inchoate state. What the crowd who rushed and struggled to see these thoughts of them we, of course, can only conjecture; but we could imagine that Mr. Whistler, who to his other gifts adds a fine sense of humour, is laughing at them in his sleeve.

#### ARCHITECTURE AT THE ROYAL ACADEMY.—II.

We passed over in our previous review an interesting pencil drawing of the interior of South Marston Church, as restored (1,600) by Mr. J. Belcher. We like to meet a pencil drawing sometimes; this medium of drawing is getting neglected. As in some other restoration drawings, there is nothing here to show how much has been restored and how much is original; we presume that the roof, with its shaft member in the place of a king-post, and apparently supported on the cambered tie-beam, is ancient. Passing on to where we broke off in our first article, we find,—

1,644, "New Catholic Church, Mount Vernon, Liverpool"; Messrs. Goldie, Child, & Goldie. This, which is hung too high to be well seen, is a good monochrome drawing of a church in geometric Gothic style, with a large traceried west window and long porch narthex-wise under it, hardly, to our thinking, sufficiently tied into the main design, architecturally speaking. A large octagon turret or small octagon tower, attached to the south-west angle, solid below and with a window-stage at the top, groups well with the rest. The whole design, without any special originality, is solid in appearance, and composes pleasantly.

1,647, "All Saints' Church, Gosforth, Newcastle-on-Tyne"; Mr. R. J. Johnson. A freely executed pen-and-ink drawing of a rather peculiar church design, all the windows, except those in the tower and east end, being flat-headed; the aisles in the style of the late Gothic Domestic windows, and coming close up to the string-course under the cornice. The clearstory windows have a tracery less late in character, but fitting in well enough with the square heads. The parapets of tower and nave are battlemented. The design looks like an experiment to show that, as a matter of practical adaptability, the square-headed window in a Gothic church may have its advantages and may be introduced with good architectural effect as the prevailing form of window-head.

1,654, "Church Schools and Presbytery of St. Joseph, West Hartlepool"; Messrs. Dunn and Hanson. Hung high; apparently a solid-looking brick church, with a large tower at the north-west angle, which is rather spoiled by the stoppage of the buttresses at a marked horizontal line halfway up, which cuts the tower into two stages not sufficiently connected in their anatomy, and the projections for the

staircase hang on to the tower in a rather accidental manner. We like to see such adjuncts look as if they were a necessary part of the whole scheme of design, inseparably connected with it, not as if they might be taken away and put on another side at pleasure and just as conveniently. The deep buttresses on the west front give force to this part of the design, the whole of which is of the solid and massive character suitable to a church of size and importance.

1,658, "View of a New Church, with Schools, &c., below it, about to be erected in a poor part of West Ham, Essex," Mr. J. Oldrid Scott. We presume the statement as to the "poor part" is intended as an explanatory comment on the plain and unadorned character of the work. There should have been a small plan and section appended (why do architects neglect this so much in their Academy contributions?), to show the arrangement of the building, the design of which is rather peculiar. The hint of a nave and aisle arrangement is kept up, but the aisle is very narrow, and massive buttresses rise above the whole width of its roof, against the clearstory-wall, and are presumably carried down to the ground. We presume, therefore, that these apparent aisle windows are really the windows of the "Schools below," divided into shallow bays by internal buttresses, and that the church is on the upper floor and lighted by what appear to be clearstory windows externally; but it would have been better if this had been shown by drawings. The church is apparently a brick one, very plain; the school (?) windows are of Perpendicular tracery type, with low straight-lined pointed arches in brick; the church windows lancet shape, with a centre mullion and tracery in the head, and placed beneath pointed relieving arches carried from buttress to buttress. The real church has apparently, from the perspective view, two aisles of equal height, with an arcade between; at least, there is a bold projecting buttress at the centre of the west end, which can have no other meaning. The building is apparently brick, very simple, but not ineffective, and very suitable in design for its purpose and position.

1,664, "Eight architectural designs:—(1) Sorensen, Whiston Church; (2) Grafham Church tower; (3) American Church, Paris; pulpit; (4) St. Mary's, Southampton: west front; (5) American Church, Paris: vestry room; (6) Wendover Church: screen; (7) St. Peter's, Mancroft: flèche; (8) St. Thomas's, Salisbury: pulpit." Mr. Arthur E. Street. Of these, No. 5 is a drawing of an apparently large room, with an open-timber roof, effectively treated; there are, however, no figures introduced to scale it, and the apparent size may be deceptive. The sheet of sketches is generally in true Gothic feeling, but a little heavily drawn; not effective, at all events, at the height at which they are hung.

1,668, "St. Andrew's Church, Willesden Green: North-east View," Mr. Jas. Brooks. This charming church is shown in an equally charming drawing, a reproduction of which was published in the *Builder* for January 2 last. It is to students a valuable illustration of the satisfactory architectural effect that may be produced by the simplest means, and with almost the entire absence of what is called "ornament," by the carefully-studied arrangement and proportion of windows, string-courses, and buttresses, so as to form a harmonious whole. The east end, with its five-light lancet window included under one wall-arch, and the development of the ends of the north and south walls, above the string-course, into shallow buttresses ending in simple gablets, is quite Greek in spirit, in its combined simplicity and elegance.

1,672, "Saundby Church, near Gainsborough: Interior View," Messrs. W. S. Weatherley & F. E. Jones. This is a small pen-and-ink interior of a chancel with a panelled wooden ceiling with massive moulded and braced principals, and an open-traceried wooden screen of somewhat elaborate late Gothic character; good work, not calling for any special comment, however.

1,684, "St. Peter's Church, Streatham: Third scheme for completion of West End Exterior," Mr. G. H. F. Prynn. This shows an octagon-ended baptistery applied to the church so as form a kind of west-end apse, in two stories, the lower story forming a meeting-room, the back portion would not be quite well lighted. On either side of the baptistery projection is a

porch, the two portions producing the impression of a narthex cut in two by the baptistery. We complain that the porches, as in one or two other instances we have noticed, are not connected with the main design; merely abutted against the west wall, without any architectural relation or connexion,—otherwise the contemplated additions may be said to be picturesque and practical.

1,699, "Additions and Alterations to Ignatius Church, Preston," Messrs. M. E. Hadfield & Son. This is a brilliant coloured drawing, not however conveying any information as to what the additions and alterations consist in. We presume they are in the seating, the stained glass, and the reredos. The general effect is rich and brilliant; the water-colour drawing hardly makes out the details.

1,703, "Church in Gordon-square: West Elevation," Mr. John Belcher. This is an elevation of a west end and a lofty tower and spire with octagonal angle turrets, in orthodox English style, and presenting little either for criticism or comment.

1,712, "A Suburban Church," Mr. E. J. Tarver. This drawing, which has been published in our illustration pages, is a clever attempt to assimilate the architectural style of a suburban church to the style of the suburban villa, by way of producing an effect of architectural unity or uniformity. Whether the process tends to the elevation of church architecture, "the wise may make some dram of a scruple, or even a scruple itself."

1,713, "Holy Cross and All Saints' Church, Warley, Essex," Mr. F. W. Tasker. A view of the chancel of an Early Geometrical church, too high to be properly seen. We shall, however, publish some illustrations and a description of this church and what has been done to it shortly.

1,730, "Parish Church, Wootton, near Liverpool," Messrs. Grayson & Ould. Hung high. Apparently a good modern Gothic church, of fourteenth-century style, with a large solid-looking tower.

1,738, "Church of St. James, Spanish-place, Exterior View," Mr. John Kelly. The description ought to have run, "Competition Design for Church," &c.; it is rather misleading to put the title in the catalogue as if it were a executed building. This was the half-French half-Byzantine design with a dome, which was noticed fully at the time of the competition. It is what may be termed a clever design, but not beautiful; externally, at all events. It would probably have made a good interior.

#### THE ROYAL ACADEMY EXHIBITION.

ALTHOUGH the works of the President this year are few in number, the two principal ones must rank among the best contributions which Sir F. Leighton has ever made to the Academy. The large painting at the top of Gallery III., "Decorative Painting for a Ceiling" (164), is intended, we believe, for the same house in New York for which Mr. Taden has designed some of the furniture. It is a triptych, representing on a gold ground the figures of Mnemosyne, Melpomene, and Thalia in the centre compartment, while the side compartments contain, on the right, figures emblematic of the poetry of Revery or of the Danae and on the left figures typifying Amatory poetry. Mnemosyne is a seated figure, with a tripod at each side; Melpomene and Thalia are standing, the one draped in blue, the other in red. On each side of the central figure hover winged genii representing Music and Poetry, with chubby children, but youthful boy figures whose delicate nude limbs make a lovely contrast with the gold ground: and in this purely ideal work Sir Frederick's manner of painting flesh with an enamelled smoothness of texture seems quiet in keeping. The whole work is full of grace and beauty, both of form and colour, and one can only regret that it should be destined for ceiling, where it can never be seen so well as to so much advantage as on the wall on which it now hangs. We have always considered it to paint high-class ideal figures on a ceiling: a mistake; no one can look at them comfortably, and from one side of the room they must always be seen wrong way up.

A certain regret also is mixed with our admiration of the other work referred to, the statue entitled "The Singsard," in the lecture room. This is a life-size figure of a finely formed man, stretching his arms and somewhat so



torting his body in an expression of physical laziness. The figure is splendidly modelled; nothing could be finer in its way; but it is almost a pity to see so much artistic power expended on a subject so little elevating or inspiring to the mind; nor, we may add, would a habitual sluggard show the fine muscular condition of this figure. There is, indeed, a certain moral point given to the work by the incident of the laurel wreath trodden under the foot of the figure; but, after all, it is the sluggard that we are to admire, and we do not admire him with a clear conscience. A little statuette in the same room (like "The Sluggard," a bronze) entitled "Needless Alarms," is another contribution of the President's, and a very clever and unusual work, showing a young girl in the attitude of shrinking from and looking over her shoulder at a toad. Like the Sluggard, it is mainly a study in modelling of the figure in a difficult position, and a remarkable success in its kind.

One of the finest and most original works in this year's exhibition is the sculpture group (terra-cotta) in the Central Hall, "The Enchanted Chair," by Mr. Gilbert. As the work of a young sculptor, nothing finer or of greater promise for the future has been seen here for a long time. The "chair" is a mysterious one, resting on dragons, coils, and wings, and in it is a fine female figure, of full contour, in the heaviness of sleep, the head drooping on the right shoulder. The peculiar attitude of the feet also, one of them bent inwards, as if the heel had slipped and unconsciously pivoted round the toe, intensifies the expression of sleep. On the back of the chair stands an eagle, its beak bending forward over the sleeper, its outstretched wings spread grandly on either side of her. This imaginative production is more than a mere piece of fine modelling; it is a real poem in sculpture, such as we seldom see amid the generally prosaic ranks of Royal Academy sculpture.

Mr. Orchardson has distinguished himself this year by a powerful sequel to a former powerful work. This is entitled "Mariage de Convenience: After!" (136). Here the elderly gentleman who sat at one end of that miserable dinner-table in the former well-remembered painting is seated aimlessly before the fire, after dinner (the table now laid for one only) musing on the wretched past, while from the wall behind the portrait of the wife who has deserted him seems to regard him with scorn. Even his favourite Laife has palled upon him; only one glass has been taken from the decanter on the table. The room and all the accessories are painted with the greatest care, with a realism which never degenerates into hardness or over-finish. The figure itself is an admirable study. There is the history of a wasted life in it. What various critics mean by the faint praise with which they condescend to notice such a work we cannot understand. Here is not only a fine and learned painting, but that kind of insight into human character which makes painting what Mr. Arnold has said poetry ought to be, "a criticism of life," and of how very few pictures in this or any Academy exhibition can that be said? Take Mr. Tadema's principal work, for instance, which hangs back to back with this on the wall of the next room, "An Apodyterium" (285). This is, perhaps, the best painted work in the whole exhibition. Mr. Tadema's principal work usually is. The marble floor of the dressing-room, the figures ascending the stairs to the bath-room, the lady in foreground putting the last touch to her costume, the nude seated figure who stoops to unfasten her sandals, the architecture in the sunlit court seen through the door, all these are represented to perfection, but there is not a suggestion of any feeling, any idea, below the brilliant treatment of superficialities. The gifts of art seem capriciously bestowed. To some, who have great gifts in technique, soul and spirit are denied, and others strive to express deeper meanings without the technical power to convey them adequately.

Among the pictures that will be remembered in this year's exhibition is Mr. Burne Jones's first contribution since he accepted membership, "The Depths of the Sea" (314), where a mermaid is dragging a drowned man down to her cave, with an expression of vicious triumph on her countenance, which is all the more striking because it is in such strong contrast to the placid faces of a certain type to which this remarkable artist has too much confined himself. The fishy portion of the mermaid is painted in a

masterly manner; her tail, which would touch the pebbly bottom if extended, is turned at right angles so as to clear it, in a way which oddly reminds one of the movements of fish as one can watch them in an aquarium. The drowned man is rigid in her arms; the last remains of his breath send up bubbles to the surface above. As a realisation of a world-old fable this is a remarkable work. The same room contains Mr. Dicksee's principal painting, and, in regard to the manner in which it tells its story, the best he has ever contributed to the Academy. Under the title, "Memories" (374), it shows an interior where a widow with her child sits, stirred to sad recollections by the music played by a young woman at the piano-forte. The face of the principal figure is full of pathos; the accessories are carefully studied; the garden seen through the window adds an incident to the scene. This is one of the works in which there is an appeal to the feelings as well as to the eye. Near it hangs one of the best of the class which are addressed only to the eye, Mr. A. Moore's "Silver" (323), a "young person" lightly clad, seated on a sofa covered with a charming pattern, and with an equally effective wall-pattern behind, which we have seen in other works by the same painter. The decorative effect of the whole is lovely. On the opposite wall is Mr. Brett's principal work, "An Argyle Eden" (340), a Scottish coast scene bathed in a flood of almost impossible sunlight, which makes blue shadows everywhere behind the angles of the rocks and among the dense foliage of the hills; a schooner slips quietly along in the middle distance, with scarcely wind enough to stretch her canvas. The sunlight effect we certainly think exaggerated; the foreground (or forewater) with its jutting rocks, is painted with wonderful reality.

Touching on sea paintings, the exhibition contains two masterpieces. Mr. Hook has seldom done anything so fine as the wave about to curl and break in the picture entitled "The Broken Oar" (65); we are conscious of the weight and momentum of the water, and expect to hear the roar it will make in breaking the next moment: the whole picture is full of wind and freshness, and of that smell of salt water which we always seem conscious of in looking at Mr. Hook's sea-pieces. Mr. Moore's "Moun's Bay, early Morning, Summer" (1094), is an expanse of sea gently undulated by the morning breeze,—cold, dark, and wonderfully liquid-looking; he does not give us the briny air which flows over Mr. Hook's seas; but the depth and the movement of the water are splendidly conveyed, and there is a fascination about the picture, partly arising from the boldness of the attempt to make a large picture out of nothing but water; not the first time Mr. Moore has done it, of course, but he has never been more successful.

Sir John Millais's one contribution (unfortunately) is an admirable and most characteristic portrait of Mr. Barlow, the engraver (190), who was also the central figure of the now well-known picture of "The Ruling Passion." Among other noteworthy portraits of the year are Mr. Holl's "Lord Carrington" (203) and the "Duke of Cleveland" (210), the latter rather exaggerated in manner and expression; we have before remarked that when Mr. Holl gets a sitter with any peculiarity of manner his endeavour after strong character leads to over-accentuation. His portrait of Mr. Chamberlain (274), however, is admirable. A very successful portrait, without any such exaggeration, of a well-marked and well-known physiognomy, is Mr. Oulless's "Dr. Burdon Sanderson" (243). Mr. Sargent's exceedingly clever and expressive group of three sisters (706) is a good example in what we venture to think a vicious method; the style verges on "impressionism," the flesh is not like flesh; yet there is no denying that the individual character, manner, and personality generally of the three sitters is very ably conveyed, and the group very well composed and contrasted. Sir John Gilbert's contribution is "The Slain Dragon" (179),—the dragon of the first book of the "Færie Queene," lying at his length in the landscape: a very good dragon as dragons go; the knight is too rugged and mature-looking a man for Spenser's hero. In the large gallery also is Mr. G. F. Watts's principal picture, "The Death of Cain" (168), of a series on this subject, we believe; a painting which, like another already mentioned in the Grosvenor Gallery, tends too much towards the mystical

school; Cain, a dark brown figure, fallen forward on his knees, seems more like a rock than a man; an angel rushes past him, pointing onward amid a commotion of light. It is fine; it is a picture one must look at; but it is rather too much what might be described as a serious *evangelisana*. Another painting near this (to come from the mystic to the realistic), before which every one must pause, is Mr. Fildes's "A Daughter of the Lagoons" (288), a powerful painting of a magnificent dark-eyed brunette in a crimson dress.

Mr. Riviere's principal work, "Rizpah" (268), is one of many examples of the painting of pictures mainly for the sake of depicting animals, and then giving them the title of a subject which ought to overpower all animal interest whatever. The real objects of Mr. Riviere's picture are the lion and lioness and jackals; Rizpah is quite a secondary matter; but so tragic a subject should not be made subservient to animal painting. Mr. Waterhouse's "Magic Circle" (450), an antique sorceress going through incantations, is a success, because the central figure is of real interest and originality, there is something exceedingly uncanny about her; she is a sorceress all over. Mr. Logsdail has a very brilliant and clever work, utterly prosaic, but uncommonly true to nature, "A Venetian al fresco" (1047), a party of pleasure of "the lower orders" in a boat going along one of the canals; it is superior in force and ability to anything that artist has previously exhibited; the personages are evidently closely studied from life, and stand out in strong relief as so many individual types of Venetian life. A much higher interest belongs to Mr. J. B. Reid's one work, "The Shipwreck," a scene on a quay or "hard" in bad weather, where an old man who has hardly survived the cold and exposure before he was rescued is supported, half dead, by two stalwart fishermen, a crowd of more or less sympathetic bystanders gazing on him. This is one of the best things Mr. Reid has done, and differs marvellously from many a commonplace shipwreck scene that is painted; it conveys the idea of being a real scene as it happened or might have happened. Among the older *habitués* in the Academy, Mr. Frith has made a successful revival of Dr. Johnson, in the painting of the incident of his attending Madame de Boufflers to her coach; the painting is hard, but the figure of Johnson, as described in Boswell's narrative of the incident, with his little wig, too small for him, on the top of his head, his "rusty-brown morning suit," and his shuffling gait and embarrassed politeness, may be taken as a realisation of the personality of the great man which probably comes very near the truth. As for the works of another old Academician, Mr. Herbert, who, as usual, indicts on us the full tale of eight, they are quite beyond criticism, and must be seen to be appreciated.

Among battle pictures, the one with most point and the most stirring subject is Mr. Gow's "Cromwell at Dunbar" (412), showing the incident when "the Lord General made a halt and sang the 117th Psalm, till our horse could gather for the chase." The painting of a troop of men all singing with their mouths open is a difficulty which has been finely grappled with; Cromwell, at the head of the troop, is rather a weak figure, but there is an old Ironsides in the foreground, shouting the Psalm with all his lungs, who would have been an awkward person to come across. If we remember right, Dunbar was fought in a gale of wind, which the Royalists had in their faces, and which contributed to their discomfiture: there is no hint of this in the picture. To go from grave to gay: Mr. Collier has sent a large picture representing a group of "Ménads" (757) running through a wood with leopards and snakes in their hands, and looking generally sprightly in their pace and attitudes; but they are obviously only acting the part in a set scene; Ménads who were worth anything, from the point of view of a Ménad, were, we are convinced, a great deal madder than this.

We have endeavoured to indicate the main points of interest in this year's exhibition, which make a respectable total in themselves, but are weighted with a great numerical proportion of uninteresting work. We shall have space for some further notes on painting and sculpture another week.

**United Service Club.**—Mr. R. St. Aubyn Roumieu has been appointed architect and surveyor to this club.



## THE GROSVENOR GALLERY.

The exhibition this year is by no means of equal interest with many of its predecessors, though it contains some fine ideal works and some very good portraits. The most remarkable work is "Hope" (61), by Mr. G. F. Watts, a very strange and melancholy, though poetic, treatment of the subject. Hope is represented by a blindfolded figure seated on a globe, and trying to string a lyre, towards which she bends her ear to listen what can be drawn from their sounds. A peculiar and indescribable tone of colour pervades the whole, and in composition the figure rising in a pyramidal form from the globe is very fine; there is a grand monumental character about the painting, in spite of its faint and unearthly colouring. Mr. Watts's other contribution, "The Soul's Prison" (10), illustrating, or illustrated by, some lines of Mr. Walter Crane's, might almost have been painted by Blake. It is a half-length female figure of dark brown colour, whose eyes scintillate strangely from the dark face, and who appears surrounded by ray-like flames. Like some others of Mr. Watts's works, it is an attempt to express what it is hardly within the possibilities of painting to express adequately.

Mr. Burne Jones sends three works: of these "Sibylla Delphica" (161) is a decorative painting in his best manner, of a figure heavily draped in terra-cotta-toned garments, standing beside a tripod, and holding up some leaves on which she gazes. As a work to give pleasure to the eye it may rank high, even among its author's works; the colouring is beautiful, and the drapery very finely treated. "Flamma Vestalis" (1) is a less ideal picture, a three-quarter length of a beautiful chaste-looking female figure, seen in profile, the face and hands only visible; as an expression of the idea conveyed in the title, it is very beautiful in conception. His third and largest work, "The Morning of the Resurrection" (96), is a total failure in conception, to our thinking: it may please pious children and child-like souls.

The most remarkable works after these are the portraits. Mr. Tadema sends a very fine one, "a portrait" (67), not at all recognisable at first sight as his work. It is a life-size three-quarter length of a lady in a brilliant green dress, standing in a rather dark staircase apartment, from the upper portion of which a gleam of light only is seen through the top of an archway. The face and hands are painted with the clearness, firmness, and delicacy of finish which marks all the artist's work, whether on a small or a large scale. In this respect it may be instructively compared with Mr. Orchardson's large painting, "Master Baby" (31), which may also probably be regarded as a patient. Here a merry child is lying on its back on a cane-backed settee, laughing at its mother who bends over it. Mr. Orchardson's peculiar tones and texture in the painting of flesh, though one has to get used to and allow for them, do not mar the intellectual interest of the paintings on his usual scale; but here, when we come to life-size figures, the effect is certainly unhappy, and the face of the mother is quite unlike any healthy flesh-tones or texture, it looks flabby and not clean. The baby's laugh is well rendered. Mr. Collier's portraits of "Ria and Frida, daughters of Col. Kennard" (53) is an admirable portrait of children, forcible as a pictorial effect also; white frocks "carried off" (as the old school of critics used to say) by a profusion of white flowers in one corner of the picture; the faces are full of healthy glow, and most delicately painted, that of the younger child especially. The same artist's portrait of Mr. Henry Irving (41) is a great success. His "Miss Nettie Huxley" (198) we hardly like so much.

There are, as usual, a considerable number of portraits by Mr. W. B. Richmond, all of them delicate and harmonious schemes of colour; all conveying the impression that the production of such effects, rather than the portraying of the real character and personality of the sitter, has been the primary aim; unless we must take another alternative, and conclude that Mr. Richmond's sitters have mostly been people devoid of any marked character or expression. The portrait of Miss Burne Jones, seated in a landscape, is the most pleasing of these portraits from a pictorial point of view, in which respect they are indeed all pleasing in their way, but are more or less weak in the matter of character. A small portrait, a cabinet picture,—"Mrs. Henschel" (84), by

Professor Grosse, should be looked at. In the east gallery we have, in the way of portraits, Mr. J. T. Shannon's "Miss Annie A. Beebe" (159); one of the attempts which have been made, since Mr. Herkomer's brilliant experiment in last year's Academy, to paint white draped portraits on a white background, and not an unsuccessful one; and Mr. Richmond's "Mrs. Warren de la Rue" (163), which, by the way, forms an exception to what we said a few lines back, for it is a brilliant and powerful portrait, with a good deal of character. Mr. Stuart Wortley, in the "Rector's Daughter," a portrait" (165) has not quite equalled his great success in portraiture (we forget the title) in a previous Grosvenor Exhibition; but this one, a quarter length, has character, and a certain originality in colour, besides good flesh-painting.

Among ideal figure subjects not yet alluded to, is a "Hermes" (89) by Mr. W. B. Richmond, a brown figure standing between the columns of an Ionic temple, leaning one hand against a column while he fits to one of his feet a rather too realistic winged sandal. The figure is a fine one, but hardly reaches the ideal character which should belong to such a subject. Mr. Calderon's "Æonea" (74) is hardly perhaps equal to the Tennysonian figure, "Forlorn of Paris," which it is intended to illustrate; but it is a very graceful and expressive figure, seated, nearly nude, on a bank, and gazing wistfully before her; the flesh is very delicately painted, and the attitude and lines of the figure most graceful,—perhaps too much so for the true expression of Æonea's sorrow. In a very different way a picture by Mr. J. D. Batten should be mentioned, "Life's Recompense" (145), an artisan leaning over the back of the chair in which sits his wife with their infant; the painting is life-size, and might have told all its story more effectively on a smaller scale and with less expenditure of canvas, but there is real feeling in it, and the group is finely composed, and has that unity of expression which makes a picture a composition and not a mere assemblage of figures. Of Mr. Strudwick's archaeological productions, ancient styles made over again, we have never been enamoured; they are among the clever affectations which have always found a place in the Grosvenor Gallery. There is more point and purpose in Mr. Walter Crane's small and brilliantly coloured work, "Venice, Florence, Rome" (16); a collection of personages characteristic of the three great Renaissance cities, arranged under three arches of an arcade. Among the Venetian group is seen Titian, stately in his long robes, and Paris Bordone's well-known blind lady; Florence is typified by Cimabue, stooping over Giotto, who kneels on the pavement sketching, and Dante; Rome by Michelangelo, Raffaele, and Julius II. Other characteristic figures make up the groups, at the back of which appear, in their respective places, the St. Mark's column, the tower of the Palazzo Vecchio, and St. Peter's. Miss Kate Gardiner Hastings gives us Elsie weaving shirts of nettles to destroy the spell which had changed her brothers into swans, according to Hans Andersen's tale (147); pretty enough, but Elsie seems to take to the nettles with great equanimity, and there is not a sign in her action or expression that she is handling anything so uncomfortable. Miss Pickering's "The Dawn" (154) is an eccentric but rather powerful work representing the dawn by three crimson-robed angels blowing trumpets, the figures of Day and Night beneath, the former wreathed in flowers, the latter departing, as she always does in such paintings, under the protection of a heavy, dark-hued mantle. The three crimson angels, however, are a new idea, and produce a rather striking effect. Mr. R. Barrett Browning has availed himself of a supposed incident in the early days of Joan of Arc (179), to paint a nude figure in a landscape; the figure, with her back to the spectator, falls in so far with the subject that it represents that kind of nervous and well-strung body which one might imagine the soul of Joan of Arc to have inhabited. There is another and more orthodox Joan of Arc picture by Mr. Harold Rathbone, representing the heroine kneeling, in armour, to receive the sacrament; the face is a noble and expressive one.

The finest landscape at the Grosvenor is Mr. J. W. North's painting (7), with a couplet from Spenser as a title. This wonderfully delicate

harmony of greens and warm browns, a rich bank of earth with a mass of foliage over it and a grass foreground, is an admirable example of that peculiar phase of nature which Mr. North has made his own, or, rather, which he has elaborated into a system in which, beautiful as the results are, there is, perhaps, more of art than nature. The effort to harmonise the sheep in the foreground, for instance, in the present case, leads to painting them of a dull nondescript colour nearly blending with the landscape, as sheep certainly do not blend in nature. Mr. Kesley Halswell's "Scaur in Gillean, Isle of Skye" (35), is a rather middling picture of a magnificent scene; his other landscape, "The Island of Loch Maree" (298) is a fine example of his special and rather restricted powers. Mr. Hamilton Macallum's "A Kiss from the Sea" (81) is a good example of his peculiar and very effective manner of representing the reflection of light on rippling sea water. "In a Cider Country" (122), by Mr. Alfred Parsons, is worth study for its strongly-marked local colour and characters, whether the "local colour" of the grass is not too pronounced a green may be questioned. "Sunset after Storm" (142), by Mr. Henry Moore, has a grand rolling mass of clouds warned by sunset light; there is a wild stormy feeling about the whole scene, but it is not one of the artist's great works. Mr. Henry's "Hot Boat came Home" (149) is a spirited work such as only a painter who has been constantly among boats and by the sea could have painted; the boat, preparing to beach in rough weather, is on the curl of a breaking wave, her bow projecting in the air in front of the wave; you can anticipate with what a thud she will come down on the beach next moment, and what a kick-up her stern will get from the breaker as she does so. Another work by the same painter, "Falmouth Natives" (192) consists chiefly of the stern of an oyster craft swinging up and down on the green water. It is pleasant to look at scenes like these painted by an artist who is really at home in what he paints, and whose pictures smell of the sea and of fishing craft.

Among other works, Mr. Nettleship has a very good lion picture (185); Mr. Spencer Stanhope has a large stained-glass kind of picture, "Why See ye the Living among the Dead?" (189), which Mr. Burne Jones's "Resurrection" will do very well for grown-up children; Mr. J. W. Waterhouse exhibits "A Flower Market" (109), a pleasant bit of cheerful realism amid an exhibition too much pervaded by affectations; Mr. Leslie has "The Garland" (50), woven by some young girls on a sunny lawn, who look rather as if they knew they ought to be at the Royal Academy and not at the Grosvenor; and Mr. John O'Connor has "St. Peter's from the Vatican Gardens" (24), in which the architecture is so forcibly painted and the foreground so deficient in force that the building seems to come close up to the spectator and consequently only looks half its real size from want of aerial perspective, nor would anyone at first glance take it for a building on the scale of St. Peter's,—a caution to architectural painters.

Among the sculpture exhibited is Mr. Maclean's life-size group "Spring," a very clever translation into marble of two figures from one of Mr. Tadema's paintings, of which we have before spoken in praise when it was in a small exhibition of Mr. Maclean's works in Finsbury. This is the principal work in sculpture. Among the others we may mention a very pretty bronze statuette by Mr. Gilbert, a study of a head by Mr. Mullins, and a good portrait bust of the Abbé Lizez, by Mr. Boehm.

**A Social Reform Conference.**—The Fabian Society has made arrangements for a Conference, which will be held at the South Place Institute, Finsbury, London, on three consecutive evenings in June next, in order to afford an opportunity for those interested in the labour question to discuss the present economic system, and the better utilisation of national wealth for the benefit of the community; and the following is the proposed order of discussion:—(1) "The Utilisation of Land" (Wednesday, June 9th); (2) "The Utilisation of Capital" (Thursday, June 10th); (3) "The Democratic Policy" (Friday, June 11th). On each evening the Conference will sit from 5.30 till 7.30, and, after an adjournment for half an hour, will continue the sitting at 8 o'clock.



## THE EDINBURGH EXHIBITION.

In 1859 an attempt was made to get up an International Exhibition in Edinburgh. Designs for a Crystal Palace were prepared by the late Mr. David Rhind, architect, and a site selected on the ground which then formed the Experimental Garden, now the pinciner, attached to the Royal Botanic Gardens. This attempt having proved futile, a suggestion was made, in the pages of the *Edinburgh Guardian*, that the buildings for the National Gallery and Royal Scottish Academy, then recently completed, might be utilised for the purposes of an art-treasures exhibition, on a limited scale. This suggestion was acted upon, and in 1861 an exhibition was opened in the buildings on the mound, which was mostly confined to the display of furniture, textile fabrics, and ceramic ware. This exhibition, although on a small scale, was most interesting, showing as it did that the Great Exhibition of 1851 had even then had an influence upon the art manufactures of the country. It did not, however, prove a success financially.

The Fisheries Exhibition of 1883, held in the Fruit and Vegetable Market, and the more ambitious Forestry Exhibition, of 1884, held in specially-designed buildings erected in the grounds of Donaldson's Hospital, both proved successful, and led to the suggestion that an International Exhibition, upon an extensive scale, might reasonably be ventured upon. A small committee was formed and proceeded to action in the most energetic manner. According to Dean of Guild Gowans, chairman of the Executive Committee, they met with little encouragement at first, but in course of time the guarantee fund, which was originally fixed at 25,000*l.*, was subscribed, and it went on increasing till it now stands at 96,000*l.* Plans were advertised for, and those submitted by Messrs. Burnet & Lindsay, of Glasgow, were adopted. The building is now completed, and the Dean pronounces it to be perfect as regards the requirements, and the cost, 30,000*l.*, to be small. The space originally intended to be set apart for exhibits was 78,000 square feet, but the applications by exhibitors were in excess of what was expected, and the space has been extended to 112,000 square feet.

Part of the buildings is intended to be permanent, and is constructed of concrete, iron, and glass. The plan is based on the simplest lines, forming a central avenue, 970 ft. in length, with courts on each hand, 135 ft. each. The permanent portion has a central court at right angles to the temporary buildings, with aisles and transepts, the latter being in continuation of the central avenue, and the aisles are appropriated as art galleries. The principal entrance is in the west façade, under a deeply-recessed semicircular pediment, flanked by square towers, from between which appears a dome, with a lantern, surmounted by a winged figure, gilt, and the angles of the great court are surmounted by small domes. This façade is approached by a flight of steps, 120 ft. wide, composed of long blocks of Stewart's granolithic material, and the main doorway, a satisfactory architectural design, richly moulded and decorated, is formed of the same material, as are also two detached Corinthian pillars, surmounted by vases, on each side. This material is close in texture, and has stood the test of time most satisfactorily. The present example is of a rich red colour, but we have seen specimens of it of a glittering white and a sober grey. It can be formed in blocks of considerable thickness and of greater length than stone can readily be procured, and the mouldings are sharp and clean. This material bids fair to be of much use to the builder, especially where long lengths are required without joints, as in staircases, &c.

Taking a hint from South Kensington, an "Old Edinburgh" has been formed at the east end of the central avenue. Its design was entrusted to Mr. Sydney Mitchell, which has arranged some of the ancient edifices which have disappeared from the old town, in a remarkably picturesque and effective manner. Entering by the Netherlands, we find ourselves in an irregular oblong court, with quaint gabled and turreted houses having outside stairs, projecting windows, and moulded doorways, surmounted by armorial bearings, texts, &c. This portion of the buildings cost about 4,000*l.*, but the rents received for the shops therein reach to within 700*l.* of that amount.

One of the most interesting adjuncts of the Exhibition is an original conception of Mr.

Gowans', to whose unwearied exertions and enthusiasm the existence of the Exhibition is in great part due. He has designed two pillars, which are placed at the north-western entrance of the Meadows where the Exhibition buildings stand. They are constructed of freestone,—red, white, and yellow,—procured from all parts of Scotland and the north of England, contributed by the quarry-masters. The workmanship is the gratuitous contribution of operative masons, and shows the various modes of tooling in use. The names of the quarries from which the specimens are procured are carved on them, and they will thus form a useful source of reference in time coming of the durability and texture of the materials. The pillars are octagonal in form, 33 ft. in height, having moulded panels, and are decorated with the armorial bearings of the principal Scottish cities, and surmounted by unicorns supporting shields and bannerets. The exhibition was opened on Thursday by Prince Albert Victor of Wales.

THE ST. PAUL'S RAILWAY STATION:  
LONDON, CHATHAM, AND DOVER RAILWAY.

On Monday next the new City Station of the London, Chatham, and Dover Railway, in Queen Victoria-street, immediately opposite the *Times* office, will be opened for traffic. The station, which extends for some distance over the river on the new five-arched railway-bridge which has been built immediately to the eastward of the existing lattice-girder bridge, has been named the "St. Paul's Station," and its opening seems likely to do much to alleviate the lot of the long-suffering residents south of the Ludgate Hill Station. The new station, by the bye, is almost immediately contiguous to the south end of Ludgate Hill Station, the two stations being in communication with each other by the girder-bridge which spans Queen Victoria-street. Seeing that, just to the north of Ludgate Hill Station,—literally within a stone's throw of it, in fact,—there is the Holborn Viaduct Terminus of the same railway, and beneath this terminus the low-level Snow Hill Station for the through traffic to Moorgate-street, King's Cross, and beyond, the London, Chatham, and Dover Railway Company have practically four stations all adjoining each other. It was pointed out in our columns some years ago that this company lost a great opportunity in not placing its city terminus on the eastern side of Farringdon-street, where adequate room might at one time have been obtained for a large high-level station. The local or suburban passengers could have entered the station from the north side of Ludgate-hill or from Farringdon-street, reaching the platforms by steps as at the present Ludgate-hill Station, while cabs and carriages could have entered the station from Holborn Viaduct, as in the present Holborn Viaduct terminus. Had the latter been four or five times its present size, it would have afforded all necessary accommodation for the City traffic of the Company, and while the low-level station at Snow-hill would still have been necessary, two of the four stations which the Company will now possess in this part of the City might have been dispensed with, greatly conducing to simplicity and economy in working the traffic, and saving a great outlay in station buildings, signalling arrangements, &c. But, recognising the fact that it is of no use to cry over spilt milk, the Company has perhaps, by the present important supplement to its station accommodation, done its best to meet the ever-increasing requirements of its traffic, and the addition has been well planned.

The works have been in progress since the spring of 1883, and have thus occupied about three years to complete. The new bridge crosses the river on five arches, three of which are of 185 feet span each, and two of 175 ft. span each. It carries seven lines of rails over the river, and with the four lines over the lattice girder bridge the company are in possession of eleven lines of rails between the Middlesex and Surrey sides of the Thames. The arches and superstructure of the bridge are of wrought-iron, the arch principals springing from massive granite piers. Between 6,000 and 7,000 tons of iron have been used in the erection of the structure. The bridge was originally designed to carry four lines of rails only, and its estimated cost, according to these dimensions, was about 300,000*l.*, but it having subsequently

been determined to widen it to a capacity of seven lines, the outlay on the structure will approach 500,000*l.* A special feature in the construction of the bridge consists in its commencing to widen out on approaching the Middlesex shore, at the third pier from the Surrey shore, and thus on reaching the Middlesex side a considerable extended width is obtained, which is devoted to station purposes, as before mentioned. The new booking and other offices of the station constitute a prominent building, faced with red brick and Corshill stone, and having a frontage of 140 ft. to Queen Victoria-street, there being square towers at each angle. On the street level in Queen Victoria-street is a large central hall, containing the booking-offices, together with refreshment-rooms and waiting-rooms. The station and booking-offices are admirably planned and lighted. The screen of the ticket-office (which has seven windows), and the doors and other woodwork, are well and solidly constructed in oak, and arrangements are made for keeping the streams of passengers leaving and entering the station distinct. From the central booking-hall three spacious staircases, 12 ft. in width, and fitted with Hawkey's patent treads, lead up to the station area and railway level above, a large landing being provided midway. That portion of the station area immediately adjoining the booking-offices, and extending to the margin of the river, has, to a large extent, been constructed on arches (available for cellarge purposes), and is covered in by an angular iron and glass roof, rising to a height of upwards of 40 ft. above the railway level; the platforms, which are four in number, being nearly 400 ft. in length, and extending, as already stated, beyond the Middlesex shore arch of the bridge, the greater part of the over-river portion of the station being covered in by a roof of patent zinc and glass. It should be added that the booking-offices are immediately over the Blackfriars Station of the Metropolitan District Company, and provision is made for communication between the two stations. The works were designed jointly by Mr. J. Wolfe Barry, Mr. H. M. Brunel, and Mr. W. Mills, as engineers, and have been carried out by Messrs. Lucas & Aird; the ironwork of bridge and station being made and supplied by the Thames Ironworks and Shipbuilding Company, Millwall. The three terminal "bays" or "train-docks" of the station are provided with Langley's ingenious hydraulic stop-buffers, made by Messrs. Ransomes & Rapier, for the prevention of accidents in case the trains run in too sharply towards the "dead-ends." Mr. Crutwell has been the resident engineer; and to Mr. Turner, the courteous representative of the contractors, we are indebted for his kindness in showing us over the works. Messrs. Saxby & Farmer have supplied the signals; whilst the lighting of the station and works in connexion has been entrusted to Mr. W. C. Cannon, of London-road, Southwark.

The Gravesend extension line of this company, which will also be opened on Monday, places the Chatham and Dover Company in competition with the South-Eastern Company for the traffic to Gravesend. The new line commences by leaving the main line at a point between the Farningham-road and Fawkhams stations, and thence, proceeding in a north-easterly direction, it arrives at Gravesend immediately on the banks of the Thames, where a pier, which has been erected, will place the railway-trains in communication with the large steamers at Tilbury.

ROYAL INSTITUTE OF BRITISH  
ARCHITECTS.

## ELECTION OF PRESIDENT AND COUNCIL.

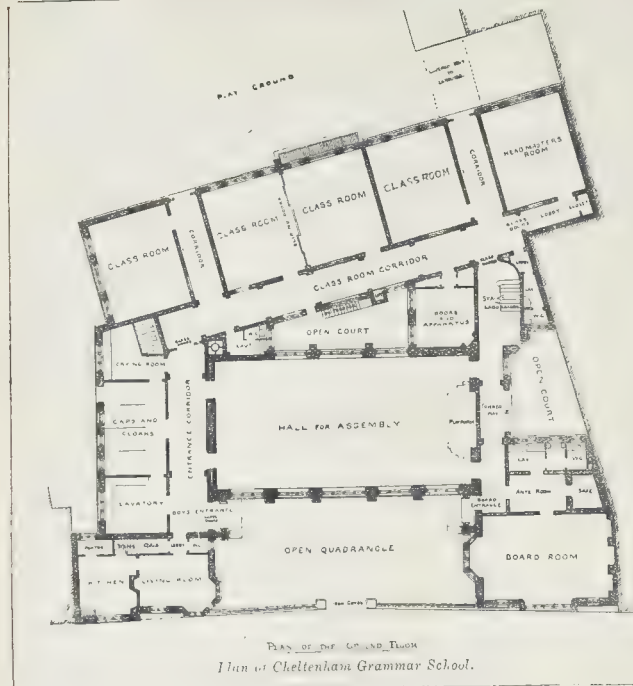
At the fifty-second annual general meeting of members, held on Monday evening last, the Council for the ensuing year of office were elected, viz. —

*President.*—Mr. Edward P. Anson, F.G.S.

*Vice-Presidents.*—Messrs. Alfred Waterhouse, R.A., Thomas Worthington (Manchester), and Arthur William Blomfield, M.A., F.S.A.

*Council.*—Messrs. George Aitchison, A.R.A., James Brooks, Arthur Cates, Charles Roberts Chorley (Leeds), Henry Curry, Robert William Edis, F.S.A., William Emerson, William Milner Fawcett, M.A., F.S.A. (Cambridge), Charles Fowler, Edward Augustus Gruning, Octavius Hansard, Charles Richard Pink, John Slater, B.A., Thomas Roger Smith, and Aston Webb. *Honorary Secretary.*—John Macvicar Anderson. *Secretary.*—William Henry White.





### Illustrations.

#### THE CHURCH OF ST. BARTHOLOMEW—THE GREAT.

**I**OR a description of Mr. Aston Webb's proposed restoration of the interesting old Church of St. Bartholomew-the-Great, West Smithfield, see the article on p. 663. We give an interior view, with transverse and longitudinal sections.

#### THE ATKINS MONUMENTS, CLAPHAM.

In the *Builder* for January 2nd last we gave an account of the circumstances attending the remarkable discovery, just then made, of sculptured figures beneath the old parish church of St. Paul, Clapham,—a discovery due to the insight and perseverance of Mr. J. W. Grover, F.S.A. The figures, five in number, are those of some members of the Atkins family. We illustrate three of them. The recumbent male figure is that of Sir Richard Atkins, Lord of the Manor of Clapham, who died in 1689. The other recumbent figure is that of Lady Rebecca Atkins, wife of Sir Richard. The seated figure, absurdly clad in Roman costume and with full-bottomed wig, is that of their son, Henry, who died in 1677, aged 24. The other figures discovered were those of two daughters, Rebecca, who died in 1661, in her ninth year, and Annabella, who died in 1670, in her nineteenth year. The figures are all in exceedingly good preservation,—no doubt because their existence had been so utterly lost sight of,—and, as we mentioned a few weeks ago, Mr. Grover, assisted by some friends, is collecting funds for placing the figures in a suitable and protected position in the church. Many who have seen the monuments incline to the belief that they are the work of a foreign sculptor or sculptors.

#### PORCH AT EAST SHEEN, SURREY.

The porch, designed by Mr. T. Collcutt, forms part of an addition to a house at East Sheen, and is constructed in terra-cotta, the roof being covered with Hartshill tiles; the inside is lined with red Staffordshire tiles.

The alterations were carried out by Messrs. Peirce & Lansdown; the terra-cotta was supplied by Mr. George Jennings, from his Parkstone potteries, and is of an excellent colour. The drawing is in the Royal Academy exhibition.

#### CHELTEHAM GRAMMAR SCHOOL.

THE accompanying plan shows the arrangement of the ground-floor. The assembly-hall is set back from the line of the street, and forms one side of an open quadrangle, 55 ft. by 25 ft., having on the right the board-room and entrance for the governors, and on the left the caretaker's residence and entrance for the scholars. The class-rooms are placed in the rear, and have a north-west aspect, facing directly down the playground. The whole of the accommodation, with the exception of the chemical laboratory and lecture-room, which are on the first floor, is on one level.

The cloak-room and lavatory, and also a room for drying coats in wet weather, are provided adjoining the entrance-corridor, and there is a way from the cloak-room direct to the playground. The old buildings on each side of the playground can be retained, and are proposed to be utilised as recreation-rooms or workshops for the boys. The latrines are detached from the schools, and are to be approached by a covered way.

The schools were originally founded by Richard Pate, in the reign of Queen Elizabeth; the style prevalent at this period has, therefore, been adopted.

The exterior is proposed to be faced with Bath or Doulting stone, and the roofs covered with Broseley tiles. The assembly-hall has an open-timbered roof, with a lofty bell-turret (utilised also for ventilating the room) rising from the centre. The walls are lined with wainscoting below the windows, and there is a gallery at the end opposite the platform.

The building is proposed to be warmed by an apparatus in the basement, and the chimney in connexion with this is constructed with a hollow space all round, into which the ventilating flues are carried.

The estimated cost of the buildings, exclusive of the school fittings, is 5,500l.

The architect is Mr. Henry Hall, whose design was selected in competition.

#### WEST WINDOW, TICKHILL CHURCH, YORKSHIRE.

THE west window in Tickhill Church has recently been filled with stained glass, which has been designed and executed by Messrs. Powell Brothers, of Leeds.

The ten chief openings contain the following subjects from the Book of Genesis:—The Fall,

Abel's Acceptable Offering, Rainbow Covenant, Abraham meeting Melchizedek, the Destruction of Sodom, Abraham's Sacrifice, the Meeting of Isaac and Rebekah, Jacob obtaining the Blessing, Joseph sold to the Ishmaelites, and the Death of Joseph.

The tracery lights contain the Days of Creation, presented to the church by the Misses Alderson, of Tickhill.

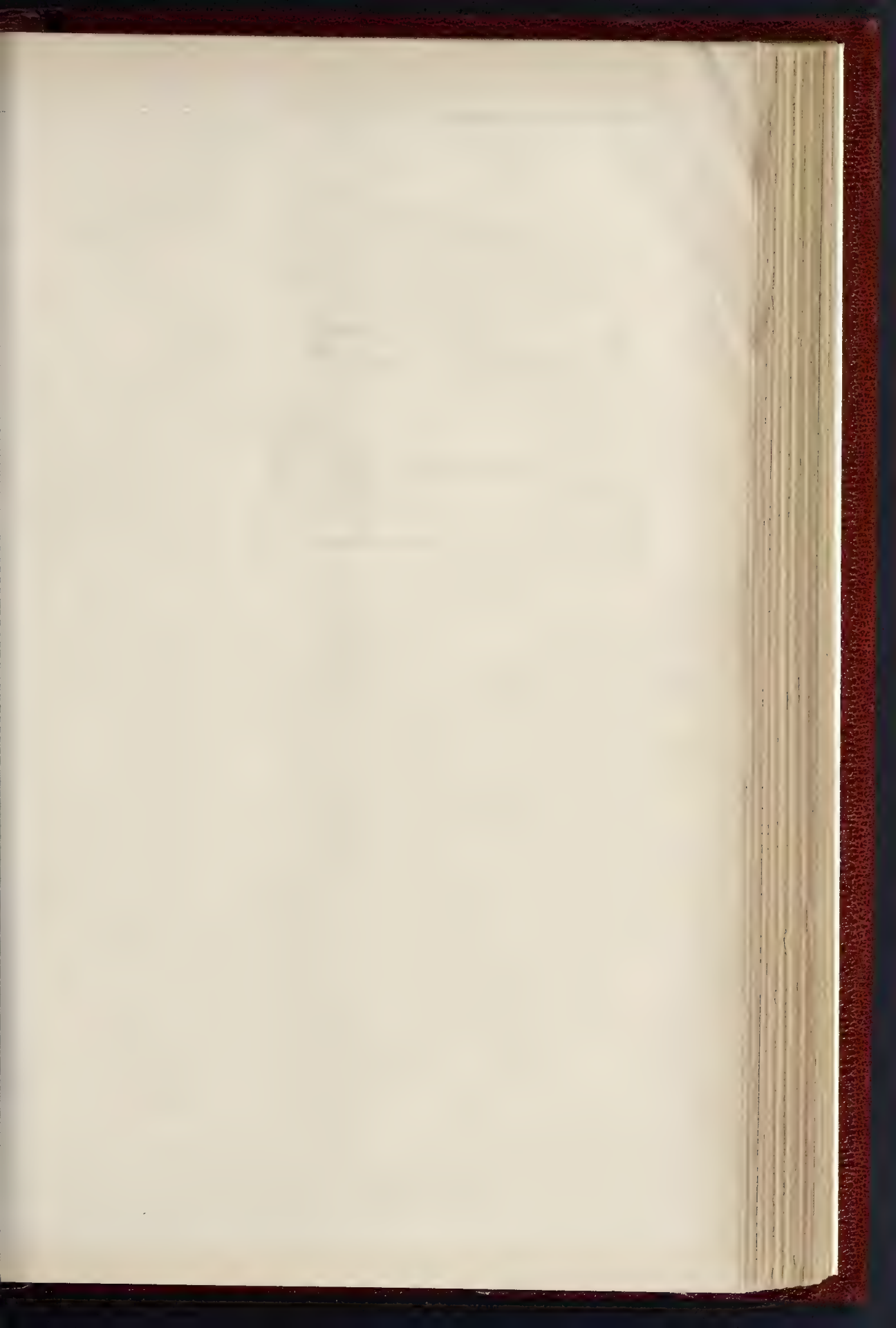
The church was partially restored some years since under the superintendence of Mr. J. D. Webster, of Sheffield.

#### ARCHITECTURAL SOCIETIES.

**Edinburgh Architectural Association.**—The fortnightly meeting of this Association was held on the 29th of April, in the Profession Hall, George-street, the President, Mr. G. Wainwright Browne, in the chair. After the usual preliminary business, a paper on "Gothic Ornament" was read by Mr. James Gordon architect. The author traced the characteristics of the Romanesque and Byzantine expression of art in ornament, and showed their combined influence in the rise and development of the Gothic style in the end of the twelfth century. Celtic art, he said, attained to a high degree of perfection in Ireland as early as the sixth century, and was carried thence by the early Christian missionaries to Britain and the Continent, where it influenced very largely the subsequent phases of ornamental art. The Norman period, which preceded the advent of Gothic, was an age of great artistic vigour, when every form of decorative art suddenly assumed a degree of perfection unapproached for thousands of years. The various changes in Gothic ornament, corresponding to the architectural styles, were described,—those exhibited in the arts of sculptured ornament, stained glass, ornamental metal-work, and MS. illumination receiving chief consideration. Conventions marked the earliest and best periods of Gothic ornamental art. Towards the end of the fourteenth century, and even earlier in Continental Gothic, naturalistic foliage which did not suit the material used, and which had little sympathy with the purpose, began to assume the ascendancy over the conventional. The tendency soon led to the decadence of Gothic ornament. The paper was illustrated by numerous photographs, cartoons, and drawings several of the drawings being the work of the talented draughtsman, the late J. G. Lais. After the customary discussion, a hearty vote of thanks, proposed by Professor Baldwin Brown, and seconded by Mr. Bonnar, was given to the lecturer.

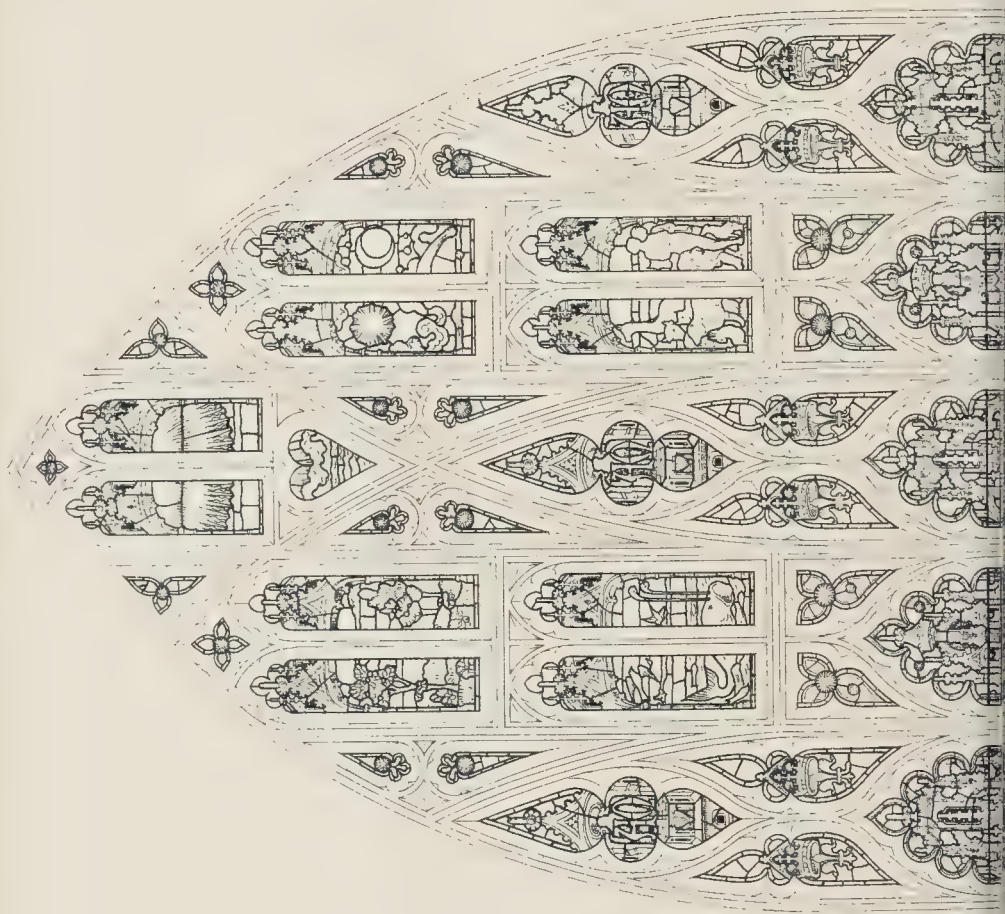
**Northern Architectural Association.**—The first of a series of out-door meetings of the members of this Association took place on Saturday last, when they visited the New Town-hall and Municipal Buildings at Middlesbrough, which have been in course of erection for the past three years, and will occupy at least two years longer to complete. The members were met by their President, Mr. G. Gordon Hoskins, F.R.I.B.A., the architect of the buildings, who, acting as *cicerone*, conducted them over the works. The existing stage of operations, perhaps, for members of the profession is the most interesting, inasmuch as the greater portion of the vast scheme is laid bare, and such vital subjects as construction, heating, ventilating, and the sanitary arrangements of the more thoroughly grasped than when in more advanced stages. We may mention the description of the building, accompanied by a double-page perspective view, appeared in the *Builder* for January 13, 1883. After a complete inspection, occupying upwards of two hours, the members accepted the invitation: the President to refreshment at the Corporation Hotel, after which they left by train for Darlington, where they went over the Free Library and the New Hospital, both recently completed works of which Mr. Hoskins was also the architect. The majority of the members ultimately returned to Newcastle.

**Newcastle-upon-Tyne.**—Messrs. R. & Hawthorn Leslie & Co. are now erecting an extensive range of offices, pattern-shops, and stores at their St. Peter's Works, also a new approach to the existing offices from St. Peter's Station, from plans prepared by Mr. W. Glover, architect, 16, Market-street, Newcastle.





THE BUILDER, MAY 8, 1888.

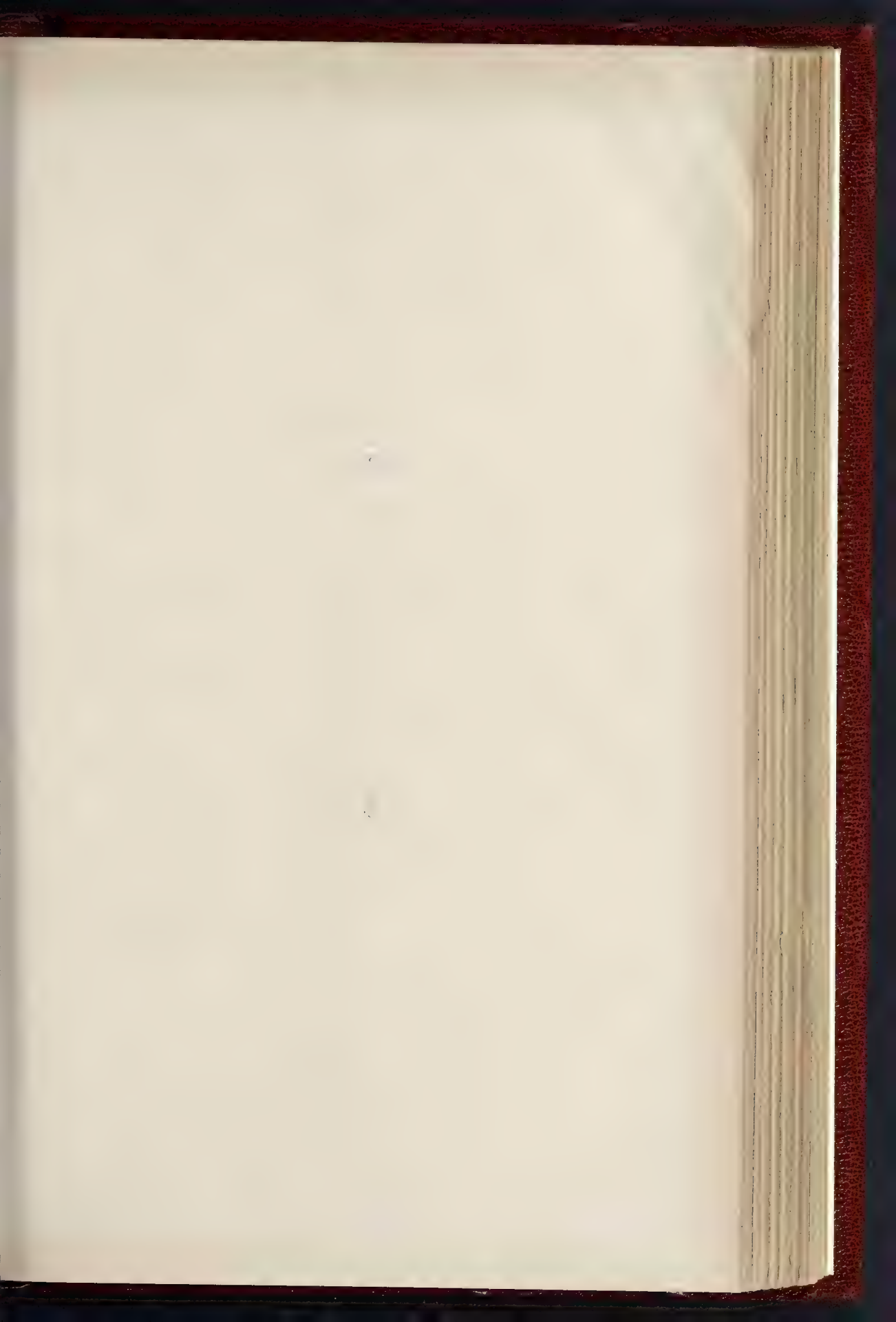




WEST WINDOW, TICKHILL CHURCH, YORKS. EXECUTED IN STAINED GLASS BY MESS<sup>RS</sup> POWELL BRO<sup>TH</sup> LEEDS.

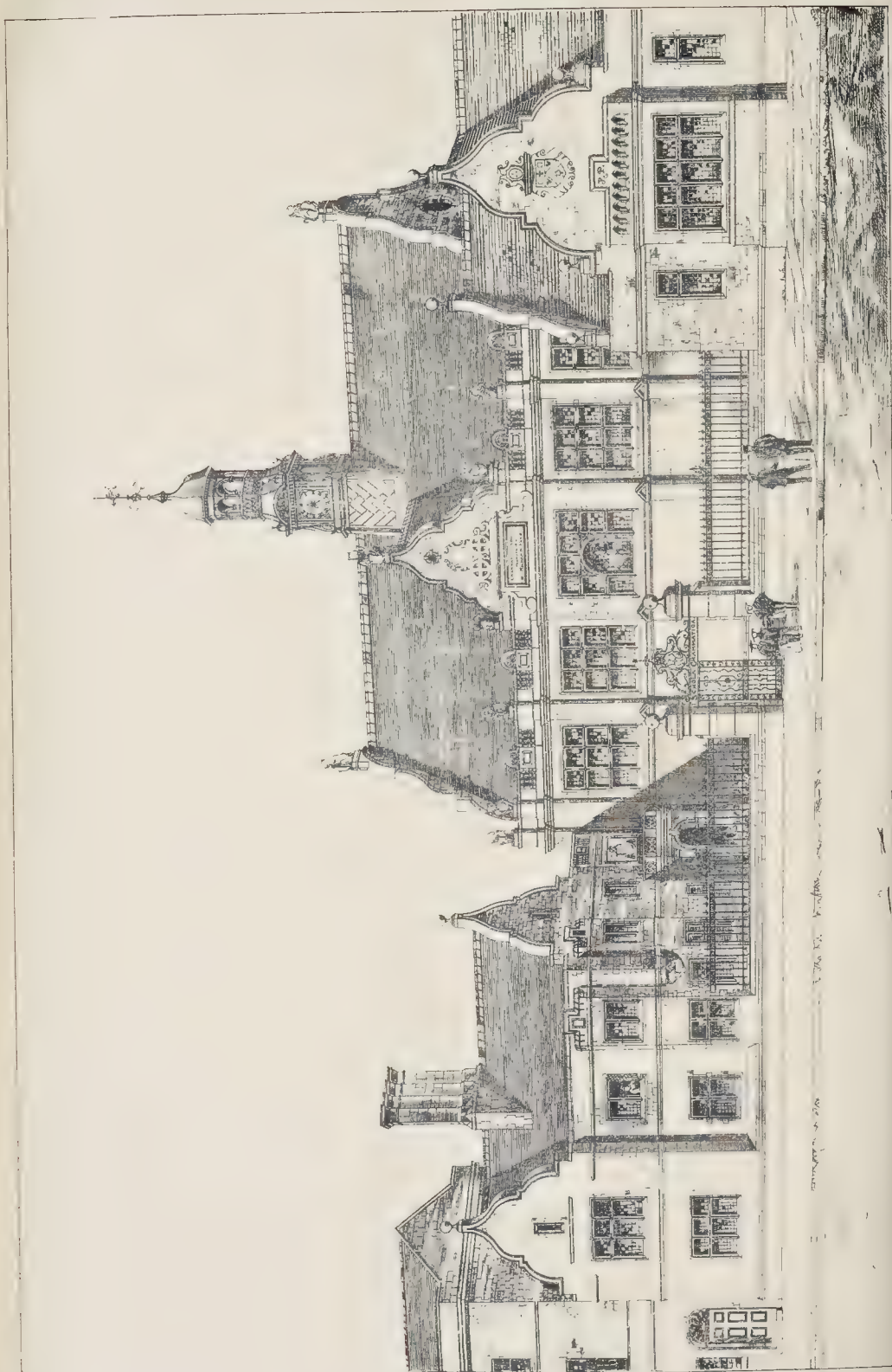


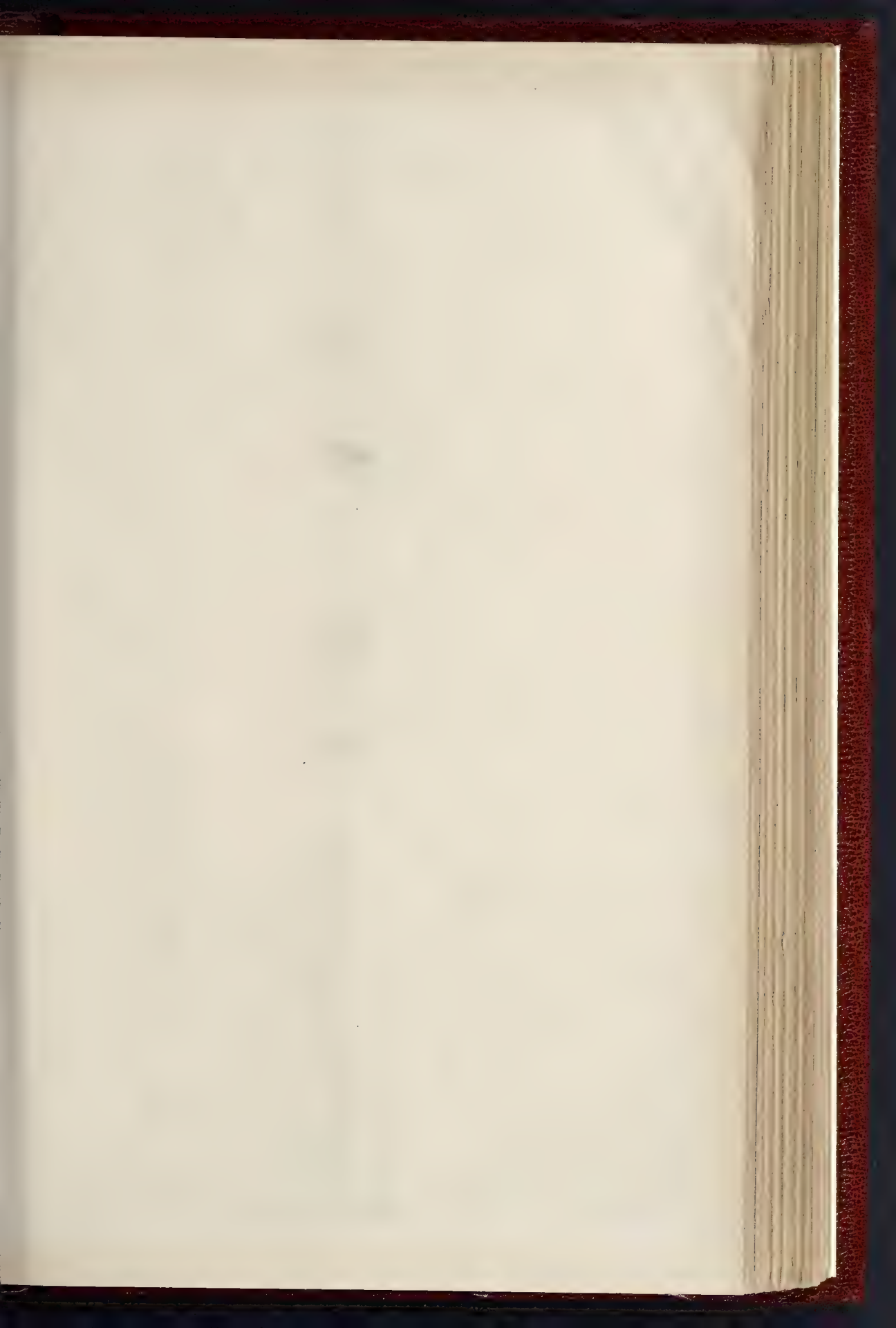






THE BUILDING, MAY 8, 1886

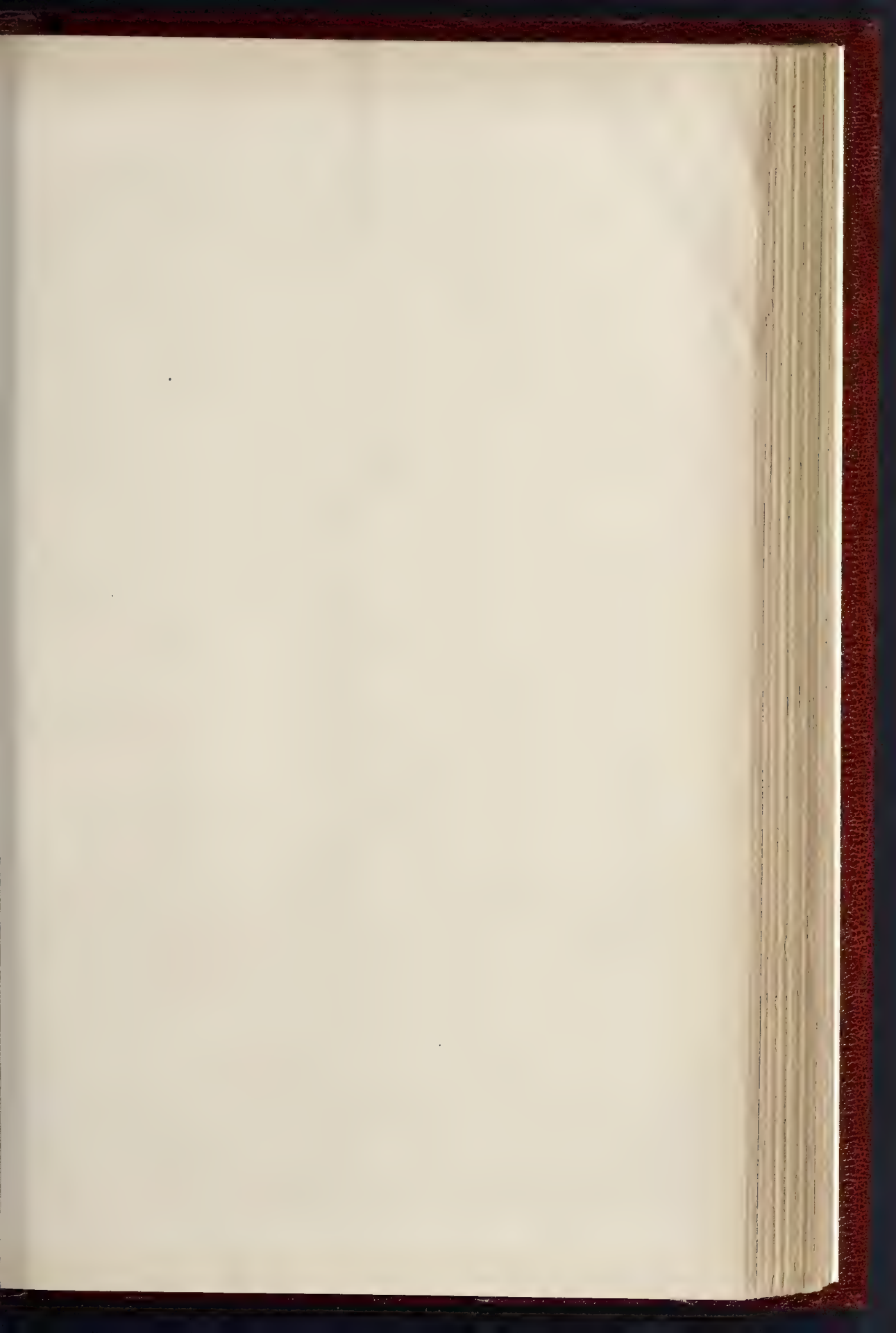




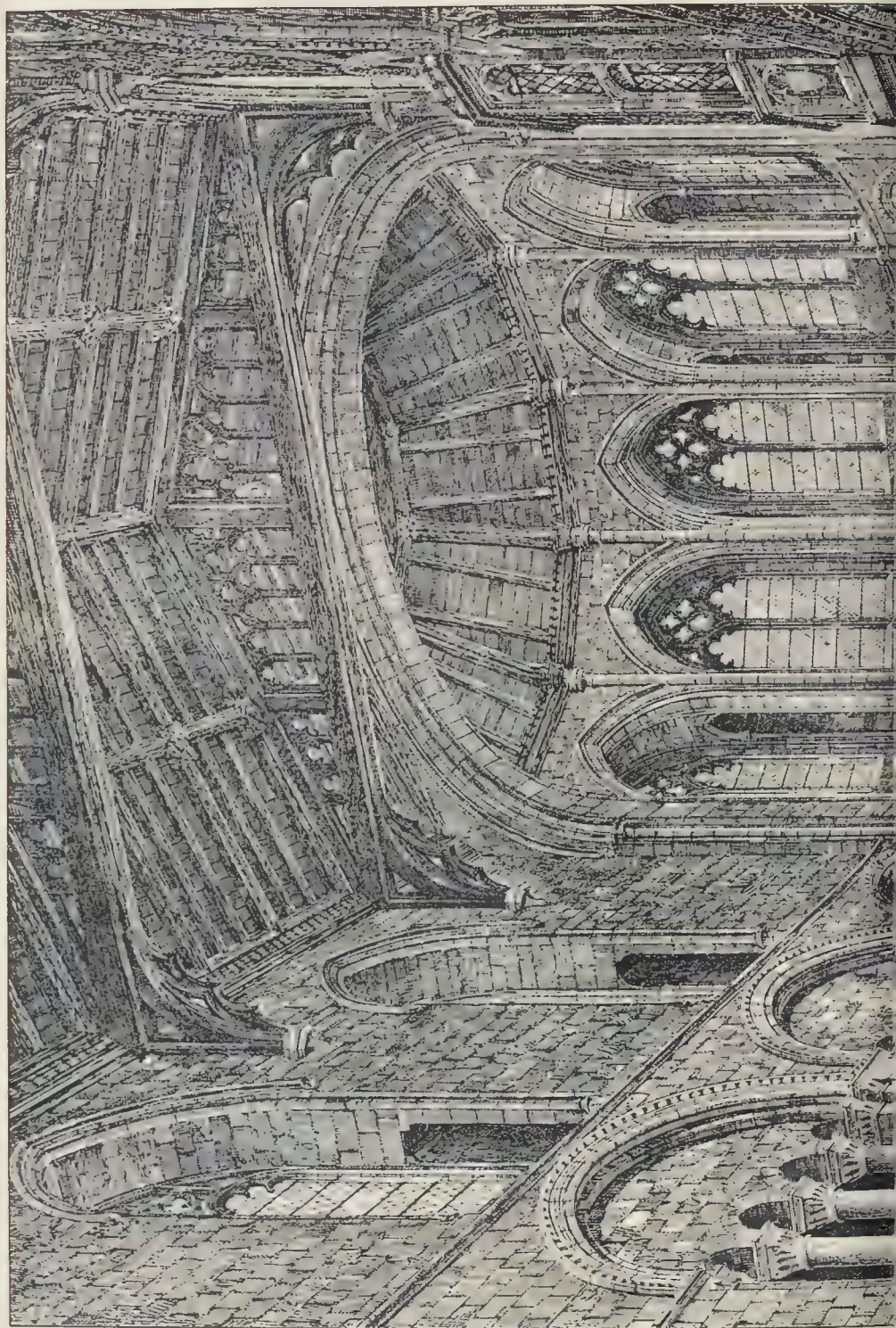


THE BUILDER MAY 8 1896











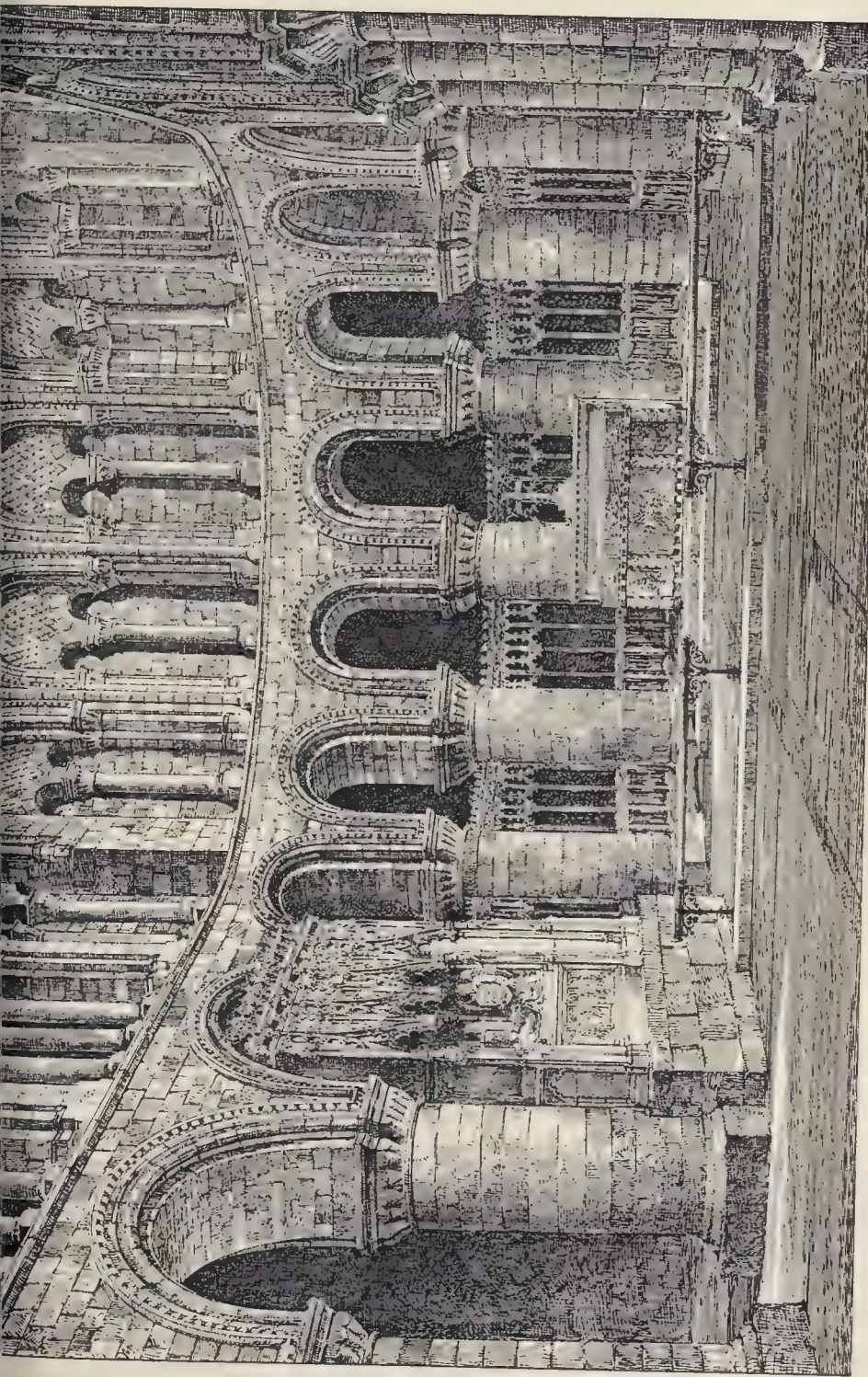
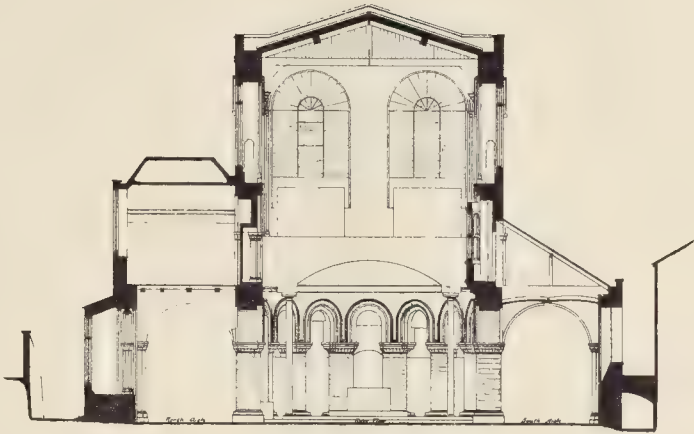


PHOTO. BY MR. SPRAGUE & CO. LONDON.

CHURCH OF ST. BARTHOLOMEW THE GREAT, WEST SMITHFIELD—VIEW SHOWING PROPOSED COMPLETION OF THE EAST END  
MR. ANDERSON WILKINSON, F.R.S.B., ARCHITECT.







TRANSVERSE SECT ON  
LOOKING EAST.



SECT ON THRO CHURCH

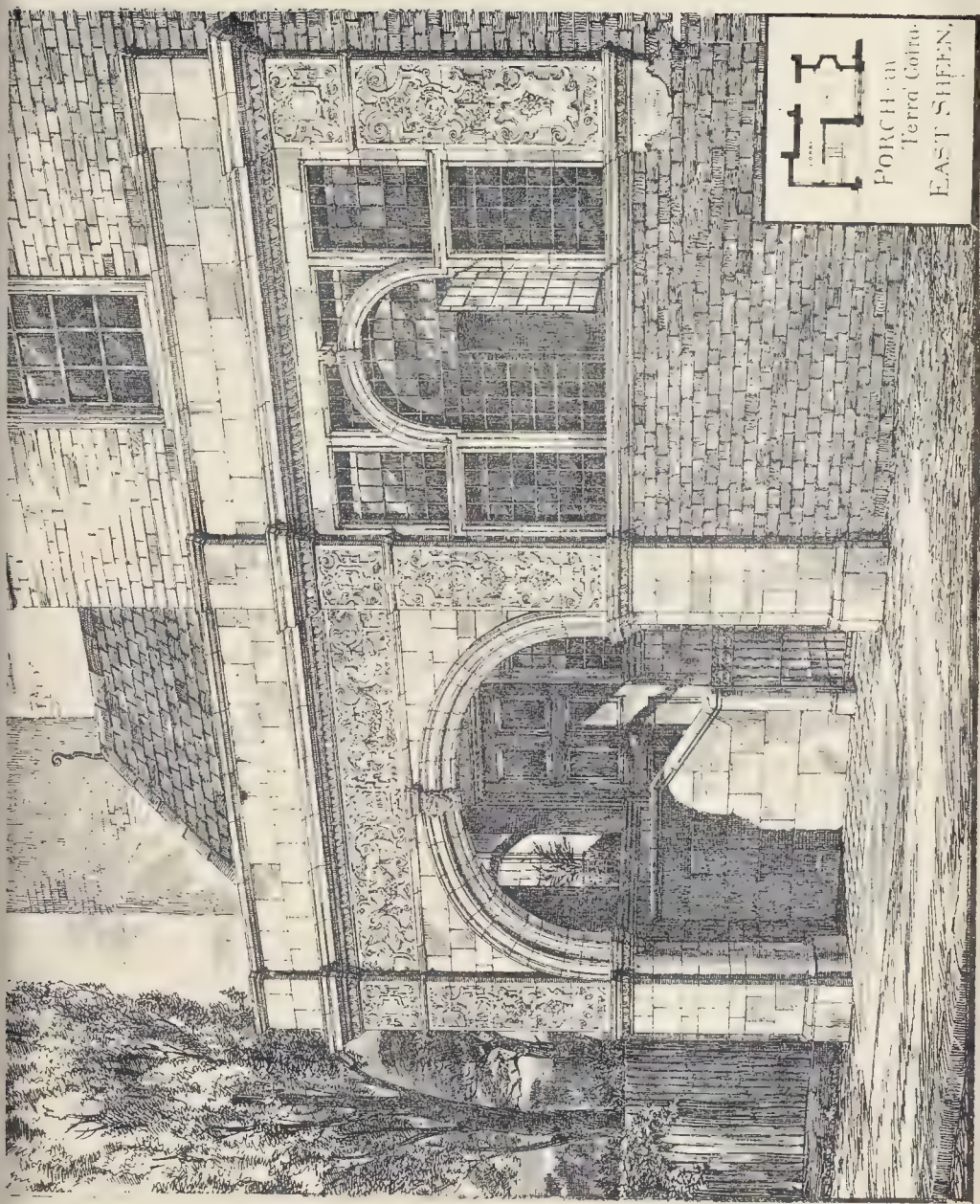
PHOTO LITHO SPRAGUE & CO LONDON

CHURCH OF ST. BARTHOLOMEW THE GREAT, WEST SMITHFIELD.

SECTIONS AS EXISTING, SEPTEMBER, 1885,







PORCH in  
Terra Cotta.  
EAST SHEEN.

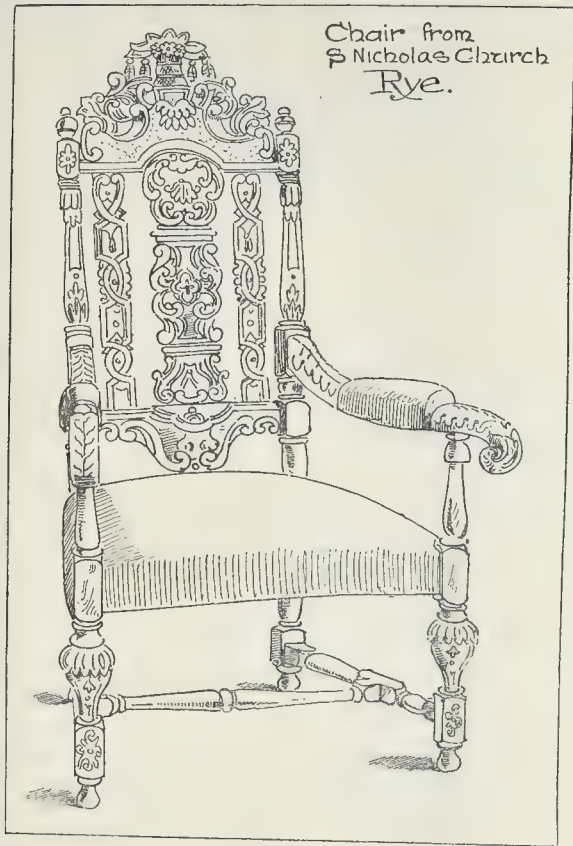
A PORCH IN TERRA COTTA. MR. T. E. COLLCUTT, F.R.I.B.A., ARCHITECT.

S. F. Kell, Photo-Litho, 24, Abchurch Lane, London, E.C. 4.





Chair from  
St Nicholas Church  
Rye.



CHAIR, ST. NICHOLAS CHURCH, RYE.  
With some of the faults of decorative style pertaining to its date,—the apparently constructive weakness, for instance, of the back rails,—this is an example of a late Renaissance chair worth commemoration for elegance and richness of effect. We can give no information as to its history.

#### COMPETITIONS.

**Hospital for Children, Shadwell.**—We are informed that Messrs. H. Saxon Snell & Son have been requested to advise the Board of Management of the Shadwell Children's Hospital as to the merits and probable cost of four designs selected from those sent in in competition for the proposed new wing to the East London Hospital for Children and Dispensary for Women, Shadwell.

**Board Schools, Clyde Bank, Dumbartonshire.**—In the old Kilpatrick School Board competition, held last week (p. 660), the designs of Messrs. J. & G. Holme and James S. A. Mercer, joint architects, Liverpool, were placed second out of fourteen competitors.

#### EXHIBITION OF JAPANESE ART-WORK.

In connexion with Mr. Ernest Hart's course of lectures on "The Historic Arts of Japan" at the Society of Arts' rooms, there is being exhibited in the library of that institution a collection of old Japanese metal-work, pottery, bronzes, lacquer, "kakemonos," &c., exhibiting the various manners and styles of the several schools of Japanese artists, from the foundation of the first native school in the ninth century.

The objects, with few exceptions, are from a private collection of Mr. Hart, and are arranged in historic sequence. Among the kakemonos, or hanging pictures, we noticed particularly a figure of the Buddha, by Kanaka

(ninth century?), in quiet neutral colours which seem to harmonise with the serene and expressionless countenance of the god. Another, which hangs close by, represents the Buddha surrounded by a heavenly choir playing, singing, and dancing among the clouds; it looks beautiful in the midst of beautiful objects, and in its gold and dark-blue colouring inclines one to wonder whether "the unknown artist of the twelfth century" may not have been Cimabue in a previous phase of existence. On the opposite side of the room may be seen a representation of a Japanese æsthetic exquisite carrying a branch of "the poet's tree" (the plum), and with a beautifully embroidered border of chrysanthemums on his dress. A picture of dogs by Okio, which hangs near, surpasses anything we have hitherto seen in delicacy and tender colouring, and has besides a touch of that humour so characteristic of Japanese art. By the popular modern master, Hckusei, there is a representation of the domestic goddess, Ofuku, casting out the demon of dirt and disorder by throwing beans—the Japanese equivalent for holy water—at him, a kind of "spring cleaning" supposed to be performed in every household upon New Year's day.

Among the swords and sword-guards exhibited, it is curious to notice how little the artists who decorated them thought of sparing their labour, and how they spent it equally upon the basest and the most valuable materials—the hardest iron, and even the steel blades of the weapons, are chased with delicate and beautiful ornament, and the guards and scabbards are damascened, enamelled, carved, lacquered, and inlaid with almost every material that could be procured—mother-of-pearl, coral, ivory, crystals, and metals, chiefly gold, silver, copper, and alloys. These materials are not, as a rule, used in their crude state, but are carved into flowers and leaves, insects, reptiles, &c., and are stained in delicate tints, with the proper veins and marks drawn upon them. The beautiful early sword-guards of cold

hammered iron must also have been wrought with an amount of labour and patience difficult to realise.

We have no space left to speak of the pottery and the bronzes and the works in lac, but we were as much delighted as ever with the delicacy and humour, as well as with the loving patience, the spirited freshness, and the broad sympathies of the old Japanese artists. No work of nature is too great or too small for them, from a mountain to the petal of a flower, from a human being to a tiny insect, everything is studied and drawn, carved and coloured with equal care, accuracy, and feeling.

#### ARCHITECTURAL ASSOCIATION: ITALIAN EXCURSION.

The following further notes of this excursion (see p. 637, ante) have been forwarded to us:—"We reached Siena on Tuesday, the 27th April, and visited the cathedral, studying the large mosaics in the west façade and the interesting incised outline pictures in the marble pavement. In the fourteenth century a far larger building was commenced, it being the intention to make the present cathedral a transept of the new one, but only a portion of this building was carried out, and the original cathedral was completed as it now is in 1348. The library is celebrated for its frescoes. The baptistery under the choir contains a curious font with a ciborium in the centre. The Opera del Duomo contains some interesting plans of the larger cathedral and cartoons of the pictures on the pavement, and a splendid collection of needle-work, consisting of altar frontals, chapel hangings, &c. The Church of St. Domenico is a striking brick building of the fourteenth century, consisting of a nave and transepts, 70 ft. wide, with open timber roof of king-post construction, with chancel and six chapels at the east end, a striking feature in the church being the small window space required to light it, only four windows being left open in the nave, though the church has the appearance of being well lighted. Under the east end of St. Domenico, which is built on the side of a hill, is the celebrated fountain of Fontebranda. The Church of St. Catherina de Siena contains some good majolica tiles and carved and inlaid stalls. The Palazzo Pubblico, with the adjacent tower and the other interesting buildings in the market-place, make it one of the most picturesque places seen on the excursion. The Loggia of the Casino de' Nobili, with its handsomely-carved benches, and the various large private houses, with their quaint iron brackets, were all carefully studied. The next town visited was Orvieto, which was reached on Tuesday afternoon. The cathedral, as is well known, is similar in style to Siena, though not so large. The west façade contains splendid mosaic pictures, and a marvellous wealth of carved marble. The roof of the nave is now being restored, the present roof, erected in 1826, showing signs of decay. The roof is of king-post construction, and is being reinstated with fir, similar to the roof that is being taken off. Whether it will last more than fifty years is rather doubtful. The span is 62 ft. A great deal of the detail in the cathedral, and the other buildings in the town, shows strong resemblance to our Northern Norman work. There are several churches with interesting fragments of old work, and one or two private buildings. One of the curiosities of the place is the well in the fortress, which is 203 ft. deep, and 43 ft. wide, with a double spiral staircase 6 ft. wide from the top to the bottom. Rome was reached on Wednesday, the 28th of April, and under the guidance of Mr. Russell Forbes, the remains on the Palatine Hill were examined, and the Roma Quadrata (the so-called Wall of Romulus), the house of Livius, and the Flavian Palace. In the afternoon the Church of St. Paolo Fuori le Mura was visited. This church, which was rebuilt after a fire in 1823, is one of the most elaborately-decorated churches in Rome. The upper part of the façade is completely covered with mosaic, and the interior is gorgeous, decorated with marble and gilding with a very unsatisfactory result."

The excursionists return to London this week.

**Rainhill Church.**—In our notice in the Builder of April 24th, the reredos of this church should have been stated as having been subscribed for by the congregation.



## THE FIREMAN'S EXHIBITION.

UNDER this title a small but interesting exhibition of appliances and materials for extinguishing fires and preventing loss of life by fire, and of constructive materials and solutions for rendering buildings and woven fabrics fireproof, is now open at the Royal Aquarium, Westminster. Of course the well-known firms of Merryweather & Sons and Shand & Mason are represented; as also are Spong & Co. and James Sinclair with chemical fire-extinguishing engines. Perhaps the most striking feature of the exhibition is the evidence which it appears to afford of the increased resort to chemical means of fire extinction, if we may accept as evidence the great number of exhibits of that kind. Here are to be seen hand "grenades" for fire extinction, made in the form of indiarubber bladders, in glass bottles and tubes, and even in the form of artistic glass and pottery vases for display on mantel-pieces and sideboards, or in cabinets,—all these receptacles being filled with chemically-charged liquid. One ingenious application of this liquid consists in filling the glass or earthenware base or stem of paraffin oil lamps with it, the idea being that, should the lamp fall and set light to floor or curtains, the fire would be immediately extinguished by the liberation of the chemical anti-fire fluid. Of mechanical and electrical appliances for use by fire brigades and the public, there are a few good things to be seen. Amongst these we must include the electric alarms and other fittings exhibited by Mr. Julius Sax, and a very good instantaneous hose-coupling (without spring, screw, or rivet) exhibited by Mr. Edward Nunan. The automatic and other sprinklers for fire extinction are also represented by one or two exhibits.

The ordinary type of street fire-escape, as used in London, is exhibited in action by Messrs. E. H. Bayley & Co., of Southwark; and a very good and simple fire-escape for domestic use, called "The Dreadnought," and consisting of a canvas tube and folding-ladder combined, is exhibited by Messrs. Piggott Bros. It folds up into a small space, and is always ready for use. Of course, the canvas and ropes are rendered unflammable by a chemical process. Another canvas escape, the "Ever Ready," exhibited by the patentee, Mr. H. T. Bailey, consists of a canvas tube with indiarubber bands inside it to check the descent of the persons using it. The practical use of these two escapes finds no lack of illustration, for the more juvenile portion of the male visitors to the Exhibition are not slow in availing themselves of the opportunity for pastime which they afford. A noteworthy exhibit is Woolven, Eade, & Co.'s rocket life-saving apparatus for saving life and property at fires. It is an adaptation of the rocket life-saving apparatus as used on our coasts. By it a line can be thrown over a high building and secured on the other side when other means of ascent or descent would be impossible. When we were at the Exhibition on Wednesday, the Friberg fire-escape (a German invention, apparently, and telescopic in action) was still lying on its side in the position in which it toppled over on Saturday last, when it unfortunately killed a poor man. It is evidently too lumbering, heavy, and cumbersome for hurried locomotion.

The gallery is mainly occupied by models of fire-engines and fire-escapes; one of the latter is devised so as to be extended or raised on the principle of the "lazy tongs," but we question whether it would answer in practice. In the gallery also are to be seen some very good portable fire-escapes invented by Col. Wethered, of Woolwich, as well as M. C. Duffy & Son's wood-black flooring as applied to fire-proof construction; Hitchins's fire-proof plastering; Wilkes's metallic flooring; Johnson's wire fire-proof lathing; Wright & Co.'s patent fire-proof fixing-blocks in a variety of their applications; and other exhibits connected with construction.

The archaeological aspect of the subject is represented by an old manual fire-engine exhibited by Messrs. W. Rose & Co., and described as dating from 1575,—a very doubtful ascription of antiquity, we think, in spite of certain traces of those figures having been painted on the engine at some time or other; and by a larger manual engine exhibited by Messrs. Spong & Co., and which is, no doubt, of the date assigned, viz., 1780.

The exhibition is worth a visit, and will remain open until the 15th inst.

## EXAMINATIONS FOR MUNICIPAL AND SANITARY ENGINEERS AND SURVEYORS.

THE Association of Municipal and Sanitary Engineers and Surveyors, established in 1873, now numbers about 250 members, all of whom are necessarily, by Rule III., "civil engineers and surveyors holding chief permanent appointments under the various Municipal Corporations, or Sanitary Authorities within the control of the Local Government Board." The objects of the Association are, by Rule II., defined to be: "(a) the promotion and interchange among its members of that species of knowledge and practice which falls within the department of an engineer or surveyor engaged in the discharge of the duties imposed by the Public Health, Local Government, and other sanitary Acts; (b) the promotion of the professional interests of the members; (c) the general promotion of the objects of sanitary science." These objects are fulfilled by the holding of seven or eight district meetings over the country during the year, which afford valuable opportunities for interchange of ideas and views between the members, while the visits to works which constitute part of the programme of each meeting are fraught with many practical lessons. With a view to the improvement of the professional status and education of the holders of such appointments as those which qualify for membership, the Council some time ago came to the conclusion that it was desirable that the Association should take upon itself, as the most fitting body for such a purpose, the duty of instituting voluntary examinations and the granting of certificates of competency to candidates for appointment as borough surveyors and surveyors to local boards and other sanitary authorities, and after some consideration decided to hold two examinations in each year,—one in April, in London, and one in October in some provincial town. The April examination has just been held, the examiners being, as we announced a fortnight ago (p. 528, ante), Messrs. R. Vawser, M. Inst. C.E., President of the Association; Mr. W. G. Laws, M. Inst. C.E., City Engineer, Newcastle-on-Tyne; Mr. E. B. Ellice Clark, M. Inst. C.E., Hove; and Mr. Clement Dunscombe, City Engineer, Liverpool. The following gentlemen who satisfied the examiners have been granted certificates of competency by the Council of the Association, viz.:

Angell, J. H., Leytonstone.  
Ashmead, H., Clifton.  
Coles, H. G., King's Lynn.  
Fenton, W. C., Sheffield.  
Grextorex, A. D., Toxteth Park.  
Harland, A., Charlotte-street, W.  
Osborne, F., Dover.  
Saunders, E. C., Walthamstow.  
Witts, J. W., Skelton-in-Cleveland.

## LOAN EXHIBITION OF PICTURES AT THE WALKER ART GALLERY, LIVERPOOL.

IN catering for the entertainment of the numerous visitors whom Liverpool is expecting next week, among other things a very good loan exhibition of pictures and water-colour drawings has been opened in the Walker Art Gallery.

This collection has been contributed almost entirely by collectors in and about Liverpool, and is a very extensive one. It occupies seven rooms in the Gallery, and numbers about 850 works of art, many of them of great excellence, and comprises examples of most of the best-known British artists of the present and past generations.

One room is entirely appropriated to foreign pictures, belonging principally to Messrs. Medley, Oakshot, and J. Davies. Another is also set apart for drawings by the members of the "Liverpool Society of Painters in Water-colours"; while a third contains works of "The Liver Sketching Club," which latter society, consisting, when first established a few years ago, exclusively of amateurs, has lately been joined by some local artists, and their combined efforts show very creditable results.

The pictures lent by Mr. Edward Samuelson, chairman of the Liverpool Art Committee, also in themselves fill one room.

Among the works exhibited we may mention "Nausicaa," by Sir F. Leighton, P. R. A.; "Ariadne," by the same artist; "Rosaland and Celia" and "Flowing to the Sea," both by

Millais; "Othello and Desdemona," by Dicksee; "A Street in Venice," by J. Holland; Bridell's fine landscape "The Temple of Venus, from the Faerie Queene"; and other fine works are contributed by Mr. A. G. Kurtz, of Liverpool.

Mr. Ralph Brocklebank lends, amongst others, Wilkie's "Letter of Introduction," Pyne's "Heidelberg Castle," Turner's "Blessing of the Adriatic," "Somers Hill," by the same artist; "Baalbec," by David Roberts, R.A., &c.

"Mr. David Jardine, of Liverpool, sends "The Cherry Seller," by W. Collins, R.A.; "Coast of Normandy," by Clarkson Stanfield; an English landscape, by Calcott, R.A., &c.

Mr. Malcolm Guthrie contributes "A Summer Storm," by Constable (a charming example of the artist); "View near Llangollen," by David Cox; and a number of other fine pictures.

Mr. Arthur East, also of Liverpool, sends "View on the Surrey Downs," by W. Linnell; "Wharfedale, Bolton Abbey in the Distance," Copley Fielding, &c.

Millais's "Fringe of the Moor," the property of Mr. T. H. Ismay, is also here.

The works of Rossetti, Burne Jones, &c., are also strongly represented.

In addition to the gentlemen already named, the following should be honourably mentioned as contributing largely from their collections to this interesting exhibition:—Messrs. F. R. Leyland, G. W. Moss, Chas. Langton, J. G. Livingstone, James Pegram, A. T. Squire, Jas. Barrow, George Rae, Benson Rathbone, G. C. Dobell, John Temple, William Coltart, and others.

The display of works of art in these rooms is highly creditable to Liverpool, and worthy of the occasion which it is designed to help to celebrate, and cannot fail to attract considerable attention on the part of all connoisseurs and lovers of art.

It is worthy of note how many pictures of the highest class, which have appeared upon the walls of our exhibitions of late years, have found final resting-places in the galleries of the wealthy citizens of Liverpool and its neighbourhood.

## DELAYS IN SANITARY LEGISLATION.

IN closing the session of the Association of Public Sanitary Inspectors, Mr. Edwin Chadwick, C.B., its President, delivered an address of Saturday evening at the rooms of the Association, Adam-street, Adelphi. The veteran sanitarian is displeased with the monopoly of the time of the House of Commons by political problems and the consequent exclusion of sanitary legislation. He says that by these continued political pre-occupations the advance of preventive sanitary measures is delayed, while silently and unheeded, ravages of life, strength, and working energy are permitted, which are more disastrous than the most terrible war. Even in the interests of Ireland he thinks the existing pre-occupations are to be condemned, since they cause measures to be overlooked that are essential to the relief of the most distressed of the Irish population, and which might provide increased wages in the execution of productive and profitable sanitary works. The poorest and most mud-hovelled districts of Ireland were ever the most disturbed, murder, manslaughters, and other crimes of violence being as characteristic of such districts as epidemic disease. The proportions, comparing the best and worst districts from the sanitary point of view, were, as he had pointed out, 1852, as 61 to 29 in epidemic diseases, and as 1 to 32 in crimes of violence and passion. Ireland being wetter than England, was in greater need of sanitary relief. The only measure that he believed would be effectual, that of affording relief by remunerative outdoor labour, as successfully carried out on occasions of great manufacturing distress in England, had not been adopted, and the measures now proposed appeared to offer no means of relief for the most distressed and troubled of the Irish population. Were all the rents and taxes given to the Irish people, it could be shown that it would only bring the wages up to about half the derivable from high culture on a large scale such as prevailed in Scotland. The delay in preventive legislation created intolerable even in one of the least afflicted districts of the metropolis, Greenwich, even when represented in Parliament by the Premier himself. The district displayed an annual excess of more than 500 preventable deaths, between 300 and 400 of which affected the bread-winners chiefly.



The loss, valued in money, he estimated at from 60,000, to 80,000, and more than 14,000, annually in a medicine bill, besides a loss of at least ten years of life. The seventy-seven miles of main thoroughfares of the metropolis were administered by sixty-eight independent local authorities, and the leading thoroughfare alone from Hammersmith to the East India Docks was under fourteen different boards, of which the Corporation of London was but one. Under this system of administration snow would have been removed to the ridges waiting without inconvenience for a thaw, footways would have been systematically cleaned by the "agees," and the jet would have been used for asphalted surfaces as in "clean-streets Paris," and all this would have involved the expenditure of only one-eighth part of the water wasted by the present system of distribution. The purification of the air which took place after a thunder-storm indicated the increased purity of the air that would result from complete cleansing, and the annual death-rate might be reduced by at least 20,000. The principle of hydrating the streets, and putting the hose in charge of the police on the beat, had, in Manchester and Liverpool, reduced the losses of life and property by fire to one-third what it was in the metropolis; yet, notwithstanding the proposals of Sir Selwin Ibbotson's Committee in 1877, no relief had been afforded, loss of life and property had gone on increasing in all its preventable excess as well as in cases attributable to design or to pure accident. Had the plan proposed in their report on the water-supply of the metropolis been adopted, the cost would have been less by very many millions than would now be necessary, and every year of delay was adding about a million sterling to that cost. Notwithstanding the expenditure of 6,000,000, on the purification of the Thames, estimated originally to cost 1,000,000, its condition had been justly pronounced by Lord Bramwell's Commission as "a disgrace to the metropolis and to civilisation," and 4,000,000 more were about to be spent, in order to throw into the sea the means of producing the milk of 200,000 cows. In the concluding part of Mr. Chadwick's address the members of the Association were adjured to make themselves masters of every detail connected with the practical use of the smoke-tester or proving the drainage of houses throughout the United Kingdom. By it they could make mental darkness visible, and show, better than any previous method, how many millions of people are living, eating, and sleeping in the midst of invisible gases, fraught with disease and death.

At the meeting, a report of the proceedings of the 8th of April was distributed, when a statement from the Association had an interview with Mr. Stansfeld, the new President of the Local Government Board, on the introduction of Mr. Chadwick. In addition to the aforementioned points—brought before the Board by Mr. Jernam, the Chairman of the Council, as points unanimously adopted by the Association—papers on sanitary statistics, the position of the "Sanitary Inspector," and "Tenure of Office" were presented to Mr. Stansfeld, who, in reply to the spokesman of the deputation, expressed his satisfaction with the comprehensive treatment of the subject by the speakers. The points submitted by the deputation were:—

"That the powers, responsibilities, and emoluments of Sanitary Inspectors should be largely increased.  
"That a minimum rate of salary for Sanitary Inspectors should be enacted.  
"That Sanitary Inspectors shall be duly qualified, and removable from their appointments for proved misconduct or incompetence.

"That Sanitary Inspectors shall initiate proceedings on behalf of the Local Authority for the abatement of nuisances by serving notices requiring all necessary works to be done for that purpose. All such notices to be read and approved, or otherwise, by the Local Authority, or, if satisfied thereon, order proceedings to be taken against the offenders.

"That the position of the Metropolitan, Urban, and Rural Inspectors be assimilated.  
"That in order that the position of the Sanitary Inspectors be strengthened, it is expedient that the appointment of all officers should be approved of by the Government Sanitary Authority, and no officer dismissed by any Local Authority without final appeal to, and approval of, the Government Sanitary Authority."

The proceedings of Saturday last concluded with a vote of thanks to Mr. Chadwick, on the motion of the Chairman of the Council, Mr. Rams, seconded by Mr. Rains, and supported by Mr. Alexander (Shoreditch) and other speakers.

In replying to the vote of thanks, Mr. Chadwick said that a proposition had been submitted

to Lord Granville to send out to the Australian and other colonies some of the instructions on sanitary matters issued at a former period in this country, and the suggestion had been favourably received on the understanding that the information given would be brought up to date. The home death-rate of 10 or 12 per 1,000 for the nobility, 20 per 1,000 for the middle, and 30 per 1,000 for the working classes, was enormously increased in the colonies, the death-rate, with every advantage of pure air and genial climates, exceeding even the rate of 40 and 45 per 1,000 of the slums of great cities. It was a terrible fact that in Australia and some other colonies more than half the children born were in their graves before their fifth year.

#### THE GEOLOGY OF THE EARTH'S SURFACE IN ITS SANITARY ASPECT.

FROM an interesting paper read by Professor W. Fream at the meeting of the Surveyors' Institution on Monday evening last, on "The Geology of the Surface in its Practical Aspects," we call the following passages:—

"A full knowledge of the nature and distribution of the superficial deposits is a necessary preliminary to a thorough comprehension of local conditions favourable to life and drainage. Water derived from surface springs is always more or less open to suspicion, and the recent progress of medical and sanitary science has indicated clearly enough the nature of the dangers which may lurk in drinking-water obtained from such sources. The growing density of the population is, even in rural districts,—perhaps I ought to say particularly in rural districts,—calculated to increase rather than to diminish this source of danger. Cases in which shallow wells have run dry when adjacent cesspools have been abolished are by no means hypothetical, and filtration through a few feet or yards of porous, sandy, or gravelly rock is utterly inoperative against organic poisons. The establishment or maintenance of ponds is another important matter, especially in agricultural districts; it is a circumstance which is largely dependent on the character of the soil and subsoil, and on the nature of the available sources of water supply.

The unhealthy character of some districts is associated with the nature of the soils, and it may be regarded as an established fact that certain classes of diseases are specially addicted to certain soils. On soils pervious to water the prevailing diseases are of the enteric or typhoid type; on impervious soils they are consumption and other lung diseases, and rheumatism. In the former case foul drinking-water obviously suggests itself as the medium of contagion, for when the level of the ground water is low, percolation is free, and then it is that most of the zymotic diseases are rife. Professor Pettenger's continuous daily observations on the height of the ground water at Munich demonstrated that when the ground water fell the death-rate rose, typhoid fever in particular inducing fatal results. Not long ago Mr. Baldwin Latham prepared a diagram showing the connexion between low ground water and typhoid fever at Croydon. The ground air, moreover, is as important from a hygienic point of view, particularly in relation to dwelling-houses, as is the ground water. The quantity of ground air varies with the nature of the soil, being least in clays, more in loams, and most in sands or gravels; it varies also with the quantity of moisture in the soil, and, in any given soil, it approaches the maximum when the ground water is at its lowest. The circulation of air in the soil is greatly influenced by the temperature and pressure of the atmosphere, and a falling barometer is a danger signal, bidding us beware lest the offensive gaseous emanations from defective drains and cesspits should be given off at the surface of the ground, and, perchance, beneath the dwelling-rooms of a house, where the draught caused by fires will aid in determining the course of the effluvia. Dr. J. W. Tripe, Medical Officer of Health for Hackney, has traced the path of injurious gases through more than 30 ft. of loose soil. Some years ago, Mr. G. J. Symons, F.R.S., Secretary of the Royal Meteorological Society, advocated the collection, by a commission of experts, of a complete statistical record of the health-rate, death-rate, geology, climate, water-supply, drainage, and general conditions of all our mineral water, sea-bathing, or pure-air resorts; and he maintains that the collection of such

statistics would have both direct and indirect beneficial effects infinitely beyond the cost of the inquiry. The temperature, both of soil and of ground water, is obviously a matter of importance.

The reason that sandy and gravelly soils have usually received town populations before clayey ones,—a fact which was well illustrated during the settlement of the metropolitan districts,—is that, on the former, water was as easy to obtain as, on the latter, it was frequently difficult; the sanitary differences between the two kinds of soil are branches of very recent knowledge. So intimate is the relation between the geology of the surface and the conditions controlling health, that the University of London in its 'Examination in Subjects relating to Public Health,' which is open only to its Graduates in Medicine, requires candidates to give evidence of a knowledge of 'Geology, as regards general knowledge of Rocks, their conformation and chemical composition, and their relation to underground Water, and to drainage and sources of Water-supply.' Among legislative enactments, the Rivers Pollution Prevention Act is not without interest and significance in the same connexion."

#### THE PROPOSED MUTILATION OF THE CHARTERHOUSE BUILDINGS.

A PUBLIC meeting, convened by the Society for the Protection of Ancient Buildings and the Commons Preservation Society, was held on Thursday afternoon last in the hall of the Society of Arts, John-street, Adelphi, to protest against the proposed mutilation of the Charterhouse and the destruction of the open space. The Right Hon. G. Shaw-Lefevre, M.P., presided.

Mr. H. N. Story-Maskelyne, M.P., proposed the first resolution, as follows:—

"That, in the opinion of this meeting, irreparable injury will be inflicted on the metropolis by the mutilation of the Charterhouse in the manner proposed by the Bill promoted by the Governors of Sutton's Charity, and now pending in Parliament."

Mr. James Bryce, M.P., seconded the resolution, which was supported by Mr. Henry Maudslay; and, after some remarks by Mr. Lee, of the Charterhouse, in defence of the Governors of Sutton's Charity, was carried unanimously.

Mr. William Morris next moved:—

"That the open land within the bounds of the Charterhouse, situate in a crowded district of the metropolis, the condition of which has recently been shown to be highly insalubrious, is of the greatest value, as conducing to the health of London; and its devotion to building purposes, in order to add to the funds of an already wealthy charity, would be a scandal."

The resolution was seconded by Mr. T. J. Cobden-Sanderson, supported by Mr. Richard Chamberlain, M.P., and carried without a dissentient.

The third resolution was proposed by the Hon. Walter H. James, M.P., as follows:—

"That no sufficient reason has been shown for the abolition of the hospital founded by Thomas Sutton in the Charterhouse, or for setting aside the expressed wish of the Founder, and the Act of Parliament passed to give effect to that wish, that the Charterhouse should be preserved as the home of the charity, and should not be turned to profit."

Mr. J. T. Micklethwaite, F.S.A., seconded the resolution, which was supported by the Hon. R. Grosvenor, and unanimously carried.

Lord North moved the fourth resolution, which was seconded by Mr. Hunter:—

"That the chairman be authorised to sign and present to the House of Commons a petition against the Bill, and that a deputation wait upon the Vice-President of the Council to enforce the views expressed at this meeting, and to solicit the aid of the Government in securing the withdrawal or rejection of the Bill."

Mr. Rowlands supported the resolution, which was also unanimously agreed to.

**Proposed Monument to Abraham Lincoln.**—The Bill recently introduced at Washington by Mr. Cullum to appropriate a sum of 500,000 dollars for the erection of a monument to Abraham Lincoln in that capital has been reported upon very favourably in the Senate by Mr. Sewell on behalf of the Library Committee. In the course of a speech respecting the Bill, Mr. Cullum said that the provisions of the measure, except as to the amount and name, were precisely similar to those in the Bill referring to the monument in memory of General Grant.



## THE ART-UNION OF LONDON.

## ANNUAL MEETING AND PRIZE DISTRIBUTION.

The fifth annual meeting of the Art-Union of London was held on Tuesday last, in the Adelphi Theatre. The chair was taken by Mr. James Hoggood, J.P., in the absence of the President, the Earl of Derby, who wrote regretting that his duties as a Commissioner at the opening of the Colonial and Indian Exhibition would prevent his taking the chair on this the first annual meeting of the Art-Union since he had been elected to the office of President.

Mr. Hallett read the annual report, from which we extract a few paragraphs:—

"In announcing to the subscribers the total amount of contributions of the year at 7,273 7s., though it shows a considerable decline from the amount of last year, the Council do not feel called upon to take a desponding tone, for, looking at the general depression prevailing in this country,—which greatly affects every kind of enterprise,—as well as the low prices which have been obtained for the price of wood in Australia, they think they are justified in regarding the amount as a satisfactory contribution to the encouragement of art; and, from the reports received on all sides, they have no hesitation in stating that, with the return of more prosperous times, the Art-Union may fairly be expected to show that general level of income which has prevailed for above forty years."

The amount to be expended on prizes will be thus allotted:—1 work at 100l.; 1 work at 75l.; three framed original drawings, by the late E. M. Ward, R.A., being replicas of frescoes in Westminster Palace, viz., 'The Sleep of Argyl,' 'The Execution of Montrose,' and 'General Monk declaring for a Free Parliament,' valued at 70l. each; 1 work at 60l.; 2 works at 50l. each; 3 works at 45l.; 3 at 40l.; 5 at 30l.; 6 at 25l.; 4 at 20l.; 20 at 15l.; 20 at 10l.; 30 sets of designs from English history; and 40 portfolios of 'Animal Life,'—making, with the prizes given to the unsuccessful members, 396 prizes.

The following is a brief summary of the receipts and expenditure:—

Amount of subscriptions .....	27,273 7 0
Alotted for prizes .....	£2,113 0 0
Set apart towards providing works of art for accumulated payments .....	472 0 0
For print of the year, exhibition, report, and reserve .....	1,975 12 6
Agents' commission and charges, advertisements, printing, postage, rent, &c., &c.	2,712 14 6
	27,273 7 0

In August last, the Art-Union found itself without a President by the death of Lord Houghton. As Mr. Monkton Milnes, his lordship had been, for many years, a member of the Council, and on the death of Lord Montagu in 1886 he was elected President. His lordship took the chair at the annual meetings whenever he was in England and his health permitted him, and frequently presided at the meetings of the Council.

In succession to Lord Houghton as President, the Council, having ascertained his lordship's willingness to accept the post, unanimously elected the Right Hon. the Earl of Derby, who had been one of the Vice-Presidents since the year 1869, and to whom, from his interest in all undertakings tending to the intellectual development of the people, the Council feel justified in looking for an active co-operation.

In August last died Professor Donaldson, at the ripe age of ninety-one. Professor Donaldson was the sole survivor of fourteen architects who, on the 13th of May, 1834, met at 14, Regent-street, and passed a resolution that it was desirable to form an institution for the promotion of architecture. After various meetings, a well-digested scheme was drawn up and adopted. The Institute of British Architects was incorporated on the 16th of June, 1835, with Lord de Grey as President, and Mr. Donaldson as one of the Vice-presidents. From the day of its formation, Mr. Donaldson was one of the leading spirits of the Institute. He was one of the founders of the Art-Union, and remained one of its most useful and active supporters to the last. He was one of a small committee which drew up an admirable report on the possibilities of the Association, which was of great service in shaping its course."

After alluding to the decease of Mr. James Fergusson, the historian of architecture; of Mr. Thomas Thornycroft, sculptor; Mr. Randolph Caldecott, and Mr. E. Thorburn, the Report referred to the question of copyright in the following terms:—

"A measure of great importance, not only to artists and authors, but to all those who take an interest in art, and desire to secure to authors the benefits resulting from the works of their own brains, is a Bill to amend and consolidate the laws relating to copyright. It has been prepared by the Incorporated Society of Authors, and there is every prospect that it will be shortly embodied in an Act of Parliament. The Bill proceeds mainly on the 16th of June, 1835, with Lord de Grey as President, and Mr. Donaldson as one of the Vice-presidents. From the day of its formation, Mr. Donaldson was one of the leading spirits of the Institute. He was one of the founders of the Art-Union, and remained one of its most useful and active supporters to the last. He was one of a small committee which drew up an admirable report on the possibilities of the Association, which was of great service in shaping its course."

At present copyright in engravings lasts for twenty-eight years from publication; in painting for the artist's life and seven years; in sculpture fourteen years from the first

'putting forth or publishing' of the work, or if the artist lives so long, for another term. In these arbitrary distinctions it is now proposed to abolish in favour of one uniform term for the life of the author, and thirty years after his death; a period which seems well calculated to meet the necessities of the case, and recommended by the Commissioners of 1878. This illustration will suffice to indicate the sweeping character of the new Bill.

Another instance of the confusion resulting from the present state of the law is to be found in the distinction as to registration. In the case of books and paintings the effect of registration differs, since it is only in the former case that the owner can take proceedings for an infringement prior to registration. The Bill deals summarily with these distinctions, establishing a copyright registration office, where any copyright can be registered. The artist should, however, it is very properly proposed, irrespective of copyright, to prohibit their being sold or exhibited in shop windows without the consent in writing of the person for whom the work was executed.

It is proposed that the measure shall extend to the whole of Her Majesty's dominions, so that it is a serious attempt to deal with the vexed question of copyright in the colonies as well as at home.

An important declaration is made of the law as to copyright in photographs, which is to belong to the taker of the negative. In the case of cartes-de-visite taken on commission, however, it is very properly proposed, irrespective of copyright, to prohibit their being sold or exhibited in shop windows without the consent in writing of the person for whom the work was executed.

Having referred with approval to the work of the Home Arts and Industries Association, the Report spoke of the courses of lectures on the Egyptian and Assyrian antiquities in the British Museum which have been given of late years by Mr. Newton and others making tours of the galleries, and illustrating their discourses by reference to the several objects exhibited, and asked whether it might not be worth while to establish something of the same sort in connexion with the National Gallery and other collections:—

"Suppose some competent person were selected who should take some special painting, and give to those standing in front of it a 'catalogue raisonné' of its elements. He would indicate the general intention of the work, whether the symbolical meaning of some masterpiece of Raphael or Murillo, or the more homely but still subtle and intensely realistic representation of interiors of De Hooch or Van Ostade; explaining the manner in which the master grouped his figures to produce a harmonious composition,—how one part was made to lead up to and give force to another,—the modification of effect produced by direct and reflected light,—the simpler principles of perspective,—the force of colour in the contrast or harmony of different colours,—the skill displayed in foreshortening the figures,—the effect of solidity acquired by the play of light and shade,—the principle which regulates the reflection of objects on water,—and, shortly, all those points which illustrate the genius and technical skill of the artist, apart from the mere 'motif' of the work, which as a general rule is all that the average spectator takes in. Who can deny that, having picked up some at least of these elements, the visitor will be enabled to go on to other pictures, and to retail for the benefit of his companions, those points, few perhaps, but and roughly comprehended, but which may have the effect of making him ponder on them as far as they go and seek opportunities of learning more. At any rate, it cannot be said that the experiment is not worth making."

As a matter in some degree, on the foregoing subject, highly deserving of recognition is the fact that the Dean of Westminster, every Saturday afternoon, personally escorts a party of ladies and gentlemen to the choir, to explain to them the design and intention of the several monuments."

In reference to the presentation work for the coming year, the Report, in conclusion, says:—

"It is long since the Council provided for the subscribers an English landscape engraving, and believing that such a subject would be acceptable, especially to those dwelling in distant lands, they commissioned Mr. Leader, A.R.A., one of the most popular landscape painters of the day, to paint a picture for the purpose. The artist chose for the subject a view at Streteley, a village on the Thames, and a very favourite haunt of artists from the charming combination of river scenery, hills, and woods, which diversify the spot. . . . The painting has been intended in black and white with marked power by Mr. Willmore, and the Council feel no doubt that it will be very popular with the subscribers. The oil painting, worth 300l., will be the chief prize in the next distribution."

On the motion of the Chairman, seconded by Mr. Zouch Troughton, and supported by Mr. Henry Maudslay (who made a few suggestions with the view of making the objects of the Art-Union better known), the Report was unanimously adopted.

The Chairman next moved a vote of thanks to Mr. Zouch Troughton, the honorary secretary, for his services during the past year, and expressed the deep regret which he felt in having to announce that the senior honorary secretary, Mr. E. E. Antrobus, J.P., died on the previous day (Monday). This was seconded by Mr. Gooden, and briefly acknowledged by Mr. Troughton.

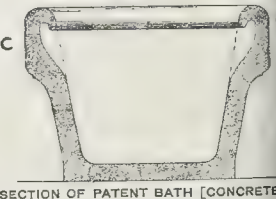
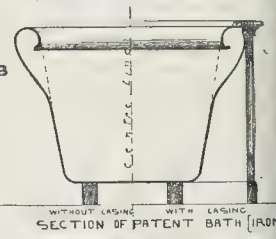
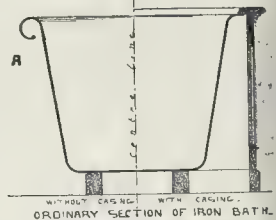
Votes of thanks were also given to the auditors (Messrs. G. J. Fearis and J. Walker); to Messrs. A. & S. Gatti for granting the use of the theatre for the meeting; and to the ladies

who rendered assistance in connexion with the drawing of the prizes.

It may be added that the principal prize (value 100l.) fell to Mr. W. G. Judge, Dorking, and the three drawings by the late E. M. Ward, R.A., to subscribers at Oporto, Lenhard (Victoria, South Australia), and Peterborough (Canada) respectively.

## AN IMPROVED BATH.

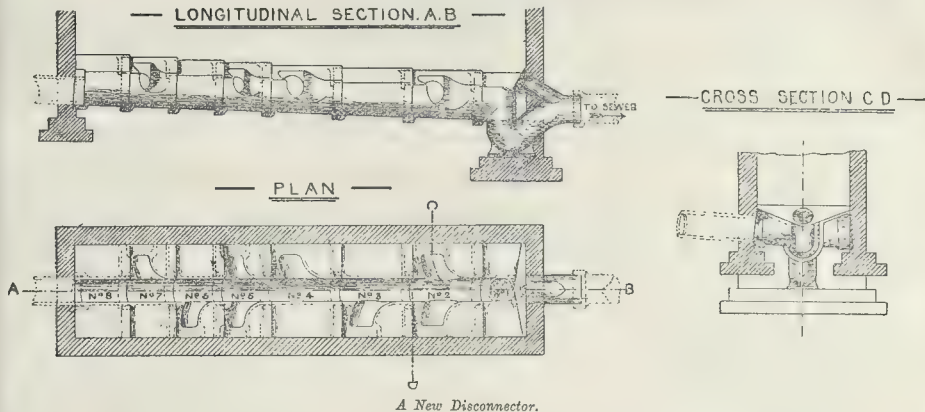
The object of the form of bath shown in the accompanying sections is to prevent the running up of water over the edge and on to the floor, which constantly and inevitably happens when a large bath is used with any depth of water, and the water is agitated during the use of it. It is an odd instance of the way in which so many things are made according to custom rather than common sense that large standing baths, which are always emptied by a plug at the bottom, and never can be emptied by pouring over the rim, are nevertheless, habitually made with a curve over at the rim, in the same way as a wash-hand basin, which (when not a fixture) is always emptied by pouring over the rim. This curved-over rim is therefore the natural and proper way of making the latter; whereas in a large fixed bath it is an object that the water should not get over the rim. Reverse the curve, therefore, and the water,—however it may run up the side during use,—will not run over the edge and give the housemaid extra work in mopping up floors, or occasionally percolate through the ceiling below.



The reverse curve is so made that it does not project inward beyond the line formed by the side of the bath in its ordinary form, a presents no edge or angle internally. It patented by Mr. H. H. Statham, and the right to the patent is made over to Mr. Jennings, Lambeth, who is prepared to make and supply the bath.

**Cutting of Glass by Heated Air.**—*Centralblatt für Glass Industrie* remarks that heated air or gas is now frequently used in place of the former methods of cutting glass. A pipe leads the air or gas against the object to be cut, which is fixed close before the pipe and rotates on its axis. In this way an arc of heated glass is produced, which is damped, and the glass can then be cut at a relative ease at the place desired. The process is described as being rapid and effectual, but likewise surer than any hitherto employed.





## A NEW DISCONNECTOR.

THIS new drain or sewer disconnecting chamber and syphon trap combined is invented and patented by Mr. Marsh Simpson, C.E., who describes its objects as follows:—

"It is a development of and improvement upon the 'Kenos' air-chamber first introduced by Professor Corfield and Mr. Mark H. Judge one year back. The object of the design is to provide chamber sections in stoneware, with or without branch channels, as required, complete, thus dispensing with separate channel pipes and cement-rendered floors. The plan and sections given above with the following notation from the registered description of the design fully explain it.

- The design is to be made of glazed stoneware consisting of eight different sections, all fitting together so that they may be used either separately or in any combination, and is applicable to the shape or configuration thereof, viz. :—
1. Syphon trap and floor.
  2. Floor with three channels of equal size.
  - 3 and 4. Floor with two channels of equal size, right and left hand.
  5. Floor with three channels of unequal size.
  - 6 and 7. Floor with two channels of unequal size, right and left hand.
  8. Floor with one channel only."

We may add that the disconnecter is manufactured by Messrs. John Bolding & Sons, of South Molton-street.

## NEW BUILDINGS FOR POOR LAW ADMINISTRATION.

Workhouse Schools for the Edmonton Union.—The Chase Farm Schools, erected by the Guardians of the Edmonton Union on the Ridge-way, Enfield, have lately been opened. The buildings have been erected at a total cost of £6000, which includes the sum of £2,000, a cost of the site, which is 44 acres in extent. The architect of the building was Mr. T. E. Underley, of 106, Cannon-street, E.C., and the builder Mr. Charles Wall, of Chelsea. The buildings comprise a lodge with long porch for protection of new comers, whilst the necessary formalities of admission are being observed; then of two separate buildings, which may be termed quarantine buildings, as in each, each child will pass fourteen days before received into the family. The main building consists of a centre and three surrounding wings. In the front of the centre are the committee and master's rooms, and sleeping accommodation for domestic servants; behind are bakery, work-rooms, kitchen, dining-hall, swimming-bath, laundries, and workshops, arranged with subsidiary kitchen and laundries to be used for training the girls in fitting them for domestic service. The wing on the left is for girls, that on the right for boys, and that in the rear for infants. In each of those the school, class and play rooms, 12 lavatories are below, with dormitories, and water-closets above, arranged so that the case of fire or epidemic a floor or block, part of it, may be isolated, as the dormitories are divided and have separate staircases.

The buildings are on what may be called the subdivided pavilion system. Beyond these are two cottage homes, each for two foster parents, and a family of thirty children, the man teaching the boys, and the woman instructing the girls. In the distance is an infirmary for infectious cases, with separate laundry. Provision has been made for future enlargement to any required extent without having to hem in the existing buildings,—an important point not always secured, even where it might be.

The Holborn Union Workhouse Buildings at Mitcham.—The large and costly new workhouse, which has for some time past been in course of erection at Mitcham for the Guardians of the Holborn Union, is fast approaching completion. The buildings are situated in Merton-lane, opposite the Mitcham and Wimbledon Gasworks, and occupy an area of about eight acres. They are built on the pavilion principle, and contain seventeen blocks, twelve of the blocks consisting of the inmates' wards. These are arranged on each side of the site, and are three stories in height. All the blocks are connected by covered and glazed corridors. The administrative blocks are in the centre of the site, and are three in number, the front block of two floors facing Merton-lane, containing the master's residence, the board-room, and committee-rooms. At the rear is the block containing the dining-hall, a large apartment 100 ft. by 50 ft., which is also intended to be used as the workhouse chapel. The kitchen, immediately adjoining, is 63 ft. by 24 ft. Adjoining is the laundry block and engine-house, whilst at the extreme rear is the infirmary, a separate and distinct block, three stories in height. The porter's lodge and the receiving-wards are at the entrance in Merton-lane. The inmates' wards, facing the Merton-lane elevation, are surmounted at each angle by towers, whilst the central administrative block is entered by a bold pedimented doorway in Portland stone. The whole of the buildings are faced with stock brick, on blue Staffordshire brick bases. The buildings have been erected from the designs of Messrs. H. Saxon Snell & Sons. Messrs. Wall Bros. are the contractors. Mr. J. H. Caine is clerk of the works, and Mr. Sanders is foreman. The whole of the wards will be heated by hot-water apparatus, furnished by Messrs. May Bros. of Holborn, who are also supplying the general engineering work. The gasfittings are by Messrs. Perry & Sons, of Westminster. The whole of the stone paving will be executed by Mr. Alfred Walker, of Golden-square, in Walker's granolithic pavement. A water-tower, with tank to hold 25,000 gallons of water, is to be erected, at a cost of £2,500. The estimated cost of the buildings is upwards of £60,000. In connexion with the new workhouse, and the industrial schools in Mitcham-road immediately adjoining, new gasworks are about to be erected.

Ranmoor, Sheffield.—Stained glass has been inserted in another of the windows in the eastern apse of the Church of St. John, Ranmoor, Sheffield. Messrs. Powell Bros., of Leeds, are the artists, and the window is to the memory of members of the Ellison family, and represents some of the chief events of the Passion.

## "ROBINSON'S CEMENT."

SIR,—Referring to the correspondence in your recent issue between Messrs. Howe and Messrs. Robinson [pp. 624, 658, ante], we are surprised to learn that the latter claim a patent right in the admixture of borax or tinned with calcined gypsum, it being widely known that for the past thirty years we have manufactured and largely sold a cement called "Parian," which is a combination of the above ingredients; and, as Messrs. Howe point out, our late senior, Mr. A. Francis, took out a patent as far back as May, 1856. We also agree with Messrs. Howe that alum is a very old ingredient in the manufacture of marble cements.

It is admitted by practical plasterers that Parian cement, made under the process we have described, is more reliable than any other cement of its kind, being free from liability to efflorescence even when on a backing of Portland cement, and being capable of taking paint, paper, or polish within forty-eight hours of being used.

FRANCIS & CO.

## NEWCASTLE-UNDER-LYME PUBLIC BUILDINGS.

SIR,—The authorship of the first premiated design for the above buildings is, in last week's *Builder*, attributed in error to us solely, whereas it was shared by ourselves, Mr. W. H. Sugden, and Mr. John Bloch.

The plans as now adopted certainly do not present themselves to great advantage in your illustrations of the 24th ult., owing, doubtless, to the fact of their reproduction from ordinary tracings. But we hope in due course to place the later design in perspective in a better light.

W. SUGDEN AND SON.

Leek, May 3, 1886.

\*\*\* This is the first intimation that has reached us that any other architects than Messrs. W. Sugden & Son were concerned in the first design of this poly-architect building.

## TRURO CATHEDRAL CENTRAL TOWER FUND.

SIR,—Will you allow me to make one final appeal for the fund now being raised for the purpose of carrying up the lower stage of the above?

In answer to my two former appeals, a sum of £866. has been promised, but this is far short of the amount required, viz., £2,874. We have now reached such a point in the work that it must at once be decided whether we carry up this portion or carry the transept roof through, thus entirely obliterating this essential feature from the design. I am the more anxious to do this work now to avoid paying off a good many men (who have now been with us from four to six years), in the present time of slackness and difficulty of getting work.

Will not some influential person take the matter up, and try and raise the £2,000. required, by collection or otherwise. Or, failing this, surely there are 2,000 persons amongst your numerous readers who, without much self-denial, could contribute 1s. each, and the amount would be at once raised. Let me press upon all who see this at once to act on this suggestion; let no one hold back and say there are plenty without me. If each will look upon himself or herself as the important one, and kindly send me only 1s., I shall soon have the pleasure of writing to say the amount has been made up and the work going on.

ROBERT SWAIN,  
Clerk of Works.



## BREWERY CHIMNEY-SHAFT.

SIR,—Having to design and draw up specification of a large shaft for an extensive brewery, will you kindly allow me to ask through the medium of the *Builder*, the following questions, in the hope that some of your subscribers will give me their practical opinion:—

1. Some architects specify that for every yard in height a course or two shall be built in Portland cement: what advantage is there in so doing?
2. Have any large shafts been built throughout with concrete?
3. If exhaust steam is turned into a chimney-shaft, will it injure the brickwork?
4. What are the binding clauses for the supplying of best Portland cement? I should like one from some well-known company or corporate town.
5. Is any instance known of a chimney-shaft standing any length of time when out of the perpendicular?
6. When subject to great heat, will brickwork in mortar or brickwork in Portland cement stand best?

I have the book lately advertised in the *Builder* on "Tall Chimney Construction," by Messrs. R. M. & F. J. Bancroft. As they have studied the subject, perhaps they would favour me with a reply, which would benefit your numerous readers as well as

J. H. G.

## The Student's Column.

## OUR BUILDING STONES.—IX.

## MINERALS COMMONLY FOUND IN STONE.

**B**EFORE proceeding to examine the sections of stone which have been cut and ground, it may be well, perhaps, to describe briefly a few of the minerals which most commonly occur in them in considerable proportions; for it is quite evident, as most rocks are made up of a variety of minerals, that unless we are able to distinguish the principal minerals under the microscope, we shall be able to make but little progress in microscopic analysis.

Minerals crystallise in different forms, and in such characteristic manners that their identification often rests, to a great extent, on what is called their crystallographic forms. The axes of crystals are referred according to their number, relative position, and relative lengths, to six different systems. It does not come within our province to describe these systems. The student will find information on this point in any elementary treatise on mineralogy.

The mineral which will be found to form a large per-centage of many sandstones and granites is

## Quartz.

In its purest form, quartz is white, being composed wholly of silica. As a constituent of building stones silica may occur as,—

1. Crystallised quartz, forming, with other minerals, a thoroughly crystalline mass, having no glassy matrix, as in granite.

2. In crystallised particles or little grains, as in sandstone.

3. Filling minute cracks, or performing the part of the matrix or cementing material of a sedimentary rock.

4. Taking the place of a pre-existing mineral, as in a stone containing silicified shells.

Quartz may be crystalline or non-crystalline. Where it is found filling veins and cavities in rocks, and so does not form one of the original constituents of them, it is called "secondary quartz."

Flint consists of an intimate mixture of crystalline silica, which is insoluble, and of amorphous silica. Chalcedony is silica, having an obscure or minutely crystalline structure.

Practically the quartz found in stones used in building operations is insoluble, and if a stone containing it decomposes, it is owing to the inferiority, in point of durability, of other minerals of which it is made.

The destruction of a stone may be somewhat retarded by the manner in which the silica is disseminated throughout. If it exists in the form 2, described above, the weathering depends on the character of the matrix. If silica itself should form the matrix, by enveloping particles which might be more susceptible to weathering, it, to a great extent, preserves it. In time, however, the exterior of the stone might become pitted with little holes, by reason of the decomposition of the particles exposed to the atmosphere. Such a stone would be quite unfit for any delicate mouldings.

If we get conditions 2 and 3 together, the stone would be almost wholly, if not quite,

composed of silica, which, although it would last for ages, would be exceedingly difficult to work, breaking with a conchoidal or splintery fracture.

Quartz appears clear under the microscope, and polarises in strong brilliant colours. Minute enclosures of foreign substances, little specks, and thousands of minute cavities are frequently seen dotted over the crystal. Its appearance is so characteristic, however, that it cannot be easily mistaken for any other mineral.

Chalcedony looks granular, and often shows a minute concentric radial structure, with a black cross between crossed Nicols.

The hardness of quartz is 7, and it cannot be scratched with the point of a knife. When in a granular condition the little grains may sometimes be detached, giving the mineral the appearance of being scratched.

## Felspar.

This mineral exists in a variety of forms, and is important enough for us to describe in some detail.

The following table shows the principal felspars, and their average chemical composition:—

Name of Felspar.	Silica.	Alumina.	Potash.	Soda.	Lime.
Orthoclase .....	64.80	18.50	16.70	...	...
Albite .....	68.82	19.98	...	11.83	...
Oligoclase .....	63.74	23.95	1.22	8.11	2.75
Labradorite .....	62.93	30.31	...	4.50	12.33

Orthoclase often contains small proportions of lime, iron, magnesia, and soda. Its colour is a dirty white, grey, or pink. It crystallises in the monoclinic system. The other three felspars crystallise in the triclinic system.

Felspar is one of the essential constituents of granite, and on the power of its resistance to weathering the durability of that stone mainly depends. We are sometimes apt to consider granite as a good weathering stone, without inquiring into any particulars concerning it, and although as a rule it is exceedingly durable, as a matter of fact, unless the felspar be of a durable character, it may weather quite as easily as a bad limestone or sandstone. For instance, much of the granite used in the buildings of Dublin is of inferior quality, being so rotten as to become quite worthless; whilst other kinds are durable.\*

In the decomposition of felspars, which may be represented as silicate of alumina combined with silicates of potash, soda, and lime, the alkali or lime is removed in combination with a portion of silica, and there remains as the final result of the process a hydrated silicate of alumina, or clay. The potash felspar orthoclase is, under ordinary conditions, much less subject to such a decomposition than the soda felspar, albite, or those which, like labradorite, contain both lime and soda. Both Mitscherlich and Bischof have remarked that where albite and orthoclase are associated, the former may be found decomposed and friable, whilst the latter is still unaltered. This change of felspar is favoured by mechanical division, which multiplies the surfaces exposed, so that when a felspathic rock is triturated with water, small portions of silica and of alkalis are taken into solution. If the decomposing rock contains, like many granites, both potash and soda felspar, the latter, being first attacked, will be rendered friable, and eventually reduced to the condition of clay.†

Under the microscope orthoclase can be recognised by its characteristic cleavage, rectangular cross-hatching, strong colour, and dirty turbid-looking appearance. It often presents a very irregular crystalline form, and commonly occurs in twins, which ordinarily polarise in different colours on either side of a median line.

Triclinic felspars in polarised light usually show a series of parallel bands, or twin lamellae as they are called, which polarise in various colours. The student will find excellent information on the microscopic determination of felspars from Fouqué et Michel Lévy, "Minéralogie Micrographique," pp. 209-227; Rutley, "Quarterly Journal of the Geological Society" (1876), p. 479; and "Study of Rocks," pp. 86-104.

\* See the *Builder*, vol. xxx. (1873), p. 1021.  
† See "Geol. of Canada" (1883), p. 670.

## Mica.

The two commonest forms of mica are termed muscovite and biotite. The former crystallises in the rhombic system, is optically biaxial, and consists principally of silicates of alumina and potash. Oxide of iron, soda, fluorine, and water are usually present in variable quantities. Its ordinary colour is silvery white, but occasionally dark brown or black specks of the mineral may be seen. Muscovite stands the weather very well, and little plates of it may be found of decomposed granite, apparently unaffected by the action of the weather; whilst the felspar has rotted away. This mica is often found in sandstones. The fissility of many flag-stones is frequently due in a great measure to its presence along certain lines, so that the surfaces of paving stones are often covered with this glittering mineral. Under the microscope, muscovite exhibits clear colours and is transparent. As in the case of most minerals distributed promiscuously throughout a rock, the section for microscopic examination being cut in any direction, it is not easy to give all the rules for the determination of this mica. Under ordinary circumstances the sections do not often coincide with the cleavage of the mineral, but cut the planes of cleavage at different angles, which causes thin parallel lines to appear in two different directions.

When, by design or accident, the section is cut parallel to the basal cleavage a tolerably strong chromatic polarisation is shown, thus differing from biotite, which, under the same conditions, appears dark between crossed Nicols. Dichroism is faintly exhibited.

Biotite is also called the magnesian mica and crystallises in the hexagonal system. Its chemical composition is silicate of alumina and magnesia, with a little potash and iron. Its colour may be either black or dark green. It is not so durable as muscovite, assuming a white, soft crust under the action of the weather. Ordinary sections of the crystal are strongly dichroic.

Mica is very elastic; its degree of hardness is so variable that it cannot be stated with any pretensions to accuracy.

## Hornblende.

This mineral crystallises in the monoclinic system. Its chemical composition is "silicate of protoxide of iron, magnesia, alumina, lime and protoxide of manganese, with frequently a little hydrofluoric acid and water."\*

There are two principal varieties of hornblende; one has a considerable proportion of alumina, and the other contains very little sometimes none.

The former is generally of a dark green, black, or brown; the latter of a pale green, white, or grey colour.

The non-aluminous hornblendes do not often occur in stones largely used for building, but the aluminous kinds are found in aegirine granite, where, in weathering, the silica, lime, magnesia, and a portion of the alkalis are removed, with conversion of part of the earth, and the iron into carbonates. The further oxidation of the ferrous carbonate is shown by the yellow and brown crust, so commonly to be seen on the surface, or penetrating cracks in the hornblende. The change proceeds until a more internal kernel of unaltered mineral remains, and until the whole has been converted into a ferruginous clay.†

Under the microscope, hornblende is strongly dichroic, and this is its principal feature. It is often longitudinally striated, in addition to which the cleavage planes form a sort of lattice work. The mineral is so irregular in form that very little reliance can be placed in its determination from that point of view.

Its degree of hardness is between 5 and 6.

## Calcite (or Calcspar).

This is an important mineral for us to consider, forming as it does the basis of the most prominent limestones used in building.

It presents a great diversity of crystalline forms, but crystallises in the hexagonal (rhombohedral) system, the cleavage being very perfect. Its chemical composition is carbonate of lime. We have previously described the principal cause of the decomposition of this carbonate on p. 459.

Under the microscope, sections of calcspar, the analyser alone is used, exhibit strong double refraction. It is very faintly pleochroic, and

\* Rutley's "Mineralogy" (1876), p. 121.  
† See Geikie, "Text-book of Geology," p. 75.



the intersecting cleavage planes are often well marked. When the polariser is used, it is frequently found that the crystals are made up of separate granules, which have different tints, and their boundaries are well defined. Each granule has a characteristic series of parallel lines running across it,—called twin lamellae,—and the direction of these lines is quite independent of those of the surrounding granules. Sections of statuary marble show this structure to perfection.

In calcitic freestones the carbonate of lime appears to have formed round grains of sand or other nuclei, in concentric layers like an onion, and sections often show radiating lines.

Calcite is the principal petrifying mineral. Shells, corals, and other organic remains found in rocks are commonly made of it. Take such stone as Portland, for example. A microscopic section of this will show that the abundant matter contained in it is almost exclusively made of calcite. The iridescent zig-zag appearance of the mineral forming the shells at once proclaims the fact.

Many very compact limestones used as carvings owe their dense structure to calcite, a mineral not only forming the whole of the organic remains contained in them, but also giving the matrix or cementing material. The rhombs of lime forming the organic remains, sometimes of a more durable character than a matrix, hence, on weathering, the fossils,—they are termed,—stand out from the surface of the stone, but often the reverse is the case. To show the importance of correctly ascertaining the nature of the carbonate of lime composing the shells of a limestone, it is only necessary to point to the many buildings now standing, where the stone is completely riddled with cavities formed by the decay of the shells, using not only a source of weakness in the walls of the buildings, but an unsightly appearance.

Both large and minute cracks in stones are often filled with calcite. The mineral is often mistaken for quartz, which, at first sight, it looks very much like. If the cracks are filled with quartz and not calcite, there is a considerable difference in quality, and, when the limestone is being rubbed down and polished, the quartz veins are a nuisance, causing a great deal more work.

Calcite is very easily distinguished from quartz. The former, when treated with acid, effervesces, and, having only a hardness of 3, is easily scratched with a knife; whilst quartz produces no effect on, and the knife cannot scratch, the latter.

**Aragonite.**  
 Its mineral crystallises in the rhombic form. Its chemical composition is exactly the same as calcite, but it weathers very differently. The fact that it is harder and stronger than mineral would lead one to suppose that it is of a more durable character, such is not the case. The shells of many fossils are made of aragonite. The action of acids containing carbonic acid, in percolating rocks, has removed to a great extent those shells which were imbedded in them, so that, unfortunately, the mineral is not so common as it might otherwise be. The cavities on the removal of the shells are often frequently filled up by calcite. When this is the case the calcite is seen under the microscope to be more or less coarsely crystalline, the original structures of the shells being obliterated, they present a different appearance to the original calcite shells which may bound them.

Microscopic sections, aragonite may be distinguished from calcite by its biaxial polarisation in convergent light. We may pause to mention this. When there is one direction in a crystal, along which a ray of light can travel without bifurcation, that crystal has one optic axis, and is called uniaxial. Iceland spar (calcite) is an example. When a crystal has two such axes, it is termed biaxial,—quartz, for example. On reference to the laws of optics relating to uniaxial and biaxial crystals, it will be seen that they respectively differ in a distinctive manner.\*

**Exhibition of amateur work.**—An exhibition of amateur metal-work is proposed to be held at Long Acre, in December next, under the patronage of Mr. T. J. Gawthorpe, to whom intending exhibitors can apply for particulars.

\* See Ganot's "Physics" (1883), pp. 572-575 and 583, for further information on this subject.

## RECENT PATENTS.

## ABSTRACTS OF SPECIFICATIONS.

23, Opening and Holding Hinged Windows, Ventilators, &c. D. Aubert.

A worm, actuated by hand by means of a pair of bevel wheels, or in a similar manner, causes a worm-wheel to revolve. To this worm-wheel is fixed one arm of a jointed lever, which raises or lowers the window when the wheel is turned. The worm-wheel and bevel wheels retain the lever and the window in any position.

60, Roofing Tiles. H. W. Robinson.

The object is to produce a tile which may be effectively used on roofs too flat to allow the use of ordinary roofing tiles. The front of the tile is pointed, and its surface is grooved with a number of channels deepening towards the point, and serving to conduct the water away from the joints. On the back portion of the tile projecting ridges are formed, over which fit the points of the tiles in the course above, corresponding grooves being made on the under sides. Nibs are sometimes formed on the under sides of the tiles and cemented into recesses in the tiles below.

101, Hinge. T. Greenwood.

This is a hinge particularly adapted to screens, but which may be used for other purposes. Toothed sectors attached to the panels of the screen, are held together by a bar pivoted at the centre of each sector.

117, Chimney-tops. J. Bennis.

Above the lower part of the chimney-top is fixed a canopy, surmounted by a cap. The upper part of the outer surface of the lower part and the whole of the inner surface of the canopy are fluted or grooved, and the outlets of both are arranged so that a free current of air carries up the smoke without draught.

217, Wood Block Flooring. W. Court.

Round the lower edge of each block is a semi-circular groove. The blocks are laid on a foundation of concrete, in a composition consisting preferably of Stockholm tar, pitch, and resin. Before being laid, the blocks are dipped into the melted composition.

230, Street Orderly Bin. W. K. Sidgwick.

A cast-iron shell has a sand-box formed on it. The dust-bin is braced diagonally at the bottom, and fitted at the top with angle iron and sliding handles.

331, Door-fastening. M. P. Ismay.

A box, fixed on the door-frame, contains a sliding block, which is formed with teeth on its upper surface, and the block is pressed upwards with springs. A pawl on the door engages one of the teeth when the door is shut, and prevents its opening until sufficient pressure is applied to compress the springs. Very little pressure is required to close the door.

## NEW APPLICATIONS FOR PATENTS.

April 24.—5,638, J. Russell, Cooking Ranges.—5,661, W. Williams, Portable Scaffold.

April 27.—5,678, J. Mitchell, Water-regulating and Waste-preventing Apparatus.—5,680, J. Jackson, Flushing Cisterns for Water-closets.—5,689, N. Locke, Self-locking Bolts for Doors.—5,706, J. Macleish, Water Fittings for Baths.—5,710, G. Porter, Dust Bins, &c.

April 28.—5,748, W. Pilkington, Plate Glass.—5,749, J. Howorth, Ventilators.—5,752, J. Parsons, Sanitary Pipe.—5,795, C. Gannaway, Ventilator.—5,803, G. Hardy, Fire Grates.

April 29.—5,812, J. Hill, Securing Knobs to Spindles for Door Locks and Latches.—5,820, J. Warwick, Manufacture of White Lead.—5,843, C. Howe, Cement or Plaster.—5,844, C. Howe, Cement or Plaster.

PROVISIONAL SPECIFICATIONS ACCEPTED.

1,368, T. Payne, Miter Frame Clamp.—4,065, S. Gerish, Spring Hinge.—4,160, J. Osmond, Holding Doors or Casement Windows Partly Open.—4,220, M. Ismay, Double Swing Doors.—4,245, J. Brierley, Wood and Earthenware Floors.—4,248, J. Brierley, Ornamenting Wooden Floors and Steps.—7,806, J. Fliegel and F. Putnam, Enamelled Metal Roofing Sheets.—2,530, W. Welch, Cement and Paint Composition.—4,267, J. Lockhart, Heating Buildings, &c.—4,330, G. Couch, Brick, Stone, Terra-cotta, and Concrete Walls.—4,332, G. Couch, Ridge, Hip, and Wall Tiles.—4,496, T. and J. Holt, Flushing Cisterns for Water-closets, &c.—4,547, W. Johnson, Brickmaking Machinery.—4,550, J. Parker, Dry-earth and Ash Closets.—4,566, C. Abel, Preventing Fungus in Flooring.—4,671, D. Cowan, Cooking-ranges or Kitcheners.—4,798, R. Dick, Ranges, Ranges.—4,803, C. Bellamy, Firegrates.—5,124, W. Allen, Ladders.

## COMPLETE SPECIFICATIONS ACCEPTED.

Open to opposition for two months.

233, T. Newman, Linings for Tunnels or Subways.—2,590, R. Roberts, Open Spring Door Holder.—12,233, R. Wyatt, Syphon Flushing Apparatus for Cisterns.—15,856, J. and W. Thompson, Slate or Glass Roofing.

## RECENT SALES OF PROPERTY.

## ESTATE EXCHANGE REPORT.

APRIL 22.	
By NEWSON & HARDING.	
Ilalington—48, 50, and 52, Liverpool-road, 46 years, ground-rent 9l.	£1,545
Holloway—15, Travers-road, 74 years, ground-rent 4l. 13s.	280
Kentish Town—167, Ilip-street, 83 years, ground-rent 8l. 8s.	300
APRIL 23.	
By J. BAKER & WILKINSON.	
Paddington—24, Chippendale-new, 76 years, ground-rent 6l.	283
APRIL 29.	
By BROWN, ROBERTS, & CO.	
Pentonville—11, 13, and 14, Percy-circus, 46 years, ground-rent 18l.	1,820
Wapping—25 and 26, Wapping Wall, freehold.	380
By INMAN, SHARP, & HARRINGTON.	
Ilalington—Ground-rents of 208. 5s. a year, term 66 years.	480
Chelsea—Ground-rents of 24l. a year, term 43 years.	390
By E. STIMSON.	
East Sheen—1 to 12, Eleanor Cottages, 83 years, ground-rent 28l.	885
Deptford—1, Prince-street, 76 years, ground-rent 4l.	340
201 and 202, Evelyn-street, 40 years, ground-rent 4l. 10s.	290
39 to 61 odd, Hale-street, 34 years, ground-rent 8l. 19s. 6d.	335
Greenwich—10 and 11, Wallington-grove, freehold.	380
Clapham—14 and 16, Meyrick-road, freehold.	773
Walworth—115 to 121 odd, Westwood-road, 68 years, ground-rent 12l.	1,215
Bermudey—319 and 321, Weston-street, and 1 to 7, Little Hunter-street, 7 years, ground-rent 60l.	90
Walthamstow—Sharn Hall-street, two freehold cottages.	200
APRIL 30.	
By WAGLAP & WARMAN.	
Hornsey—9, Hornsey Park-road, freehold.	269
By E. RICE.	
Tottenham Court-road—6, 8, and 30, Windmill-street, freehold.	5,540
Marylebone, Horace-street—Perpetual rent-charge of 5l. 6s. a year.	380
Nos. 25, 26, 27, 35, 39, and 40, Horace-street, freehold.	105
By H. F. CLINTON.	
Bayswater—16, Lonsdale-road, 56 years, ground-rent 7l. 4s.	340

## MEETINGS.

SATURDAY, MAY 8.  
 Architectural Association.—Visit to the National Liberal Club, Victoria Embankment. 3 p.m.  
 Edinburgh Architectural Association.—Visit to Kirkton and Burnside and Parish Churches, and Rosebank Castle.

MONDAY, MAY 10.  
 Society of Antiquaries of Scotland (Edinburgh).—Dr. Daniel Wilson, LL.D., on "Illustrations of Early Celtic Christian Art." Three other papers. 3 p.m.

TUESDAY, MAY 11.  
 Institution of Civil Engineers.—(1) Further discussion on Mr. Francis Fox's paper on "The Mersey Railway," and of Mr. W. E. Rice's paper on "The Hydraulic Passenger-Lifts at the Underground Stations of the Mersey Railway." (2) time permitting) Mr. W. H. Hulse on "Modern Machine Tools and Workshop Appliances for the Treatment of Heavy Forgings and Castings." 8 p.m.  
 Society of Arts (Special Lectures).—Mr. Ernest Hart on "Japanese Art Work,"—II. 8 p.m.

WEDNESDAY, MAY 12.  
 British Museum (Archæological Room).—Miss J. E. Harrison on "The Topography and Monuments of Modern Athens."—I. 11.45 a.m.

THURSDAY, MAY 13.  
 Forbes Museum of Hygiene.—Mr. B. Warrington, F.R.S., on "Recent Investigations on Well-waters." 8 p.m.  
 Society of Antiquaries.—8.30 p.m.

Society of Telegraph-Engineers and Electricians.—Mr. W. H. Preece, F.R.S., on "Long-distance Telephony." 8 p.m.

Employers' Liability Assurance Corporation (Limited).—Annual Meeting. 2 p.m.  
 Edinburgh Architectural Association.—Annual Meeting. President's Valodictory Address. 6.30 p.m.

FRIDAY, MAY 14.  
 University College.—Professor C. T. Newton, C.B., on "Greek Inscriptions."—II. 4 p.m.  
 British Museum (Archæological Room).—Miss J. E. Harrison on "The Technique of Greek Vases."—I. 11.45 a.m.

SATURDAY, MAY 15.  
 Artists' General Benevolent Institution.—Anniversary Dinner, Freemasons' Tavern. 6 p.m.  
 Society of Arts (Special Lectures).—Professor George Forbes, M.A., on "Electricity."—V. 3 p.m.

**Society of Arts.**—The papers to be read at the ordinary meetings of the Society of Arts, after the Easter recess, will include the following:—May 26th, "The Purification of Water by Agitation with Iron, and Sand Filtration," by Mr. William Anderson, M. Inst. C.E. In the Indian Section, Mr. B. H. Baden Powell's paper on "Indian Manufactures from a Practical Point of View," will be read on May 7th. The fourth, fifth, and sixth lectures of Professor George Forbes's course of Elementary Lectures on "Electricity" will be given on Saturday afternoons, May 8, 15, and 22; and Mr. Ernest Hart's second and third lecture on "Japanese Art Work" will be given on May 11th and 18th.



## Miscellaneous.

**The Institution of Civil Engineers.**

At the ordinary meeting on Tuesday, the 4th of May, Sir Frederick J. Bramwell, F.R.S. (President), in the chair, it was announced that Mr. George Hodson had been transferred from the class of Associate Members to that of members, and that the following candidates had been admitted as Students:—Messrs. Joseph Edward Davies, David Morgan Jenkins, James Newsome Matthews, Walter Bishop Purser, and Arthur Henry Wakeford. The monthly ballot resulted in the election of two Members, viz.:—Messrs. Joseph Hobson, Grand Trunk Railway, and James Young, P.W.D., Bombay; of fifteen Associate Members, viz.:—Messrs. Arthur Beckwith, Stud. Inst. C.E., Chislehurst; Philip George Brunton, D.P.W., Sydney; George Murray Campbell, Westminster; Charles Dick, London and North-Western Railway; Crews; John Gill, Bangor; Edward Rainford Jackson, Stud. Inst. C.E., Jamaica; John Arthur Dayrell Lloyd, South Indian Railway; Richard Loch, Hereford; James Meldrum, Kensington; Karl Emil Nabholz, Dublin; Robert Robertson, B.Sc., Stud. Inst. C.E., Glasgow; Alexander Charles Schöenberg, Westminster; William Charles Ernest Smith, Stud. Inst. C.E., Lodi, Italy; James Thropp, Lincoln; and John Alexander Warren, Stud. Inst. C.E., Glasgow; and of Mr. George John Armitage, Brighouse, as an Associate.

**The Proposed Mining Exhibition at Newcastle-on-Tyne in 1887.**—It is stated that the Newcastle Corporation will grant the Bull Park as the site for this Exhibition, to which reference was made in our last. At a meeting of the Building Committee last week, Mr. William Glover, Vice-president of the Northern Architectural Association, attended, and showed a sketch-plan of the mode in which he proposed to utilise the seven acres and a half of the Bull Park site. The committee carefully considered the plan, and some alterations were proposed, after which Mr. Glover was formally appointed architect for the Exhibition, and instructed to prepare a detailed plan to lay before a future meeting. The plan prepared by Mr. Glover shows about six-acres of covered-in space in the Bull Park, all arranged so that there will be no need for any visitor to go out into the uncovered ground at all to get from one department to another. It is proposed to reserve the reservoir in the ground for use in connexion with marine working models, diving-bells, and hydraulic appliances. It being thought that the Bull Park area will not be large enough to allow mining operations to be illustrated there, it is very probable that that department of the Exhibition will be accommodated on a portion of the recreation-ground to the north of the Bull Park. This would leave about five to five and a half acres to be covered in, and the remaining portion of the Bull Park will be laid out as an ornamental garden, in which will be erected band-stands, refreshment-rooms, &c.

**Walthamstow.**—From the Surveyor's annual report to the Walthamstow Local Board we learn that important works have been executed for the completion of the drainage of the district, and for the better disposal of the sewage. These works comprise the underdraining of about thirty-five acres of land on the Low Hall Farm; the construction of 1 mile 180 yards of concrete and earth carriers for the distribution of the effluent water over the south-westerly portion of the sewage farm; so that now over 100 acres of land of good and suitable soil are available for the purpose of deodorising the sewage in addition to the oxidising influences which are exercised in the effluent water over two miles of open carriers, before it is discharged into the Dagenham Brook. The works for the sewerage disposal also comprise the erection of brick mixing-shed, offices, boiler, and engine houses, with machinery for grinding the chemicals, and automatic arrangements whereby the varied flow of the sewage regulates the inflow of the proper amount of chemicals by night, as well as by day, thereby securing a regular and even pureness of effluent sewage; another important feature has been the construction of machinery whereby a more convenient disposal of the sludge is accomplished, which is now pumped into troughs and thereby passed on to the virgin soil at the rate of one acre a month, and there dug or ploughed into the land at the south-easterly portion of the farm.

**Royal Institution of Great Britain.**

The annual meeting was held on Saturday last, Sir Frederick Bramwell, F.R.S., Honorary Secretary and Vice-President, in the chair. The annual report of the Committee of Visitors for the year 1885, testifying to the continued prosperity and efficient management of the Institution, was read and adopted. The real and funded property now amounts to above 85,000*l.*, entirely derived from the contributions and donations of the members. Twenty-six new members paid their admission fees in 1885. Sixty-three lectures and nineteen evening discourses were delivered in 1885. The books and pamphlets presented in 1885 amounted to about 354 volumes, making, with 464 volumes (including periodicals bound) purchased by the managers, a total of 818 volumes added to the library in the year. Thanks were voted to the President, Treasurer, and the Honorary Secretary, to the Committees of Managers and Visitors, and to the Professors, for their valuable services to the Institution during the past year. The following gentlemen were unanimously elected as officers for the ensuing year:—President, the Duke of Northumberland, K.G., D.C.L., LL.D.; Treasurer, Henry Pollock, Esq.; Secretary, Sir Frederick Bramwell, F.R.S.

**Risks of Intermittent Water-Supply.**

The dangers of the intermittent system of water-supply to houses is well illustrated by an event which recently happened in Marylebone, and of which Mr. Wynter Blyth gives account in his last report. When the water was turned off by the water company's officer, a vacuum was created in the water-main, and a quantity of coal-gas which had escaped from a leak in the gas-pipe in the ground was sucked in; when the water was again turned on, coal gas was delivered into the house with the water. In houses where the ground becomes saturated with filth by defective drainage, it is probably of no uncommon occurrence for the water to be polluted in the mains by filth of this nature. Coal-gas is easily detected, but it would be quite possible for more dangerous gases to enter the main without recognition. The risk is most easily avoided by the adoption of the constant system of supply, but even constant service must be occasionally interrupted when necessity arises for the repair of water-mains. The provision of a stop-cock to every house would go far to obviate this danger.—*Lancet.*

**Railway Enterprise in India.**

A section of the Indian Midland Railway from Cawnpore to Kalpi was recently inaugurated by the Hon. T. C. Hope. Starting from Cawnpore, the main line of the railway runs *via* Kalpi, Jhansi, and Etawah, to Bhopal, a distance of about 320 miles, joining the Grand Indian Peninsular main line about midway between Khundwa and Jubbulpore. A distance of fully 120 miles is thus saved for traffic proceeding from Cawnpore to the port of Bombay for exportation. In addition to the main line direct, however, from Cawnpore to Bhopal, there are several other connected lines, namely, Jhansi-Gwalior, Jhansi-Manikpur, and Etawah-Saugor, which, when completed, will raise the mileage of the system to some 700 miles. The survey of the line from Cawnpore to Kalpi was commenced early in the year of 1884, so that the whole of the operations involved in the construction of the forty-two miles of railway have been accomplished in the comparatively short time of two years. The total expenditure is estimated at about thirty lakhs of rupees, which is on the average 70,000 rupees per mile.

**Birmingham.**—An interesting exhibition is being organised to be held at Bingley Hall during the month of September next, in connexion with the visit of the British Association to Birmingham. The Midland Manufacturers' Exhibition is to be confined strictly to articles manufactured in Birmingham and in the district embraced by a radius of fifteen miles, while it is further intended to limit the exhibits to the productions of leading manufacturers and to the makers of specialities, in order to be able to illustrate the great variety of manufactures carried on in the Midland district. Among the twelve classes into which the manufacturing section is divided, one will, as a matter of course, be devoted to hardware of every description. A second class will be devoted to heating and lighting, and will include stoves, fenders, and fire-irons, gas and electric light fittings, and oil lamps and candle fittings.—*Martineau and Smith's Hardware Trade Journal.*

**A Warehouse Roof in Fore-street.**

We have had an opportunity of seeing a glazed roof which has been erected on MacKenzie's patent system (the British Patent Glazing Company's) over the new premises at present being erected by Messrs. W. Brass & Son, contractors, of 47, Old-street, for the Fore-street Warehouse Company in Fore-street, from the plans of Messrs. Ford & Hesketh, architects, Aldermanbury. The roof consists of five spans of ironwork, 26 ft. long each, and these are covered with polished plate-glass in sheets 10 ft. long each, which are placed in Mackenzie's patent bars, fitted up at centres of about 20 in. We are informed that sheets of polished plate-glass of such a size have never before been fitted up on a roof, and from the small size of the bars the shadows are reduced to the minimum. The roof has a very good appearance. One point worth mentioning is the admirable way in which the architects have arranged the plan of the warehouse so that the top-light from the skylight will be effectively available on all floors of the building.

**Automatic Control of Temperature of Rooms.**

A novel device for controlling the temperature of rooms heated by natural gas has lately been made by Mr. Westinghouse, and has been patented in the United States. It consists of a brass tube filled with alcohol, fastened to the wall of the room. This tube connects with the gas-pipe leading to the grate where it is attached to an automatic valve. Attached to a tube of alcohol is a check-valve arrangement which can be set at any desired temperature. If the temperature rises above the valve, the alcohol thermometer records the fact and communicates it by an electric wire to the valve, which is closed. As soon as the temperature commences to fall below the desired degree the valve is opened by the same method. Should the weather grow warmer, the instrument gradually shuts off the gas sufficiently to maintain the proper temperature.—*Invention.*

**Torch for Paint-Burning, &c.**

Mr. G. Farmiloe & Sons draw our attention to the Wellington Automatic Torch, invented by them for burning off paint, soldering joints, brazing, tempering tools, &c., and for any purpose where a powerful flame is required. It consists of a strong brass reservoir, to which is attached a burner and needle-valve; a small air-pipe is also provided. The reservoir is charged, not filled, with two pints of benzoline. A small quantity of air is forced in by a few strokes of the air-pump, which forces the spirit forward to the burner. On opening the valve, a small quantity of spirit is allowed to run into a cup under the burner. This is lighted to warm the burner. The valve is again opened, and the spirit, reaching the hot burner, is formed into a powerful gas, which is consumed as fast as made by unscrewing the valve; the size and intensity of flame can be regulated as desired.

**Enlargement of the Prudential Insurance Company's Buildings.**

The extensive buildings in Holborn and Brooke-street, which were erected a few years since for the Prudential Insurance Company, from designs by Mr. Alfred Waterhouse, R.A., are at present undergoing still further additions by an extension at the north end in Brooke-street, carried as far as Greville-street. The extension is 140 ft. in length, and when the enlargement now in progress is completed the company's buildings will have a frontage of 340 ft. to Brooke-street, occupying nearly the whole of the east side of that thoroughfare. The new buildings contain five floors, and are architecturally uniform with the original structure, faced with Edwardian Ruscon red bricks and terra-cotta. Mr. Waterhouse being the architect of the extension, and Messrs. Holland & Hannen the contractors.

**Stoke Newington.**

The fourth of the series of stained glass windows in the Sanctuary of all Saints' Church (Mr. F. T. Dollman architect), has just been added. The subject is illustrative of the passages from the "Deum,"—"The Goodly Fellowship of the Prophets," and "The Noble Army of Martyrs." The subject is "The Goodly Fellowship of the Prophets," and "The Noble Army of Martyrs," being a part of the general scheme of adoration of "All Saints." The window as well as the three eastern lights are from designs by Mr. Daniel Bell, and executed by Mr. R. Davison.

**The Atmospheric Cowl Company.**

Our notice last week of the exhaust cowl made by this company, it should have been stated that Mr. Wery is the patentee, and the cowl is known as "Wery's Patent."



**Colonial and Indian Exhibition: Reception Committee.**—After consultation with the Agents-General of the Colonies, the Reception Committee have adopted a classification of the visitors who may be expected to come within the range of their operations, and for whose benefit accordingly special excursions are being arranged. Besides a limited number of representatives of the different Executive Commissions, the classification includes:—Colonial governors, ministers and ex-ministers, members of the legislatures, mayors of cities, heads of government departments, secretaries to the high commissioner and agents-general, judges if the higher courts of justice, officers in the colonial forces, who have held command down and including the rank of lieutenant-colonel; residents of railway companies, principals of railway companies, principals of universities, relates and heads of religious denominations, widows of ex-governors and administrators of governments. The wives and daughters of these visitors who are comprised in the above classification will be considered as being included in the classification. The names of distinguished visitors from the colonies not included in any of the above classes will be added to the committee's list on the recommendation of the agents-general, and as the arrangements of the committee permit.

**Beech Wood as a Paving Material.**—The above subject has recently been treated in detail by the *Deutsche Bauzeitung*, and the special interest manifested by Prince Bismarck in the adoption of this system has gained for it relative amount of notoriety. During last summer trials were simultaneously at Berlin and Hamburg, a superficial area of nearly 1,000 square feet having been in each instance laid with beech-paving. The height was partly 4 in. and partly 3 in. The forests of Friedrichshagen, near Hamburg, and Prince Bismarck's estates furnished the wood, which was treated according to Roeper's patent process. His method comprises impregnation under high pressure with chloride of zinc, and subsequent immersion of each single block in a heated solution of pitch. Various other trials have been arranged for both in and out of Germany.

**PRICES CURRENT OF MATERIALS.**

TIMBER.	£. s. d.	£. s. d.
Deals, Finland, 2nd and 1st, std. 100	7 10 0	8 10 0
4th and 3rd	6 0 0	7 10 0
Riga	6 0 0	8 0 0
St. Petersburg, 1st yellow	9 0 0	14 0 0
2nd	7 0 0	8 15 0
white	7 0 0	10 0 0
Swedish	6 0 0	15 0 0
White Sea	17 0 0	17 10 0
Australia, Pine 1st	17 0 0	30 0 0
2nd	13 0 0	17 0 0
3rd, &c.	6 0 0	10 0 0
Spruce 1st	8 0 0	11 0 0
3rd and 2nd	5 0 0	7 10 0
New Brunswick, &c.	5 0 0	7 0 0
all kinds	4 0 0	13 0 0
Flooring Boards, sq. 1 in.—Pine, pared, first	0 9 0	0 13 0
Second	0 7 6	0 8 6
Other qualities	0 5 0	0 7 0
Cedar, Cuba	0 0 3 1/2	0 4 0
Honduras, &c.	0 0 3	0 4 0
Australian	0 0 2 1/2	0 3 0
Mahogany, Cuba	0 0 5	0 7 1/2
St. Domingo, cargo average	0 0 3 1/2	0 4 0
Mexican	0 0 3 1/2	0 4 0
Tobacco	0 0 4	0 6 1/2
Headings	0 0 4 1/2	0 6 1/2
Maple, Bird's-eye	0 0 4	0 6 1/2
Rose, Rio	7 0 0	10 0 0
Bahia	8 0 0	10 0 0
Box, Turkey	5 0 0	18 0 0
Satin, St. Domingo	0 0 7	0 11 0
Porto Rico	0 0 8	0 1 3
Walnut, Italian	0 0 4	0 6 5

**CONTRACTS AND PUBLIC APPOINTMENTS.**  
*Epitome of Advertisements in this Number.*

Nature of Work, or Materials.	By whom required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
War Department.....	Official	W. J. Hardcastle.....	May 11th	ii.
Com. of Sewers.....	Official	do.	May 14th	ii.
Great Eastern Ry. Co. Chepping Wycombe	do.	do.	do.	ii.
U.S.A. ....	do.	do.	do.	ii.
Oxford Gas Light and Coke Co.	T. & C. Hawkey	do.	May 16th	ii.
Eyl. Portuguese Rail Co. Okehampton Chert. Trust	Official	do.	do.	ii.
Liverpool Corporation	Official	do.	May 17th	ii.
War Department.....	do.	do.	do.	ii.
Parish of St. Marylebone	do.	do.	do.	xiv.
Com. of H.M. Works	do.	do.	do.	ii.
School Bld for London	do.	do.	May 18th	xiv.
War Department.....	do.	do.	do.	ii.
do.	do.	do.	May 19th	ii.
The Company.....	do.	do.	May 22nd	ii.
The Committee.....	Bleakley & Cabbon.....	do.	do.	ii.
Harley Winkley Un. Tottenham Local Board	—Turner	do.	May 26th	ii.
do.	—De Pape	do.	May 31st	xiv.
Parish of Oring, Sussex	do.	do.	Not stated	ii.

**PUBLIC APPOINTMENTS.**

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page.
door Assistant.....	Vestry of St. Mary Abbott's, Kensington	150l.	May 11th	xviii.
man or Clerk of Works	Moulton Lun. Asylum	104l.	May 18th	xviii.
d Surveyor.....	Tottenham Local Board	200l.	May 18th	xviii.

**TENDERS.**

**BROMLEY (Kent).**—For alterations at Elmfield, Bromley Common, for Mr. Edward Norman. Mr. Ralph Nicholson, architect:—  
Crosley ..... £370 0 0  
Arnold & Son ..... 863 0 0  
Wm. Smith ..... 830 0 0

**COLCHESTER.**—For the erection of four cottages on the West Bergholt-road, Colchester, for Mr. Geo. Joslyn, Maldon-road, Colchester. Mr. J. W. Start, architect, Colchester:—  
Beard ..... £287 15 0  
Chambers ..... 879 0 0  
Smith ..... 875 0 0  
Shepherd ..... 840 0 0  
Ambrose ..... 617 0 0

**DAGENHAM (Essex).**—For the erection of a public-house, with stabling and offices, adjoining the Railway Station, at Dagenham, Essex, for Messrs. Ind, Coops, & Co., Romford. Mr. John Hudson, architect, Leman-ster, E.:—  
T. Little, Whitechapel ..... £2,711 0 0  
J. Hearle & Son, St. George's ..... 2,702 0 0  
J. Outhwaite & Son, Upper East Smithfield ..... 2,500 0 0  
J. Hammond & Son, Romford ..... 2,406 0 0  
J. Bentley, Waltham Abbey ..... 2,380 0 0  
\* Accepted.

**DERBY.**—For the erection of an inn at Shipley Gate, for Mr. E. M. Munday. Messrs. Pettifor & Simpson, architects, Leicester. Quantities supplied:—  
G. Hewitt, Leicester ..... £1,500 0 0  
A. Plant, Leicester ..... 1,487 0 0  
T. & H. Herbert ..... 1,474 0 0  
G. Oldershaw, Marlpool (accepted). ..... 1,359 0 0  
T. Shaw, Ilkeston ..... 1,285 0 0  
J. Manners, Ilkeston ..... 1,185 0 0  
[Architect's estimate, £1,446.]

**FOLKESTONE.**—For new schools to be erected in the Dover-road, Folkestone, for the Folkestone Borough School Board. Mr. Andrew Bromley, architect, Folkestone. Quantities by the architect:—  
Tunbridge ..... £3,410 0 0  
Brooks ..... 5,360 0 0  
Reason ..... 5,338 0 0  
Clemmance & Son ..... 5,280 0 0  
Webster ..... 5,250 0 0  
Baker ..... 5,235 0 0  
Fette & Son ..... 5,079 0 0  
Prebble ..... 5,035 0 0  
Hayward & Paramor ..... 4,973 0 0  
Mercer (accepted) ..... 4,907 0 0  
[All of Folkestone.]

**HOLBORN.**—For workshops at Eagle-street, Holborn, for Mr. W. T. Purkis. Mr. Edward Clark, architect, Strand. Quantities by the architect:—  
C. Wall ..... £2,634 10 0  
Wilkinson Bros. .... 2,443 0 0  
Kirk & Randall ..... 2,428 0 0  
J. Anley ..... 2,381 0 0  
Jackson & Todd ..... 2,337 0 0  
Perry & Co. .... 2,185 0 0  
Steed Bros. .... 2,180 0 0  
Mattock Bros. .... 2,163 0 0  
J. O. Richardson (accepted). ..... 2,039 0 0

**HULL.**—For the erection of new dispensary and surgeon's residence, Baker-street, Hull, for the Hull and Southcoates Dispensary. Messrs. Butterell, Son, & Bilson, architects, Parliament-street, Hull. Quantities by the architect:—  
Simpson & Malone ..... £2,130 1 6  
B. Musgrave ..... 2,096 0 0  
J. W. Garbutt ..... 1,973 6 8  
R. Sergeant ..... 1,977 0 0  
Hockney & Liggins ..... 1,963 0 0  
Mark Harper ..... 1,924 0 0  
Thos. Goater ..... 1,921 0 0  
Thos. Kendall ..... 1,918 9 4  
J. T. Skinner ..... 1,900 0 0  
J. Drury ..... 1,860 0 0  
Erors. of T. Southern ..... 1,891 0 0  
J. F. Freeman ..... 1,872 10 0  
Gen. Ling ..... 1,868 15 0  
P. Blackburn (accepted). ..... 1,868 0 0

**LAMBETH.**—For rebuilding wall, and drainage work, at Lambeth Workhouse Schools, Linton-grove, Lower Norwood. Messrs. Catt & Smith, architects, Farnham's Inn:—  
A. B.  
Bottoms ..... £390 0 ..... £30  
Martin ..... 377 0 ..... 20  
Smith ..... 361 0 ..... 12  
Leslie & Knight ..... 312 0 ..... 10  
J. Wood & Co. .... 296 0 ..... 25  
Dean ..... 290 0 ..... 20  
Robson ..... 286 0 ..... 20  
Wallace ..... 285 0 ..... 19  
Fleaman ..... 275 12 ..... 21  
G. Jenney ..... 273 13 ..... 22  
P. Higgs ..... 263 0 ..... 20  
Walker ..... 253 0 ..... 25  
Brightman ..... 249 0 ..... 24  
Turner ..... 228 0 ..... 20  
Hitchcock ..... 225 0 ..... 8  
Barton ..... 212 0 ..... 24  
A. Wall rebuilt, and present coping used.  
B. Wall rebuilt, and terra-cotta coping used.

**LONDON.**—For exterior painting and interior works at York House, Regent-street, for the Junior Army and Navy Stores (Limited). Mr. F. Dudley, architect, Queen Anne's Gate, S.W.:—  
Ansell ..... £487 0 0  
Smith & Son ..... 358 0 0  
Langdale & Son ..... 329 0 0  
Clarke & Mannoch (accepted) ..... 294 0 0

**LONDON.**—For building two blocks of offices and chambers at No. 63, Lincoln's Inn-fields, for Mr. William Robinson. Mr. Wm. Simmons, architect, Long Acre:—  
Mark Gentry, Front block ..... £3,975 0 0  
Wormwood-street, E.C. Back block ..... 6,340 0 0  
accepted. (Concrete floors up to 1,700 ft. & [Quantities of the two blocks by Messrs. Nixon & Raven and the architect respectively.]



*Wessex House, Northumberland Avenue, Charing Cross, London, W.C.*



# The Builder.

VOL. L. No. 2285.

SATURDAY, MAY 16, 1886.

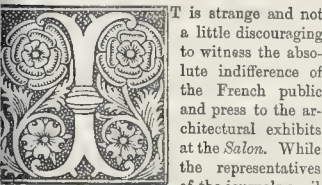
## ILLUSTRATIONS.

Houses in Cadogan-square.—Messrs. Ernest George & Peto, Architects	710-711
Chambers and Shops, Mount-street, Grosvenor-square.—Messrs. Ernest George & Peto, Architects	714-715
Buchan Hill, Sussex: Views of Gallery across Hall, Staircase, and Hall Chimney.—Messrs. Ernest George & Peto, Architects	718-719
Cottages at Leigh, Kent.—Messrs. Ernest George & Peto, Architects	722-723

## CONTENTS.

Architecture at the Paris Salon	693	San Vicente, Avila, Spain	708	The Church of St. Bartholomew-the-Great	727
More Light on the Law of Light	700	Houses in Cadogan-square: Chambers, Mount-street, Grosvenor-square: "Buchan Hill, Sussex: Cottages at Leigh, Kent"	708	Brewery Chimney-Shaft	727
Notes	701	Prepared Public Banns, St. George's-in-the-East	708	Glazing Skylights with Plate glass	727
Architecture at the Royal Academy.—III.	703	Church of St. Lawrence, Oxford	708	The Student's Column: Our Building Stones.—X.	727
The Edinburgh Exhibition: Gateway Buildings	703	The "Shippers" Exhibition, Liverpool	708	Various	728
Further Notes on Academy Pictures	704	Architectural Societies: Italian Excursion	708	Recent Patents	728
The McLary Marbles	706	Architectural Association: Italian Excursion	708	Recent Sales of Property	729
The Surveyors' Institution Examinations	706	Architectural Association	708	Meetings	729
Some Thoughts on Architectural Training	706	Competitions	708	Miscellaneous	729
				Prices Current of Building Materials	730

### Architecture at the Paris Salon.



It is strange and not a little discouraging to witness the absolute indifference of the French public and press to the architectural exhibits at the Salon. While the representatives of the journals avail themselves of "varnishing day" to promenade their readers through all the paintings and sculpture, they seem not even to know the place where, at the extremity of the Palais de l'Industrie rooms, architecture awaits patiently, in her deserted galleries, the few critics whom professional duty calls there. The causes of this neglect are the same in Paris as in London. Architecture is an austere art, and does not captivate the masses. Plans, sections, and elevations leave them unmoved; and the most learned of archaeological restorations is worth nothing beside flesh-painting and tapestry.

It must be admitted that the architectural exhibition this year is inferior to that of the year preceding. The number of exhibitors is diminished; and the list of 173 drawings does not show any work of such boldness and originality, or of such beauty of detail, as to leave a very striking impression on the memory. As usual, there is a heterogeneous assemblage of various elements, sketches *en route*, public monuments projected or in course of execution, private houses, restorations of ancient monuments, &c. As usual, also, there is a proportion of school designs from young men anxious to figure in the great art show, and whose classical projects are in art what themes and size poems are in literature.

The sketches taken in course of travel increase every year in number and importance. These collected studies from here and there, selected by the chance of travel, and in the enjoyment of first impressions, please us much. While some of them reveal considerable practical and artistic capabilities in the young architects who are mostly their authors, they have a certain stamp of personality which the more regular academical studies do not reveal, and enable us to make a kind of anticipatory classification in order of merit, with which it will be curious to compare the future work of the same men.

In this class of work M. Breffendille holds a honourable place. His easy and unpretentious pencil gives us lightly but truthfully etched views from the South of France. The sketches of M. Ch. Normand are interesting,

but a little dry and precise in style. MM. Ch. Giraut and Goutier take us on a full career of Arabian architecture, while M. Julien has directed himself towards Venice, and M. Lechatelier brings from the Campo Santo of Pisa an agreeable drawing of the monument of Ph. Decio. M. F. Kaheun, a Londoner by birth, but of French parents, shows a pretty water-colour drawing of the church of Offranville, a curious monument of the sixteenth-century, not far from Dieppe. But the palm must be given to M. Courtois-Suffit, who, under the title of "notes and sketches of a traveller in Italy, Algiers, and Tunis," gives us in the first place a very careful coloured restoration of a mosaic fountain from Pompeii. This highly-finished water-colour shows great technical ability. He has also, in one frame, about forty water-colour sketches from Italy, beautiful both for colour and for freshness of observation. His details of the cloisters of San Gregorio, at Venice, are especially remarkable, and we note also some details of Pompeian architecture which show their author to be a close student as well as a facile sketcher. Nor must we forget to mention the view which M. Ballu has brought from Algiers of the mosque of Djama el Djedin.

The restorations of ancient monuments are very few in number this year. We only half complain of this, for archaeology, which is a little overdone in France at present, ought not to take too prominent a place, interesting as it is in the light of a study. It is chiefly valuable as a means of educating and purifying the taste of the more advanced students. In the same room, and in the same place where we noticed last year the fine restoration of M. Laloux of the Altis of Olympia, we find this year a restoration of the Megaron at Eleusis, executed by M. Blavette; not a work equal to that of the preceding year, but we cannot deny the talent and learning of this young pupil of M. Givain. In a very complete plan, which accompanies the elevation of the actual state of the ruins, he distinguishes the excavations carried out successively in 1814, by the Society of Dilettanti; in 1860 by François Lenormant, who discovered the two propylæa; and then those made in 1882, 1883, and 1884, by the Archaeological Society. The restored elevation and section of the sanctuary should also be noticed. In the section the interior decoration is minutely drawn with details, interesting but a little fanciful. It is unnecessary to describe the heavy and uninteresting studies in Greek architecture by M. Thierry, or M. Pauline's water-colour of the Baths of Diocletian, executed to complete a monograph.

If the utility of reconstructing, from uncertain documents and descriptions, monu-

ments which have disappeared, be very contestable, there is a different kind of interest attaching to buildings which make part of the history and national art of a country. There is a real and immediate interest in some of the works of this class exhibited this year, especially in the careful drawings of M. Zéquier from the Château d'Anet, that marvellous residence of Diana de Poitiers. The drawings made by M. Macaigne, in collaboration with M. Vassilief, after the portion of the Château de Blois dating from the time of Louis XII., are equally careful and conscientious.

M. A. Lafon exhibits a complete restoration of the Hôtel de Bourgherolde at Rouen, and has given the details of that lace-work in stone with a patience and fidelity which almost bids defiance to the photographer. The Francis I. Gallery and the five bas-reliefs representing the Field of the Cloth of Gold are particularly well treated in the drawings. M. Steinheil, a worthy follower of his father, gives us drawings of the sixteenth-century windows which decorate the Church of St. Julien du Sault, and M. Suasso has sent six sheets of studies from the villa of Pope Julius at Rome, an interesting piece of work, especially the longitudinal section of the palace, and the ground plan. But, however fine, conscientious, and learned it may be, a restoration is not completely the work of the artist who makes it. It is when we come to the designs for public buildings in which the architect has marked out a new idea entirely from the commencement, that we come to the most interesting part of the Salon architecture.

In this respect one cannot deny a certain merit to M. Akermann. The monumental fountain which he has designed for New York wants neither style nor elegance. An abundance of water plays in cascades into a series of superposed basins, over which is a loggia recalling the form of the "Fontaine des Innocents" in Paris, and forming a shrine for a deity armed with a trident. But too many bas-reliefs, columns, and allegorical figures are heaped over the structure, the decorative effect of which would have gained by being simplified. This is the great fault of the young architects who, taking the work of the Renaissance for their models, always wish to amplify and elaborate it.

M. Albert Ballu, who has from the Roumanian Government the commission to design the Palace of Justice at Bucharest, exhibits a collection of drawings and perspective views of incontestable merit. The design, which is in course of execution, is in a broad and severe style, and of great simplicity of lines; it shows imposing façades and very sober decoration. The charge of being too simple, which might be brought against this work, is certainly



not a fault with which we can charge M. Ostermann, a Swedish architect, and author of a design for a colossal theatre, intended probably for Stockholm, and the terraces and columns of which are shown reflected in the waters of the Mælar Lake. The design is an ill-digested agglomeration of Classic reminiscences, and this magnificence of porticos, statues, and bas-reliefs will seem little in place under a grey northern sky. We could understand it better on the banks of the Mediterranean.

In that latter region M. Paugoy has erected a building of strange enough aspect. Without the assistance of the catalogue one would certainly not guess that this construction bristling with turrets, was a laboratory of marine zoology. And then to think that this Marseilles architect is a pupil of M. Questel! Another southern architect, M. Boussac, has done better with a design for a library for Narbonne, his native town.

Next is a Lycée, which M. Ridet is constructing at Laval, a sober and well-studied design; and the same praise may be given to the Lycée for girls, with which M. Baudot proposes to replace the calcined walls of the Cours des Comptes. This will be more suitable than the proposed Musée des Arts Décoratifs; but, Musée or Lycée, the great point is to substitute something as soon as possible in place of these melancholy ruinous remains of civil war.

M. Achille Hermant merits special notice for his design for the reconstruction of the Mairie of the eighth arrondissement, Rue d'Anjou St. Honoré, opposite the English embassy. This is a remarkable and beautiful design, and shows a very good plan, arranged in perfect accordance with the requirements of the public service. The design has also the great merit of breaking through the regulation style of Paris municipal buildings, and maintaining a character harmonising with the high-class mansions in its neighbourhood.

M. Hénard, a veteran architect, whose talent at all events does not seem to age, shows a little further on a design for a grand fireplace and mantel for the "Salle des Fêtes" of the Mairie of the twelfth arrondissement (Avenue Daumesnil). The general effect is fine; the artistic portion (figures and ornaments) has been entrusted to MM. Barrias, Delaplanche, and Cain. The plans and designs made by M. Roussi for the firemen's barracks on the Boulevard Diderot, complete all which relates to municipal architecture in Paris; of this last building some account was given in our last "Letter from Paris."

The religious edifices restored or simply reproduced in their actual state, are not numerous this year: a sign of the times. The tendency to secularisation, which is spreading in every direction, has made itself felt in architecture also. Nevertheless, what a vast field of interesting study for young architects, and how much better for them, instead of shutting themselves up among the dead works of past ages, to apply themselves to reviving the national art, the study of which was the education of such men as Viollet-le-Duc, Lassus, Magne, Ballu, and Constant Dufeux. In this class of work we may note the drawings of M. Bertrand (restoration of the Church of Banyuls), M. Châme (elevation of the Church of Ydes), the views of Vézelay, by M. Degeorge; five sheets by M. Petelgrand, devoted to the Church of Gallard; a curious interior of the Cathedral of Puy, by M. Gautier; and the drawings by M. Rapine of the Church of Grand Brassac.

In consequence of the too exclusive direction given to architectural study in France, the annual exhibitions count a very small number of projects having for their object the everyday requirements of modern life. Since public monuments are exceptional things, and the number of theatres, libraries, palaces, and museums is necessarily restricted, it is vexatious not to see a more decided effort at the architectural treatment of dwelling-houses and private properties.

With M. Lheureux, however, we are in the full tide of modernism, and, which is more, of modern utilitarian construction. This architect, who has been commissioned by the Municipality to construct the immense wine

warehouse at Bercy, shows a design for a restaurant forming an annexe to that establishment. This building, intended for the use of the wealthy business men at Bercy, is perfectly appropriate to its purpose. The façade is gay with ornamental brickwork and coloured tiles, while the vine twines about the porticos which extend along the river front. The general aspect is fresh and pleasing, and the drawings are executed with great care.

The design by M. Cuvillier, on the other hand, has nothing of the industrial about it. We have here the aristocratic abode which M. Le Marquis de B— has had built in the Avenue de Wagram, in the best quarter of the Plaine Monceau. If the general architectural splendour of the building is borrowed entirely from the Renaissance, the pavilion roofs, the finials of the dormers, the armorial trophies of the pediments,—in a word, almost all the exterior decorative treatment, has been copied from the similar details of the Marquis's château at Angerville. M. Cuvillier merits high praise for his contribution to the exhibition, and special mention should be made of a design for the ceiling of the dining-room, a remarkable piece of decorative work. We cannot like so well the work sent by M. Saint-Ange, and the Shahovskoy-Streckneff Palace at Moscow may be an imposing building, but is cold and heavy in its architectural style.

We pass over without notice the commonplace villa buildings of MM. Ménuel and Coquelin, only noticing, without very much sympathy, the turreted hotel built by M. Sauvestre at Neuilly-sur-Seine.


We have not classed among designs for public buildings some schemes which belong entirely to the domain of fancy, such as the compositions which M. Monie proposes to place at the four angles abutting on the dome of the Pantheon, in honour of Hugo, Voltaire, Corneille, and Rabelais. M. Monie, to whom Paris is partly indebted for the very bad monument on the Place de la République, has the idea apparently of completing after his own manner the work of Soufflet, which does not stand in need of any such completing; but young architects are so presumptuous in these days. In the matter of fancies, the car which M. Formigé had designed in view of the great historical procession (indefinitely postponed for want of funds) is shown in a water-colour drawing, in a light and free style; a very original design, much superior to the allegorical car exhibited further on by M. Dumesnil for a public celebration at Lyons. The first is the fancy of an artist, the latter a hippodrome "property." Very bad also is the fantastic universal exhibition palace which M. Mussignann proposed, but unsuccessfully, to erect at Vincennes. As might have been expected, the exhibition building for 1889 has tempted more than one exhibitor; but we come here into the region of pure insanity. There is the scheme of M. Jules Doré, for instance, who proposes to engulf in one immense bazaar the Champs de Mars, the Invalides, the Place de la Concorde, the Champs Elysées, and the Tuileries! There is also a municipal tower designed by M. Lanternier for somewhere in America,—a grotesque achievement.

There are a few sepulchral monuments this year; a less number than usual. The best is, undoubtedly, that to Dr. Fauvel at the cemetery at Passy, designed by M. Girette.

Passing over, for want of space, a good many things, we have, nevertheless, noticed the best of the exhibits, as well as some few of the worst. The exhibition of works, as observed, is inferior to that of last year, and in every way less interesting. This is partly owing to the absence of some eminent architects who, for want of time or other causes, have not lately troubled themselves much about the annual exhibitions. The field, therefore, remains open to the younger men, who misuse it by making the *Salon* a kind of chapel-of-ease to the Ecole des Beaux Arts. It thus happens that while the other sections at the Palais d'Industrie, especially that of sculpture, present a sustained interest, and bear witness to efforts continually renewed, one is conscious, in the architectural room, of an atmosphere of indecision and want of enter-

prise. We do not take this as any indication of a decline in the art of architecture in France. Convincing proof of the contrary is given by the interest always excited by the public competitions organised by the Municipality of Paris, and the high merit of a large proportion of the designs submitted on these occasions. The intended competition for the 1889 Exhibition building, in spite of the absurdities to be found in the *Salon*, will no doubt awaken again the same kind of interest, and evoke the same proportion of talent.

#### MORE LIGHT ON THE LAW OF LIGHT.

 O branch of law has been more completely created by judicial decisions in recent years than that concerned with the law of light. Let any one compare Mr. Latham's work on the "Law of Window Lights," published in 1867, with the most recent publications on the same subject and the superstructure of case law which has engrafted itself on to the third section of the Prescription Act, will be very apparent. The recently reported case of *Scott v. Pape* (Law Reports, 31, Chancery Division, p. 554), is the most recent of the cases which has thrown further light on the subject. It is reprinted at length in the May number of the Law Reports, and we are thus enabled to see exactly its extent and its bearings. It will be found on perusal to decide once for all that bringing a wall forward or rather by building a new wall in advance of the line of the old one, and placing in it a new window, for the present we will say substantially the same as an old one, the light is not lost. The putting back of a wall was for the first time in 1888 declared not to cause a loss of a right of light. That was the effect of *Bullers v. Dickinson*; and there is no doubt that in principle, the right is preserved when the wall is brought back, it is equally preserved if it is brought forward. But arguing as to the result of a case from principle is one thing; to have a decision of the Court of Appeal, as we now have, is quite different. But, in commenting on *Bullers v. Dickinson* at the time of its decision, we expressed our difficulty in saying where the line was to be drawn as to the extent to which a wall might be thrown back without the loss of a right of light. The recent decision of the Court of Appeal in *Scott v. Pape* enables us for the future to have some guide in the matter, and let us also point out that *Scott v. Pape* may be looked on as affirming *Bullers v. Dickinson*, the principle of the two cases being in effect the same. We must quote the judgment of Lord Justice Cotton as giving in words clearer than we can find the explanation of this difficulty. He says:—"Then will moving back the plane of the wall deprive the plaintiff of his right?" my opinion, no! It is difficult to see how mere fact of moving back can do so, and, in fact, there is authority against such a proposition. [The Lord Justice no doubt referred to *Bullers v. Dickinson*, which had been cited in the argument.] Then if moving it back will not, will simply moving it forward have the effect? In my opinion, both the moving back and the moving forward may destroy the light, because the new building when constructed may, either by being substantially advanced or substantially set back, be placed that the light which formerly went in the old windows will not go into the new. If a building is set back, say 100 ft., it will not enjoy the same cone of light that was enjoyed before, but will have an entirely different cone, and it may be moved so far forward that it will not enjoy the same light as that enjoyed by the old building. In my opinion, the question to be considered is this, whether the alteration is of such a nature as to preclude the plaintiff from alleging that he is using through the new apertures in the new wall the same cone of light, or a substantial part of the cone of light which went to the old building? It is true that these semi-scientific propositions about cones of light are not altogether satisfactory in practice, because the angle at which



the cone of light" may be regarded as entering the window, must make all the difference as to what is a substantial moving forward or setting back of a window. Of the three windows the subject of the action in *Scott v. Pape*, the one which was the most moved was put 2 ft. 3 in. more forward than the old one, so that there was no question that it had not been substantially moved forward. Thus *Scott v. Pape* settles clearly enough that a wall may be put forward or backwards, and yet retain as to windows in it the right to light. It seems also pretty clearly to promise a considerable crop of litigation, because until a judge has said in each particular case whether a window has been substantially moved backwards or forwards, it will be well-nigh impossible to say whether it retains the right to light or not.

We will now touch on the no less important second point which this interesting case clears

The point may be best put in an interrogative form, and it is this: how much of the space of old window in a new window will give the latter a right to light? We assume, of course, that the old window has obtained a prescriptive right to an enjoyment of light for the statutory period. The well-known case of *Appling v. Jones*, in the House of Lords, "gave rise to a not unreasonable impression, that however small part there might be of an old window in the new one, it was sufficient to give a right to the light in respect to the new window." Then came *Newson v. Pender*, in 1884, in which Lord Justice Cotton examined that this was not the case, that he understood it to mean that the new light must contain the area of old light, or substantially area. But as in *Newson v. Pender* there were some new apertures quite the same as the old, it was unnecessary to decide the point, and an injunction was granted in respect of these. But if the quotation already given in *Scott v. Pape* be referred to, it will be seen that it includes the words, "substantial part of that cone of light which went to the building."

Therefore it seems to show that it is not necessary to have the entire area of the old light in the new, but only a substantial part of it. How much is a substantial part of it? The woodcuts illustrating two decisions to be found in the appendix to Roscoe's "Digest of Law of Light" will serve as examples of how much is not a substantial part. The facts in *Scott v. Pape* show how much is.

Old window No. 1 was 3 ft. 6 in. high, 9 ft. wide, and divided into two parts by a 9-in. partition. One of the new windows contained more than one-half one of these parts, and more than one-third of the other; the second new window more than one-third of one part and more than one-half the other part of old window No. 2, which was about the same size; and the third new window one-third of one part and three-fourths of the other part of old window No. 3. At these examples show that everything must depend on the application of the words "substantial part of the old area" to the circumstances of each particular case. Here, again, is a fine field for disputes and lawsuits, which are the more difficult to avoid because the issue depends on the way in which individual judicial minds may apply what is now a clear rule to widely differing facts.

**An International Statistical Institute.** The preliminary meeting of the officers of the International Statistical Institute was held at Bologna at the beginning of the present month. Mr. Rawson W. Rawson, K.C.M.G. (President), Professor von Neumann-Spallart, and Mons. E. Vassier (Vice Presidents), Signor Luigi Bodio (General Secretary), and Mr. John Biddulph (Treasurer), were present. It was decided, on the invitation of the Italian Government, to hold the general meeting at Rome on the 23rd to the 29th of September next. It was announced that the members nominated at the preliminary meeting of the Statistical Society in Rome last had accepted their nominations, and the first business of the Institute at Rome will be to complete the list of Members and Associates.

NOTES.

**T**HE rejection of the Charterhouse Bill on the second reading, or, rather, its withdrawal to avoid a probable rejection, is an indication that Parliament is becoming somewhat more alive to the interest and value of "Old London" than it formerly was; and if the Governors of the Charterhouse have not altogether dropped their project, they will have at least an opportunity of giving it fuller consideration. Although we are among those who would regret to see any such alterations carried out as were proposed, we do not think the arguments used against the scheme, when compared with one another, make up a very logical assemblage of reasons. One critic twits the body with mismanaging their own property in having sold a few years ago to the Merchant Taylors, for 90,000*l.*, land which was now worth 520,000*l.*; while another urges that the sales proposed now will not be by any means as lucrative or advantageous as is supposed. Those who are interested in preserving the buildings speak rather too contemptuously of the idea that a larger number of pensioners might be provided for if larger funds were acquired, and wish to persuade us that the founder preferred benefiting a small number of men to a large number. No doubt Sutton contemplated the establishment of the charity on its present site in perpetuity, but then he did not contemplate the changed condition of London, and it may be very much doubted whether he would not have approved of the idea of providing for a larger number of pensioners in a neighbourhood where land was cheap, by selling property which has now acquired a very high commercial value; and there is a certain point in Mr. Courtney's remark that "it was hard on the Governors that they should be constrained to keep up a historical monument at the cost of a number of poor brethren who might otherwise be provided for." We, and many others, would regret to lose one of the oases of London, — fast becoming fewer and fewer, — but somewhat question whether the essential object of the founder would not be more truly realised by the sale of the property for the purpose of giving larger accommodation elsewhere.

**T**HE Home Secretary has called the attention of the Metropolitan Board of Works to the circumstance that the House of Detention, Clerkenwell, and Coldbath-fields Prison are no longer used as prisons, and inquired whether the Board has any intention to negotiate with Her Majesty's Prison Commissioners for the purchase of the two sites or either of them, with a view to appropriating them to the erection of dwellings for the working classes. This appeal looks like a cheap bid for popularity on the part of the Home Secretary, who ought to be aware that the Board's powers are strictly limited by Act of Parliament, and that they have no authority to purchase land for the purpose of housing the working classes as suggested.

**W**E report in another column the result of the Sunderland Municipal Buildings Competition so far. The Town Council accepted Mr. Waterhouse's award by a large majority of votes; and though there was a good deal of opposition on the part of certain members, and the discussion on the subject, as reported in the local journals, is somewhat amusing reading, it is satisfactory to observe that, generally, the Council seemed to be quite convinced that they had done a wise thing in calling in Mr. Waterhouse to assist them in forming a judgment on the designs. One speaker on the occasion admitted that he had been opposed originally to what he regarded as the unnecessary cost of calling in a professional adviser, but that he had not listened for ten minutes to Mr. Waterhouse's exposition of the merits and demerits of the various designs before he was convinced that the money had been well spent. A question, we observe, was raised in the discussion which has been raised before in similar cases, viz., whether the professional assessor was invited to adjudge the premiums,

or only to aid the Council in doing so by his advice. Practically it seems to have been decided that they were bound to accept his award. It is a point, however, on which it is better in such cases to have a distinct understanding beforehand. We should recommend any one who is invited to become assessor in a competition to put the question plainly beforehand to the Committee, — "Do you ask me to adjudge the premiums, or only to assist you by advice?" and in the former case to obtain a definite undertaking that they will abide by his decision.

**T**HE representatives of the railway interest in Parliament did not press for a division on the second reading of the Railway and Canal Traffic Bill, which has accordingly passed that stage. The speeches of the opponents of the measure formed a marked contrast to the extravagant utterances which have been heard outside the House, and the discussion was reasonable and instructive. It has been recognised that the 24th clause, which so alarmed the directors, would not, as it stands, afford a satisfactory settlement of the rates and charges difficulty, and that part of the Bill will be amended in Committee. The assurance that the Government were willing to join with the Companies in arriving at a decision which should be just to all concerned removed the main objection, and the railway officials must feel as great a desire as any one for the question to be dealt with without more delay and controversy. The irritation produced by uncertainty has a mischievous effect upon all concerned, and as this uncertainty would be perpetuated by any weakness or insufficiency in the clause regulating the charges, it is clearly essential that this should be clear and definite. It is very satisfactory to find the House so unanimous in agreeing with the principle of the Bill as to permit the second reading without a division; but there is a strong feeling upon certain points, — such as the preference rate clause, — which will probably lead to an animated discussion in Committee. The agitation among the railway employees, to which we referred last week, resulted in a number of petitions against the Bill, one of which Mr. Mundella presented himself.

**W**E have received a pamphlet on Freehold Disfranchisement, by Mr. G. Beken, published by the Liberty and Property Defence League. It is a counter-blast to the publications in favour of Leasehold Enfranchisement, and states the opposing case clearly and well. Together with this question that of the taxation of ground-rents is also dealt with, though the connexion of the latter with the enfranchisement of leaseholds is not altogether apparent. The amount of bad arguments which are advanced in favour of any particular change are usually as numerous as the sound ones, and, therefore, Mr. Beken has no difficulty in showing that some of the arguments in favour of leasehold enfranchisement can be confuted. For example, ground landlords have been accused of hiring parties to build when there is no demand for houses, and, therefore, it is said, Abolish ground landlords! Of course, it is easy to show that this is a ridiculous charge. The perusal of this little publication will certainly help any one who wishes to form a definite opinion on this subject to arrive at this desirable end.

**T**HE Alcázar, Toledo, now used as a training school for officers of the army, is in the hands of the restorer. The important rooms restored or redecorated lately, are the chapel, reception saloon and ante-room, and the library for the use of the students. The chapel, absurdly out of proportion to the number of students (more than 400) is more the size for a small private chapel than for such a large institution as the Alcázar. It has been richly decorated, both with paintings and wood-carving, giving a very satisfactory result. The new stained glass in the windows on the east side is, however, very disagreeable in colour, being both garish and inharmonious, especially noticeable after the incomparable windows in the cathedral. The unpardonable



fault has also been made of painting sham windows in the north and south sides of the chapel. The reception saloon and ante-room and library are on the first floor, and occupy the centre part of the principal façade. The reception saloon is a fine spacious apartment, but an inadequate supply of money has induced the architect, Señor Pablo Vera, to paint the whole of the dado in chiaroscuro to represent the mouldings and high-relief ornament in the panels, and this, as can be imagined, destroys, to a great extent, the otherwise grand effect of the room. The ceiling is, in section, a very flat semi-ellipse, and, in the almost vertical portion immediately above the cornice, Sans, a clever Spanish painter, has represented, in fresco, scenes from Spanish history, arranged as much as possible as a procession, the rest of the ceiling being blue to represent the sky. The ante-room is extremely well decorated in the Moorish style of the Alhambra. The dado, 4 ft. in height, is of azulejos or tiles, the walls in the diaper stucco richly coloured, and the wood ceiling worked in a somewhat intricate geometrical pattern, and supported by honeycomb stalactical pendants. The library is a large room fitted up with bookcases against the walls, and with comfortable reading-desks for the students, the material used being varnished pitch-pine or some equally resinous wood. Altogether the new work at the Alcázar would have been a great success if only Señor Vera could have resisted the temptation of trying to obtain a more grandiose effect than was possible with the money at his command.

THE *Baria Adriatic* (No. 481) reports the accidental discovery, in the island of Syros, of three graves, the structure and contents of which would point to very early prehistoric date. The discovery was made during the digging for the foundations of a new building in the town of Hermonopolis. The vessels found in the graves are in good preservation, and are, with one exception, of wood or earthenware; the one exception is a vase of metal, in which are the ashes of a dead man. The other graves show, without exception, unburned bones, thus pointing to a mixed cremation and burial. Votive offerings are disposed about the skeletons in every case, those of greatest value being placed near the dead man's hands.

EVERY one should see Mr. Albert Goodwin's collection of "drawings of city, town, and hamlet" at the Fine Art Society's Rooms. It was at first intended to be an Exhibition of cathedral cities alone, but the scope was a little widened, apparently because the artist was unable to resist the temptation to paint the pleasant spots he met with elsewhere. The sketches are on a very different level in regard to finish: some are slight enough, some finished drawings; but all have their own individuality and their own effect; Mr. Goodwin has no patent system of producing landscapes of a given pattern as if they were turned out by machinery, like some of the heroes of the Academy walls. Among the drawings is a very powerful one of Boston Tower in twilight, dark against a deep-glowing remains of sunset; "The Miller's Garden, Winchester," is shown as laid out in little tapering parterres on the piers between rushing water; Abingdon furnishes several charming subjects; "Durham, Autumn," is seen from a new point of view and in new light; "The Bishop's Garden, Wells," is all in a shimmer of summer light; "Whitby in Gloom" and "Whitby in Gladness" are contrasted. There is not a drawing in the collection that is not worth looking at, and that does not make us share the enjoyment the author must have had in producing it.

RIPOLL, a town of Catalonia, not far north of Barcelona, suffered greatly in the first Carlist war by the sacking of the famous Monastery of Santa Maria, founded by Wilfredo el Velloso, and for some time the pantheon of the independent Counts of Barcelona. The already ruinous state of the monastery was increased in 1860 by the falling in of considerable portions of the internal vaulting, and shortly afterwards a project for

restoring the church was prepared by the architect, Señor D. Elias Rogent, who for the next seven years carried out extensive works to preserve the fabric from further ruin, the expenses of such works being borne by the Commission of Monuments at Gerona. Last year the Spanish Government conceded the monastery to the Bishop of Vich, who has confided the task of complete restoration to Señor Rogent, conjointly with Señor Artigas, another well-known Spanish architect, giving them instructions to complete the works by 1888, so that Catholic worship may be resumed in that year, the millenary of the foundation of the monastery by Wilfredo. The inauguration of these works took place on the 21st of last month, under the patronage of the Bishop of Vich, who celebrated high mass among the ruins in the morning and presided at the banquet in the afternoon. Considerable interest has been taken by the Spanish papers in this movement for restoring one of the most interesting and dilapidated ruins in Spain, and, if all goes well, in two years' time the reproaches of many travellers in Spain condemning the apathy of the Spaniards as to the condition of their monuments of art will no longer be justified in the case of St. Maria at Ripoll.

THE Government recently announced that there was no intention of laying-out the waste land on the western side of the Law Courts as public gardens, as it might be wanted for an enlargement of the Law Courts. It is quite certain, however, that there is no immediate intention of such enlargement. Therefore, although it may not be advisable to lay this bare space out as regular gardens, it might well be gravelled over, and benches should be placed about it, and the public allowed to use it. The use of a space such as this adjoining the crowded courts of that part of London would be an immense boon to the children and poorer inhabitants of the district in the approaching summer. Hundreds of children daily throng the Temple Gardens when they are opened in the evenings, and so far as space is concerned they would have equal enjoyment on this piece of ground. The Board of Works could, no doubt, also supply a few scores of geraniums and shrubs in pots which could be placed on stands and would add to the enjoyment of those who frequented the place. The delight with which children who have never seen flowers will look at them cannot be appreciated until a child from the slums is taken into the country. As that, in most cases, is an impossibility, the world of flowers should be brought as much as possible to the children in the towns.

AT the last meeting of the Académie des Inscriptions, Paris, M. Ravaisson announced that the Museum of the Louvre had received the addition of an interesting statuette of Mercury, from Entrains, in the department of Nièvre. The statuette is in bronze, of small size, and is considered to be a copy of the colossal statue of Puy de Dome, executed by Zenodorus, under Nero. Zenodorus, it will be remembered, was famous for the fabrication of colossi. The one ordered by the Averni took ten years to make, and cost a sum equivalent to about 335,000*l.* The statue of Nero himself had to be moved by the help of twenty-four elephants. This colossal tendency will scarcely be perceptible in a small copy, but, happily, Zenodorus was equally famous for his tereutic skill.

THERE is a small and very good collection of Dutch pictures to be seen at Messrs. Boussod and Valadon's. It contains two very fine works by Israels, "The Shipwrecked Mariner" and "The Sewing Class." The latter is one of the painter's most finished works. The face of the old preceptress cutting-out is an admirable study of human nature. She has been cutting-out shapes all her life, and has no intellectual perceptions beyond that. There are two or three fine works by Artz, and a remarkable landscape by Mauve, "The Return of the Flock;" another by De Bock, "Evening." Both these are,

it must be admitted, unlike nature in their tones, but the painter's object is obvious enough, and the works become what may be called landscape-fantasies, expressions not so much of the landscape itself as of the feeling with which the painter saw it, and which he wishes to convey to others. Too much of this kind of landscape-fantasy is not good for people; we need to come back to unadulterated nature from time to time for a breath of unsophisticated air; but there is more intellectual interest in it than in some of the realistic or would-be realistic landscape so popular in England.

THE Vestry of St. Martin-in-the-Fields have intimated to the Metropolitan Board of Works that they approve of the suggested alteration in the plan of the site of the new Admiralty and War Office, as proposed by the Institute of Architects, and illustrated in our pages (see p. 367, ante).

WE regret to see, on the agenda for the meeting of the Metropolitan Board of Works this Friday, May 14, that among the communications received by the Clerk, and to be brought before the Board, is a "letter from Mr. G. Vulliamy tendering his resignation of the office of Superintending Architect in consequence of failing health." Our readers will remember that in our issue of the 13th of March we referred to Mr. Vulliamy's illness, and we can now only renew our expressions of regret, coupled with the hope that in his retirement he may yet be able to find some measure of renewed health.

THE eleventh annual exhibition of painting on china, at Messrs. Howell & James's, is a considerably larger one than usual, but does not otherwise differ much from the usual nature of these exhibitions. There is a great deal of clever work, a large proportion of which consists of subjects totally unsuited for china-painting, such as landscapes, interiors with figures, &c.; all which can no doubt be done up to a certain point on china, but with the result which only serves to remind us how much better the same thing could be done on paper or canvas. China painting calls for decorative work, not realistic figures or landscapes; head with a certain degree of conventional treatment, may be made something of. The judges Mr. Marks and Mr. F. Goodall, seem to be very little alive to the true decorative nature of china-painting, if we may judge from the award of the *Queen* newspaper prize for "the best decorated pair of panels"; the two panels rewarded (Nos. 61, 770) being not "decorated" at all in the true sense of the word, but representing simply hard paintings of interiors, each with a common-place looking figure. This is no "decoration"; it is only rather bad painting. Among the contributors who seem to know what china-painting is for are Mrs. W. Smith of Woodclyffe, who sends two plates in the Persian style (34, 78), which gained the Crown Princess of Germany's gold badge; Miss Izon (conventional design of honeysuckle, 30); Miss Anderson (roses and stephanotis, 14); Miss Alice Brady, who gains a silver medal for an acacia design (186); and Miss Welby, who has gained a silver badge, presented by the Crown Princess of Germany for the best work by a lady professional, her two Renaissance dishes (195, 201), which are the best things we saw in the collection, and show a true feeling for decorative design. A great majority of the examples exhibited are what, from an artistic point of view, we would rather not see at all. What lovers of landscape art would ever purchase a china painted landscape, or even accept it as a gift?

New and Latter House of Israel, No. Brompton, Kent.—A further contract (the first being now completed) has been signed between Mrs. J. J. Jezreel and Messrs. Nay & Son, of Rochester, for the completion of the superstructure of the Temple now in course of erection at Chatham Hill, Chatham, at a further estimated cost of about 40,000*l.* The external dimensions of the building are 124 ft. square and 124 ft. high.



## ARCHITECTURE AT THE ROYAL ACADEMY.—III.

ONE of the most important drawings exhibited is that by Mr. J. D. Sedding (1,563) for the restoration of the great screen at Winchester Cathedral; the drawing is hung higher than it ought to have been, and the details cannot be well made out at the Academy. The screen has been terribly pulled about, partly by concolastic enemies, partly by restoring friends, and the sculpture is entirely gone. Mr. Sedding's drawing shows a restoration of the whole; a good deal of the canopy work existing now is modern patchwork, some of it in plaster; the restoration of a portion of the canopies in 1820, under the direction of Dr. Nott, one of the fanatics, is, Mr. Sedding considers, very good for the time at which it was done, and some portion of it, at all events, will be retained. According to the Dean's report, published a little while since, the work required to be done to complete the screen, amounts to this:—"Two large pedestals for statues, and six larger canopies; all the pedestals and canopies for the thirty-four smaller statues; and if the picture of West be removed, the ornamentation of the large space so left bare." The removal of the picture forms a part of Mr. Sedding's design, and the space is shown filled up by a series of small niches and statues, and canopy work. The removal of West's picture is, to our mind, a thing to be thought twice about. It represents the contribution to religious art of a painter who was certainly not contemptible in his day, and has a historical interest; and it may be questioned whether an assemblage of modern decorative Gothic detail to fill the space will have as much interest, after all. We only suggest it as a point to be considered. The restoration seems very finely carried out in the drawing. The figures were drawn by Mr. Westlake, and Mr. Onslow Ford is doing the first portion of the sculpture; the part of the work at present undertaken being the middle portion, including the cross and the six large figures adjoining it. The sketches for a picture above the altar, and on the altar, and on the doors on either side, shown in the drawing, are by Mr. Burne Jones. Mr. Sedding has so much knowledge of and sympathy with Late Gothic detail, that the architectural portion certainly could not be in other hands.

We now proceed to some notes on the secular public buildings, institutions, &c., represented, giving them in the order of hanging. 1,547, "Beckenham Public Hall," Mr. George G. A brick building apparently, with a very good hipped roof over the whole, and lantern (probably for ventilation) in the middle of the gable. The lower story has round arches with square mullioned windows under them; upper story, pilasters standing out on corbels, overhanging the lower portion, a very foolish and logical use of the pilaster, sanctioned by fashion. The hall is on this floor, lighted by long mullioned windows. The angles are decorated by diagonal angle turrets, also overhanging out at the first-floor line, with good effect; an angle turret is a different thing from pilaster. The building is solid-looking, but not beautiful. The author is to be commended for spending a plan.

1,551, "Dining Hall, Middle Temple," Mr. John Crowther. A beautifully-executed water-colour drawing, combining fine effect with the most minute representation of detail; as an example of illustrative architectural drawing it deserves the highest praise. Too often water-colour drawings of this class lose detail and a general glitter.

1,552, "Bedford Grammar School," Mr. Basil Champneys. A simple piece of Queen Anne architecture; mullioned windows with horizontal cornices below and sharp-pitched pediments to the windows in the upper story, broken at the apex, but the angles covered by shields with scroll supporters. The festooned wells sculptured on the wall above these windows are, of course, a feature of the style chosen, but a very absurd one, which it is a pity to see repeated by modern architects who, these days of æsthetic enlightenment, should know better than their "rude forefathers."

1,557, "New School of Science and Art, Lincoln, Portion of South Front," Mr. George Sedger. A studied drawing of a main entrance with a bay window over, a boldly-tranced piece of Jacobean work with a deep shadow under the recessed elliptical-arched doorway; the only

point we dislike is the obelisk-like spikes on the gable; another instance of modern imitation of bad detail.

1,562, "Proposed New Building for the University of Oxford, adjoining the Schools: High-street Front," Mr. T. G. Jackson. A very pleasing and picturesque design, which is Gothic in feeling, though only partially so in detail. It has mullioned windows, some of them with pedimented gables over, some without, the window compartments with circular heads without cusping, a point which is repeated in the design of the open balustrades. In the left-hand side of the building (which is in two marked divisions), the manner in which breadth is given and the whole connected together by carrying the window divisions over the wall in the form of panelling, and by the rich carved first-floor string-band continued round this portion under the panelling, is most effective and artistic. Though containing details borrowed from different periods, this is no piece of mere Jacobean or Elizabethan copyism, but a combination of details into a harmonious whole with a considerable amount of originality. No plan is given, nor is it stated what is the purpose of the building.

1,569, "Northern Assurance Company's Offices, Dublin: Design in Competition," Messrs. T. N. Deane and Son. A water-colour drawing of a red brick building with stone dressings, the portion at the angle of the street forming a kind of massive tower with a pyramidal roof, and a large open archway on the ground story. No plan is given; the design is successful in giving picturesque effect to "business premises"; it looks a trifle heavy, but this may be due to the drawing, which is somewhat loaded, and wants brightness.

1,572, "New Building for Corpus Christi College, Oxford: Garden Front," Mr. T. G. Jackson. A very simple and pleasant bit of Domestic Gothic, looking rather like an ancient building, and probably intended so, to harmonise with others in the vicinity.

1,576, "Entrance to a London Hall," Mr. E. H. Sedding. Hung high; a "Classic" block, with a level skyline, pilasters on either side of arched entrance, with balconied windows between.

1,583, Mr. T. G. Jackson: apparently the south front of the same building "adjoining the Schools" at Oxford, of which another face is shown in No. 1,562; but hardly recognisable as such. This is a sepia drawing, showing windows of similar design to some of those in the other drawing, but the general style and feeling much more tame and uninteresting, perhaps because the author was more influenced by adjoining buildings on this side. The different method of execution makes the difference still greater; no one looking at them apart from the catalogue would guess at the two drawings representing the same building.

1,587, "Municipal Buildings, now being erected," Mr. W. Young. A large and carefully-finished pen drawing of the Municipal Buildings, Glasgow; the rusticated ground-story, with pilasters and pilastered windows let into it, so to speak, is effective; but in the main it is a piece of pompous and well-elaborated commonplace.

1,598, "Prudential Assurance Offices, Dale-street, Liverpool, Mr. A. Waterhouse. A Gothic red brick and terra-cotta building, with an angle entrance, and projecting angle bay on heavy corbels; the ground-floor shops are treated with heavily-moulded segmental arch windows with solid piers between. The whole resembles so much other buildings designed by the author in the method of plain solid Gothic, with certain specialities of detail which are at once recognised as his, that detailed description is unnecessary.

1,595, "Design for Board Schools, Northampton," Mr. W. Doubleday. Hung too high to be well seen; a coloured drawing of a building in which the departments into which the school is apparently divided are picturesquely expressed in the design; no plan, however, is given.

1,625, "The Constitutional Club, Northumberland Avenue," Mr. R. W. Edis. A large and careful water-colour drawing, showing very well the effect of the red terra-cotta dressings against the lighter-tinted wall-spaces, as intended, we presume, though it hardly appears so rich in effect as this. The three large gables and two smaller ones a little separated from them, with variously-curved outlines, make a highly picturesque sky-line; the rounded end

of the building, with open loggias, and the shallow rounded bay-windows within the columns of the projecting bays, are other effective incidents in the design, which will certainly be one of the most sumptuous of London clubs in architectural appearance.

## THE EDINBURGH EXHIBITION.

A VISITOR to the Exhibition possessed of architectural proclivities naturally gravitates to "Old Edinburgh." After passing down the central avenue, where everything is intensely modern, he finds himself outside the eastern doorway in the open air, and before him, as if raised by the skill of a magician, stands the gateway of an ancient city flanked by battlemented walls, over which appear the tops of gabled houses. To this and the rest of the reproduction a remarkable degree of solidity and truthfulness has been imparted; corbels, string-courses, gargoyles, &c., stand out in bold relief; different kinds of masonry and varieties of stone are wonderfully imitated, and the effects of time and weather are rendered with artistic finish. The gateway represented is the Nether Bow-Port, built in 1606 and demolished in 1764, the easternmost of the six principal gates which pierced the wall built after the battle of Flodden, and which led from the city to the burgh of Cannongate. The design of it is said to have been taken from the Porte St. Honoré at Paris, and it was as massive and picturesque a structure of the kind as could be found in any ancient city. The archway was flanked by circular towers similar to those existing at Holyrood, and over the archway arose a square clock tower with a spire. Passing under the gateway, which is guarded by members of the ancient city guard in quaint costumes armed with halberds, we find ourselves in what may be considered the market-place of the ancient city.

The whole of the buildings represented no longer exist, and, of course, did not occupy the contiguous positions here shown. To the left appears "The Twelve Apostles' House," to the east wing of which tradition has ascribed the name of "The French Ambassador's Chapel." This building was taken down in 1829 to make way for the erection of the George IV. Bridge. It is an example of the semi-fortified Scottish town house. The upper floors are reached by a staircase situated in a strong square tower, corbelled out in the upper stage, and having a circular turret with pointed roof at one side. Above the doorway is a shield bearing a werewolf and a crescent between two stars in chief, with the motto '*Speravi et inventi*.' The house next to this is of a different character entirely, being one which stood in Dickson's close. The basement is of stone, and the upper stories, which project over it, are of wood and plaster. It must have been built after 1508, when James IV. granted, by charter, the Burgh Muir to the Town Council of Edinburgh. The ground was greatly occupied by oak trees, and, in order to encourage the citizens to purchase the timber, permission was given to project new fronts to the houses in the town to the extent of 7 ft. With each story of height the projections increased, till in some of the closes opposite neighbours could shake hands. These projections were generally closed in by lath-and-plaster walls between oak uprights, but in some instances they were open, forming galleries, which were used for recreation. The house in question was occupied in 1785 by David Allan, artist, "the Scottish Hogarth." Passing on, we reach another timber-fronted house, which was taken down, as being unsafe, so recently as 1878. It stood at the angle of the West Bow and Lawn Market, and had an open piazza on the ground-floor towards the west. The ground-floor was occupied as a shop or open booth, to which the piazza formed a useful adjunct. The second floor was decorated with fluted pilasters, and the windows glazed in lattice work. It was here that the Messrs. Nelson laid the foundation of their famous publishing house. Turning northwards, we see Major Weir's house, through which there is an exit to the Meadows. The house stood in a small courtyard entered by a close from the West Bow. Over its doorway was inscribed the legend: "*Soli Deo honor et gloria, 1604.*" This was one of the haunted houses of the city, and is associated with the name of Major Weir, in respect to whom we refer the reader to a book named "Satan's Invisible World Discovered."



by George Sinclair, Professor of Philosophy, in the College of Glasgow, published at Edinburgh in 1685. Major Weir was burned at the Galloway, between Edinburgh and Leith, in 1670.

The next house was the residence of the Earl of Selkirk, and afterwards of the Earl of Hyndford, Ambassador to Frederick the Great, and at a subsequent period it was occupied by Sir Walter Scott's grandfather. It was a stately edifice, the most remarkable feature of which was a tower supported upon massive pillars and round arches, under which there is a continuation of the footpath. Then follows a house which stood in the Cowgate, between the College Wynd and Horse Wynd, remarkable for its double row of dormer windows and high cross-stepped gable containing the stair. The "Laus Deo" house adjoining, bearing the date 1591 below the motto, stood on the Castle Hill; it is supposed to have formed part of the Palace of Mary of Guise, the back portion of it having borne evidence of being erected at the same time as the Guise Palace, although the street elevation was of more modern character. The interior was richly decorated, and so lately as 1840 a beautifully painted ceiling in wood was discovered. The ceiling was arched and the painting in distemper. The Mint or Conzie Nook was destroyed in the siege of 1673, and another erected in the following year bearing the legend "Be Merciful to Me, O God, 1574." It is approached by an outside stair and arched wooden porch. The Charity Workhouse at the foot of Leith Wynd, which was erected by the Magistrates in 1619 in place of "The Hospital of our Lady in Leith Wynd," is a picturesque structure, with a fine row of dormer windows; it was removed by the North British Railway works. This completes the north side of the Market-place. The east side is occupied by the house of Simpson the printer and Mary of Guise's Oratory. The former is a timber-fronted house, the first floor of which is approached by an open stair. Above its massive oak door was an elliptic architrave with rich mouldings bearing two inscriptions: "Gif ve deid as ve wuld ve myght haif as ve vald," and "Get and saif and ve saif haif, 1515." The oratory of Mary of Guise stood on the Castle Hill, and was removed to make way for the Free Church College. It was erected after the English invasion of 1544. The palace of which it formed a portion was, as a whole, the finest as regards internal decoration in Old Edinburgh. It contained richly-carved stone and oak mantelpieces, panelled and arched ceilings, having emblematic and heraldic paintings, &c. After the death of the Queen Regent in 1560 the buildings were occupied by wealthy tenants, but, like all the fine mansions of the old town, it was at last divided into small dwelling-houses. *Sic transit gloria mundi.*

Entrance is obtained to Old Edinburgh at the south-east by the royal porch (1490-1753),—a finely-groined Gothic gateway, surmounted by a high-pitched gable, and having on one side a circular battlemented tower, and on the other a corbelled turret. It formed the chief entrance from the city into the courtyard of the Abbey of Holyrood, and was erected by Abbot Bollanden, who also "brocht hame the gret bellie, the gret basin fownt . . . he theikit the kirk with leid, he biggit ane brig of Leith, ane other our Clide, with many other gude works." This fine example of Gothic architecture, as well as the good abbot's house which adjoined it, was remorselessly demolished in 1753 by the Duke of Hamilton, Hereditary Keeper of Holyrood House. Proceeding westward, we find the Tolbooth,—*"The Heart of Midlothian,"*—towering aloft, and projecting its huge bulk obtrusively forward. It stood between the Church of St. Giles and the High-street, and was removed in 1817 as an obstruction to the thoroughfare. There was good reason for its removal, for although its loss may be lamented in an historical and romantic point of view, its condition as a prison, as described by Hugo Arnot, was most disgraceful. In front of the west elevation of the Tolbooth, Mr. Sydney Mitchell has reproduced an earlier version of the Market Cross recently restored by him. On the site now occupied by Melbourne-place stood a house and chapel which belonged to the Abbots of Cambuskenneth. These were acquired by Mr. Robert Gourlay, a city merchant and messenger-at-arms, in 1569. He utilised the carved stones in erecting for himself a

house, which was one of the most massive and striking in the city. The manner in which one half of the gable is corbelled out is exceedingly bold, and there is a most effective turret, which contained a spiral staircase leading to a room used as a cell for State prisoners of gentle blood, which tradition names as the apartment where occurred "The Last Sleep of Argyll." The house was planned so as to be easily convertible into several distinct residences approached by separate flights of stone stairs leading from one point. When taken down in 1834 a secret chamber was discovered between the ceiling of the first story and the floor of the second. Cardinal Beaton's house stood at the south-east end of Blackfriars-wynd at its junction with the Cowgate. It was built by James Beaton, Archbishop of Glasgow, afterwards of St. Andrews, and was remarkable for a bold octagonal angle turret. The attempt to reproduce the Parliament Stairs was too daring a one to be successful in the circumstances. This great flight of stairs reached from the low-level of the Cowgate to the high-level of the Parliament Close. They are produced in miniature, and form a pleasing feature. At their head is a corridor, the open timber-work of which is a *fac-simile* of that of the Old Hall at Lintilhgow, recently taken down, which once belonged to the Knights Hospitallers of St. John of Jerusalem. The adjoining building is a copy of the Assembly-rooms in the West Bow, where used to meet the rank and fashion of the city. It is a lofty building with high-pitched cross-stepped gables and long slender chimney-shafts rising from the eaves, very unlike any modern structure appropriated to similar purposes. It was erected by Peter Somerville, a baillie of Edinburgh, and bears his initials with the date 1602 and the motto "In Domino confido." A representation is given of a portion of "The Black Turnpike,"—a massive structure of large extent and great height which stood to the westward of the Tron church, and which was taken down in 1788. It is Gothic in style, and has an ogee-pointed doorway and niches, which have an affinity with late French Domestic Gothic. Tradition ascribed its erection to Kenneth III. (994), but the later date given, 1461, is obviously nearer the mark. The last *fac-simile* to be noticed is that of a Cowgate house of very pleasing form, which was removed a few years ago. It was one of the timber-fronted burgher dwellings, with a piazza on its ground-floor and an open gallery on the first floor.

A word of commendation is due to Mr. Sydney Mitchell for the admirable manner in which he has performed the task entrusted to him. Were one placed amidst these quaint surroundings, with none but the members of the ancient city guard, in the scarlet coats, cocked hats, and black leggings, who supersede the modern policeman, and the damsels who attend to the open booths attired in the costume of the time of Queen Mary, appearing as inhabitants, the picture would be complete, but the box-hat, billicock, dress, "improver," and parafal of to-day everywhere appear, and dissipate the illusion.

**Glasgow University: Gateway Buildings.**—The opening of the Underground Circular Railway having enabled the North British Railway Company to vacate the College Station, Messrs. Morrison & Mason, the contractors, are now engaged in carefully taking down the Old University Buildings in High-street, and removing the original archway, escutcheon with royal arms, and other historical stonework (*temp. Cromwell and Charles II.*) to Gilmore-hill. They have at the same time commenced the erection of new gateway buildings at the north-eastern entrance to the grounds of the present university, in which the materials and decorative features of the old façade are to be embodied, thus conserving a valuable link with the past. The new buildings are in the Scottish Domestic style of the period, with a blending of French and of Scottish Baronial architecture. They are the gift of Mr. Wm. Pearce, M.P., the eminent shipbuilder; and the architect is Mr. Alexander George Thomson, I.A., who, in a letter published in Nov., 1883, suggested this application of the ancient stonework. The lower floor is to be occupied as the janitor's dwelling-house, and the two upper floors as class-rooms in connexion with the Elder Chair of Naval Architecture and Marine Engineering.

#### FURTHER NOTES ON ACADEMY PICTURES.

We give some further notes on pictures in the Academy Exhibition, taking them now in the order of hanging. In Gallery I. is a charming little work by Mr. Marks, "A Delicate Question" (29), submitted in the shape of a manuscript of some kind to an elderly gentleman in a white wig and blue coat, who holds the paper before him with an admirable expression of puzzled responsibility. The colour is on a delicate and carefully-arranged scheme, waning gradually from left to right of the picture, from the blues and greys of the old gentleman's dress to the pale saffron of the girl's dress, who is the messenger, and finishing with the warmer orange in a bunch of flowers on the extreme right; giving quite a decorative value to a painting of realistic life. Mr. D. Collman's "Warranted Quiet to Ride or Drive" (12), where an old man is getting taken in about his purchase, is a capital bit of humour along with a very good painting of a horse. Mr. Calderon's "Ruth and Naomi" (21) is the largest work in the room, and seems an earnest attempt to give new life to an old story; but the expression of Ruth is rather staid and exaggerated, as if she were playing to the gallery. Mr. J. Farquharson's "In Cairo" (41), a street scene with the figures in conversation, is animated certainly, but does not go to show that the author would be wise to desert the field of landscape in which his real power lies. "Choosing a Summer Gown" (66), by Mr. Woods, is a brilliant and very lifelike painting of a group of figures on a quay in Venice; each figure tells its own story well, the incident is of the slightest. Mr. Sargent's portrait of "Mrs. Harrison" (78) commands attention by its original style and peculiar costume, but for a portrait it aims too much at sensation. In this respect it may be contrasted with Mr. Pettie's carefully studied and mainly portrait of "W. Bailey Hawkins, esq." (20), a very good example of portraiture. Mr. L. Jeune has one of his pretty combinations of child-life and landscape, "Water-Lilies" (80), and near this is a large, flashy, clever, and very vulgar painting, by Mr. A. M. Rossi, "A Solo by Request" (82), showing a drawing-room full of very vulgar and commonplace people, who have no possible claim to be painted at all.

In Gallery II. the largest work is Mr. Long's "Pharaoh's Daughter" (115), on steps above the water's edge, inspecting Moses and his cradle, and accompanied by various handmaidens, all in a state of more or less undress. This is one of those rather exasperating works which are very well painted, and yet totally fail to interest one, or to suggest anything but a scenic effect of grouping. Mr. Goodall's "Puritan and Cavalier" (87), where a girl in sober grey hides behind a screen from the puritan of a gaily-dressed little boy with a bunch of mistletoe, is bright and amusing, and the screen, which occupies the largest portion of the canvas, is a fine piece of Renaissance decorative work. Mr. Farquharson has done finely in his landscape, "And Winter's Breath came Cold and Chill" (94), if we except rather too hard and metallic look on the water; it is a snow landscape with the sunny light reflected from a stream not yet frozen; a peculiar and striking effect. Mr. Wyllie's "The Estuary of the Thames" (103), is a small but really fine landscape; the estuary, with the tide low, and its mud banks dotted with coasting vessels aground, is seen from a height, the line of hills sloping across the picture from the left contrasting with the wide levels of the estuary; a very artistic composition, in which the art is not obtruded. Mr. Woods has done something new in a small painting of "The Water-Wheels of Savasas" (114), where we look up a flight of subterranean steps, the water-wheels on the left. An interesting example of an out-of-the-way subject turned to pictorial account, "Work-a-day England" (123), also by Mr. Wyllie, is a sunset picture over a river golden beneath but bordered by factory chimneys and clouds of smoke; we do not recognise the locality; it is a very effective picture, suggesting matter for thought too, in the contrast between the glory of nature and the work of man. We have never seen anything better from Mr. Wyllie than these two small and unassuming landscapes, both of which are hung on the line. Mr. Marcus Stone's "A Peacemaker" (149) is a pleasant picture, with three figures in the



foreground of a landscape, where a girl is interposing to conciliate two lovers, who have unrelaxed; the costumes (of the Jane Austen period) are carefully studied, and the figures expressive in their action; the face of the offended young lady is very handsome, and sufficiently expressive of anger not to spoil her good looks.

In the large Gallery, Mr. A. B. Donaldson has as a work in his richly-coloured but rather stiff manner, of Pope Alexander VI. deciding between the claims of Spain and Portugal to the Indies by drawing a line across the map; the Pope's is a characteristic head, and worth looking at; he seems to enjoy his dictatorial action; the other figures rather fill up the canvas than aid in the story. Mr. Pettie's "The Musician" (189) is a pathetic picture of a man of refined and spiritual features, on which the light is concentrated, evidently dying of consumption, looking on a sheet of music which he will never hear performed; chamber-organ, a violoncello, and other accessories, fill up the apartment; a well-studied picture as well as a pathetic one. Mr. Boughton's "The Councilors of Peter the leprostrong" (225) is a humorous scene from the early history of Puritan New York, not very interesting. "A Violin Player" (231) is a half-length portrait, by Mr. Storey, of a very handsome young woman clad in a very effective robe, and filled up to her chin; it is a pleasant picture to look at, but the face is a little too polished and wax-like for flesh. "Sacred to Pasht" (263), by Mr. Long, is really a study of Persian cats, or the type of cat commonly so called; as such, it is good, and attracts the interest of the many lovers of those animals. Mr. Joseph Knight's large landscape, "The Summit of the Great Orme" (363) is rather a puzzle; the tones of the grass suggest moonlight, which is obviously not the intention; it is an unreal-looking work.

In Gallery IV. we passed over (expressibly), on our previous comments, the remarkable landscape by Mr. A. W. Hunt, his one contribution, "Dunstanborough" (334); but, indeed, Mr. Hunt's landscapes are so far out of tune with the regulation Academy key, that they at last amid the more strongly-hued and self-asserting views amid which they are hung, is a view showing the "iron coast and angry waves" in the foreground, and the castle in the centre, the setting sun behind it; to the right, over the reef beyond, comes one team of wonderfully real and luminous light. There might be a little more force in the foreground rocks, perhaps, with advantage; though possibly any such attempt would have spoiled the unity and solemn effect of the whole. Mr. Pope's portrait of "Mr. Pfeiffer" (312) is an exceedingly good likeness; Mr. Holl's "The Reverend the President of St. John's College, Oxford" (335), is one of his best portraits in regard to force and power of characterisation. Mr. Leader's "When the West with Evening lows" (346), is an effective work in a hard and unimaginative manner. Mr. F. Hamilton has tried a very good subject (352), the endeavour of a man who, like Tannhäuser, ad dwelt in the Venus cave, to obtain resolution from the Pope, when the figure of the goddess appears behind the Pontiff's hair as if to claim the suppliant as her own. The subject is not treated with the over it demands, but so many trumpery objects are put before us at the Academy, that the effort to rise to something higher merits recognition. The like praise may be given to Mr. W. F. Calderon's attempt at Dante in the Valley of Terrors" (364), the poet and the three animals that disputed his oath. It may be doubted, however, whether this kind of pure allegory can be successfully dealt with in painting; in verse it is very well to bring in animals as allegorical of certain influences or certain States (for the meaning of Dante's leopard, lion, and wolf, is disputed by critics), but when you come to paint the actual animal on canvas, the symbolical meaning seems to disappear behind the mere question of animal painting. Mr. John Faed's "Still Life" (372) is a brilliant production in its kind, except, perhaps, the grapes, which are a little dead in appearance.

In Gallery V. Mr. H. Moore's "The Sound of Sea after Sunset" (404) is a beautiful sea-piece, with a quiet swell on the water such as is seen when a breeze has gone down; the waves are golden where the fading of sunset light strikes them. Mr. Holl's portrait of "Sir John

Millais" (405) is certainly not one of the most favourable specimens of his work in portraiture, and confirms us in an opinion we have long entertained, that Academicians select for their diploma works those which are of least value to themselves. Mr. Riviere's "Union is Strength" (428) is a good painting of a sheep preparing to retaliate on an over-bold half-grown dog, whose sudden alarm is very ludicrously portrayed. "The Handmaidens of Siva preparing the Sacred Bull at Tanjore for a Festival" (434), by Mr. Val Prinsep, though not beautiful, is interesting as a transcript of fact, as we presume it is. "Across the Moor" (445) is the best of Mr. Peter Graham's contributions, which are in the usual order of things,—Highland cattle, hills, and a mist. There is a special point in this one from the brilliant and very real way in which a passing gleam of bright sunlight is shown, almost glittering, on the side of a middle-distance hill. Mr. MacWhirter's "The Three Witches" (455) is a very expressive painting of three trees which have probably all suffered by lightning, stretching their withered arms about over the heath, but there is too much lightning in the picture; not from the storm which decapitated these three trees (for they are evidently old victims) and, therefore, not to the point, and lightning is an eminently unsatisfactory thing to paint, and should be indulged in as little as possible.

In Gallery VI., "Domino," by Mr. Frank Bramley, is a capital specimen of what may be called the modern "white school," where no details are made out, and as little colour used as possible. Two girls are playing at dominoes; white table-cloth, white dress, white muslin "work" thrown down, and a nearly white wall; the only bit of positive colour is in some flowers in a vase; but the attitudes of the two girls playing, and the face of one of them (the other has her face nearly turned away) are full of character and expression. There is little else in this Gallery to pick out for mention beyond what is mentioned already. "The Squire's Daughter" (508), by Mr. Margate, is a life-size study, rather intended to be, we should say, after the manner of Mr. Boughton; it is rather dubious in colour, but not unpleasant. There are some other pretty things, and some very bad ones, in the same room.

Gallery VII. contains two works by Mr. Macbeth, from his favourite fen country; "Sodden Fen" (598), a very dreary-looking spot with a faint red sun going down behind a dreary-looking building; and as this dreariness and melancholy was probably what the painter wished to convey, he must be held to be successful so far, though it may be questioned whether the result was worth the canvas. The other work, "A Fen Lode" (604),—what is a lode?—where two picturesque-looking country girls are walking along the grass dyke by a canal or cutting, is a brighter and more pleasing work, and is one of the artist's most successful things in regard to both landscape and figures. Mr. Peter Graham's "Rambles" (610) may be noted as a subject somewhat distinct from his ordinary run; the usual cattle are there, but their *habitat* this time is a sand-hill locality by the sea, and the sand-hill scenery is very well painted. Mr. Shaw's "Ramsey Island" (614), is, of course, a sea-painting showing much of the sea and little of the island; it is not equal to some previous works of his. Mr. MacWhirter has two small companion pictures in this room: "Winter Morning" (625), a beautiful painting of a birch-tree whitened with snow, in a snow landscape, and "Autumn Evening" (630), a nearly similar scene under different light and different circumstances. The "Winter Morning" is the finer work of the two. Mr. Seymour Lucas's "Peter the Great at Deptford" (653) is a work which covers too much canvas for the degree of interest it includes; the group of figures in the foreground have a good deal of character, especially Peter himself, in workman's apron, who sits looking at a drawing of the framework of a ship, and who is well contrasted with the figure of a conventional pop of the day, who forms one of the group; in fact, Peter looks a great deal more respectable than he probably ever did look in reality; but a great part of the canvas is filled up by the hull of a ship in progress behind, which, to say truth, is not painted with such an amount of force and realism as to be of much interest, and the large canvas has a somewhat blank appearance. Mr. Joseph Knight's "An October Day" (665) is a little gem: an evening scene, with a green turnip-

field in the foreground, and the folds of meadow going back from the eye in gradually deepening shades,—a very poetic little landscape made from simple materials.

Mr. Goodall's "Susannah" (688) is the principal nude figure in the Academy, the only one of any consequence or pretension; and, to say truth, does not justify its existence on so large a scale. It is a commonplace affair in conception, and not of the first order in execution.

Mr. Perugini's "Tempora Mutantur" (697) is a pretty idea,—a modern girl standing in a Renaissance interior amid a circle of caryatides, who seem as if they returned her contemplative examination. "Nature's Conquest" (711), by Miss Florence Small, is a pretty picture of a young girl who has fallen asleep reading; the colour of the work also is pleasing and harmonious. Mr. Blashfield's "Inspiration" (716) is a startling effort, rather of the old school; a female seated in a theatrical attitude on a gorgeous throne with a scroll in her hand, receives "inspiration" from an angelic visitant who comes on in a cloud; the draperies are all as if agitated by a strong wind. It is impossible not to smile at this piece of bombast, which, for all that, has a certain merit. How different is the next picture, "Relics" (717); a simple portrayal of a mother gazing on the toys and other little possessions of her departed child; the attitude and expression unaffected, the colour very refined. Mr. Ludovici's "Letters from Home" (732), a girl's school in the early part of the century, has some character and humour; and Mr. Bryan Hook, in "Cornish Fishers" (735), which are, in fact, cormorants in front of a stretch of sea, is showing himself a promising follower of his father. "The Tennis Match" (740), by Mr. J. Lavery, is a lively work of the impressionist school,—figures and faces which are only phantoms, but phantoms with grace and nature in their movements. "Flowers and Fruit" (770), by M. Charles Verlat, is a great bravura piece of flower-painting, not in the highest style, but brilliant and powerful in its way.

In Gallery IX., mostly occupied by small works, is Mr. Tadema's other contribution, "Rose of all the Roses" (818), a figure in a marble alcove, with a bright look-out over a distant landscape, on the right of which is discernible a rock-out temple with the square pillars coloured a strong red. Mr. Faed's "Sunday Afternoon" (806) is a pleasant painting of a country girl, reclining in blissful ease on the ground. "Gathering Limpets" (924) is one of the best of Mr. Hook's pictures, with a breezy sea and breakers flashing in the sunshine. Mr. Tom Lloyd, in "Take us, Daddy" (893), has been rather poaching on Mr. Hook's marine preserves. The picture is full of aerial effect, but it recalls the older painter rather too strongly.

In Gallery X., "Twixt Power and Duty" (959), by Mr. John Bowie, should be looked at as a really original and striking work, both in composition and colour. It shows an ecclesiastic in red, in a dimly-lighted room, hesitating about signing a paper. A friar is seen in the background. The story of the picture is only vaguely hinted at, but it is done in a powerful and suggestive manner. Mr. Leader's "With Verdure Clad" (964) is a large, bright mountain landscape, with a great deal of realistic force in the foreground. Among others in this room may be mentioned Mr. Eyre Crowe's "Hougoumont" (976), a larger picture than usual for him, showing a group of wounded French soldiers, listening to an oration from another who has elevated a small tricolour standard, and points up to it. There is a novelty in the subject, which is given with considerable dramatic force. Two admirable pictures of the relation between humanity and dogs are found in this room: "In Disgrace" (1,008), by Mr. Burton Barber, where a dear little child, put to sit in a corner, is consoled by her favourite dog, looking up to her with a touching expression of sympathy; and "The Welcome" (1,020), by Mr. Riviere, where a very large working man is greeted at his door by a very small white puppy. The action of the dog is perfect. In "Iris" (977), Mr. Grimshaw has succeeded in giving a wonderfully luminous effect of light in the halo round the head of the figure. "Off to the Fishing Ground" (1,021), by Mr. Stanhope Forbes, should be looked at for the character of the figures in the boat, but the water is not painted at all, only a grey expanse—a very easy way of painting marine subjects. Mr. Ernest Croft's



"Return from a Raid" (1,027) is a kind of Walter Scott business, looking more real than such things sometimes do in painting; not one of the artist's best works, however.

In Gallery XI. Mr. B. S. Marks's "Jewish Bibliophile" (1,039) is a fine little work, and Mr. David Murray's "Glen Falloch" (1,041) vindicates the position the Academy have accorded him better than some of his works which we have seen there: Mr. Vicat Cole's "Great Marlow" (1,052) is the best of his usual series of Thames pictures which are turned out regularly year after year, and by which the simple-minded might be persuaded that Thames scenery never had any but one aspect and one colouring. It is the successful manufacture of a certain type of landscape, rather than landscape art in the true sense. Mr. Waterlow's "Sunny Hours" (1,100) is a brilliant foreground and figures with a poor sea behind it. Mr. Aumonier has sent a beautiful "June" (1,108), a scene under great trees through which the sunlight comes with a subdued glimmer. M. Fautin's large picture "Autour du Piano" (1,093), is obviously a group of portraits; the pianist, whose action and expression are very true, reminds us of Herr Jaell, but we have no information as to the personalities. The picture is better in expression than in colour; the flesh tints are unpleasing and muddy in effect. Two good portraits may be mentioned in this room, Colonel Lionel Barton, by Mr. Wirgman (1,095), and "The Duchess of Buckingham and Chandos" (1,109), by Mr. Arthur S. Cope; the latter a beautiful work, and an advance, to our thinking, on anything this artist has previously done.

The sculpture we will notice separately.

#### THE McLEAY MARBLES.

It is not generally known that the McLeay marbles exhibited for a short time some years ago in the South Kensington Museum during the absence of their owner in India have now passed into the hands of Sir Charles Nicholson, and are beautifully arranged with several additions in his house, The Grange, Tottenham. Last month, on the occasion of his receiving from his own University, that of Edinburgh, the honorary degree of Doctor of Laws, mention was made of the conspicuous services rendered by Sir Charles Nicholson to the cause of Egyptology. He twice visited Egypt for purposes of research, and there made a large and valuable collection of antiquities which he presented to the University of Sydney, in the inauguration of which he had taken a conspicuous part. More recently he has done good service to Greek archaeology. The valuable collection of marbles given him by his friend, Mr. George McLeay, he has not only suitably housed, but has had them photographed, and it is hoped that a selection of them will by his kindness shortly be published in the "Journal of Hellenic Studies." When we consider the vast stores of ancient marbles scattered in the town and country houses of England, when we remember that it needed the advent of a learned German, Dr. Michaelis, among us, to note and catalogue these national treasures, we feel that Sir Charles Nicholson sets an example valuable from its rarity. We do not intend to anticipate the discussion of the marbles in the "Hellenic Journal," but we may note that the provenance of the marbles is, for the most part, Asia Minor, and their date post-Alexandrian. Marbles of this late date and graceful style are specially fitted to adorn a private house, and when by the kind courtesy of Sir C. Nicholson we visited them in their present home we felt that they gain greatly in charm by their present fostered disposition instead of the usual massing in a museum. In the entrance-hall, on either side of a door, stand two female figures dressed in long chitons, with the high post-Alexandrian girding, and ample himation; the light from a side window upon them makes their position singularly favourable. In the same hall below the window is a small Greek grave-tablet, of a type already familiar: the young warrior leading his horse, a tall draped figure, followed by miniature figures, leading a sheep to sacrifice. Underneath the staircase is a group of Ganymede and the eagle, interesting from its close analogy to the group of Ganymede and the Eagle at Bonn. Ganymede, in Phrygian cap and high boots, leans against a pillar, on which the eagle is perched. A

relief, standing on the right hand of the hall door, is interesting as having been found in the Amphitheatre at Pergamon: it represents a gladiatorial scene, a man in boots and short chiton, with a whip in the right hand, faces a tiger about to spring upon him. The collection includes several grave reliefs, a number of heads, some of portrait type; a life-sized and well-preserved statue of Flora; and many others of interest. As a rule, we regret the existence of private collections, but where, as in this case, the owner is willing and eager that they should, by publication, be made available for scientific purposes, we are able to enjoy, without scruple, the added charm of beautiful and natural surroundings.

#### THE SURVEYORS' INSTITUTION EXAMINATIONS.

THE Council announce that the following candidates, whose names appear in alphabetical order, have passed the Professional Examinations held on the 5th to 9th April last:—

##### CANDIDATES FOR PROFESSIONAL ASSOCIATESHIP.

###### Students:

Burrows, Alfred John.	Lausdown, Harold W.
Callendar, William J.	Lowe, Charles Robert.
Carter, Frank W.	Perkins, Walter Frank.
Halton, Harry Russell.	Physick, Walter F.
Jones, Samuel M.	Turner, Percy.
King, William Isaac.	Vale, Henry.

Of the foregoing candidates, A. J. Burrows passed at the head of the list with a high aggregate of marks, but, being precluded by age from competing for prizes, the Institution Prize, of the value of fifteen guineas, falls to W. F. Physick, and the Special Prize, of the value of ten guineas, to W. F. Perkins, these candidates being respectively second and third in order of merit.

###### Non-Students:

Birkett, Tom.	Hill, Alfred.
Bousfield, Edwin V. D.	Ivimey, Alfred.
Briggs, John.	Lee, John Wilfrid.
Campbell, Colin.	Maxwell, Francis Wm.
Crosland, Walter.	Patersen, Andrew T.
Drew, Henry Alban.	Pelham-Clinton, H. E.
Ellis, Ralph Staples.	Prater, Thos. Hubert.
Gibb, William Pashley.	Roads, Alfred.
Golightly, Charles H.	Ruddle, Frank J.
Green, Thomas Joseph.	Woolnough, John W.,
Henderson, Richard.	

of whom A. Roads obtained the highest aggregate of marks, and receives the "Driver Prize," of the value of Fifteen Guineas.

##### EXAMINATION FOR THE FELLOWSHIP.

The following have passed the Examination for the Fellowship:—

Day, William, jun.	Jones, Henry Arthur.
Godfrey, Robert.	Paul, Alan.
Hasluck, Lancelot G.	

#### SOME THOUGHTS ON ARCHITECTURAL TRAINING.\*

IN offering you a few stray thoughts on architectural training, a question which has for a long while interested me, I certainly cannot claim originality as to the subject chosen, nor perhaps for many of the ideas I have attempted to string together; but I trust you will allow the apparent staleness of my subject to be outweighed by its importance to us and its peculiar fitness for discussion by such a body as our Association. Since, moreover, it seems to be a question on which the last word has not yet been spoken, by any means, we may possibly still find one or two points worth considering or even reconsidering, in spite of everything that has been said and written concerning it. In fact, regarding some points, one is half tempted to ask, "What has all the attention given to the matter of late years really amounted to, so far?" To say nothing of the destined victims themselves, the pupils-to-be, standing, so to speak, on the brink of the profession, about to take their great "leap in the dark," are the parents and guardians, up to the present time, say better informed or enabled to inform themselves much more clearly than hitherto, about what is involved in an architect's training and subsequent career, what are the main requirements and the chief conditions essential to success,—or, at least, to avoidance of failure,—in such an undertaking?

\* A paper by Mr. W. J. N. Millard, read before the Architectural Association on the 7th inst., as elsewhere mentioned.

Here, to begin with, I would submit, lies the possible source of much mischief which might be rendered more preventable than it is, by us architects.

The immense importance of any reliable information that can be obtained with regard to an architectural career, before committing a youth to it for life, must be obvious; and surely it rests with us, and us alone, to enlighten the outside public in this respect. As yet, however, I fail to see where the parent is to turn with certainty of obtaining anything more than the most meagre hints to help him to a decision in such a case; and still, it seems to me, it ought to be quite possible to afford him ample means of fully weighing a step so grave in its consequences for his *protegé* before letting him take it.

For instance, a Students' Manual or Text book might be drawn up, one would think, and issued under the joint sanction of the Institute and the Association; embracing the entire training of an architect, and setting forth in detail all the various branches of study, with the order in which they could be best taken up according to circumstances, as well as other items of information bearing on the subject.

To accomplish this effectually, would perhaps call for a little more unanimity than seems to have prevailed until now, as to the main lines to be laid down for an architect's training, but I hope we may really take it that all the interest recently exhibited about the whole question is evidence, at least, of a genuine desire for some more general agreement.

The project of a Students' Text-book to be published by the Institute, was put forward in a paper by Mr. Phene Spiers so long ago as the General Conference of 1871; but, for some reason or other, it seems to have fallen flat. Perhaps vested interests in the pupil-farming system were too powerful in those early days for any so radical an attempt at reform.

It is true, the A.A. "Brown Book" and the lately issued Institute "Kalendar" do give particulars of many things a student may wish to know, such as our classes and the Examination, thus fulfilling their purpose well enough in its way; but we seem to be in need of something far more comprehensive in its aim: a production that should, if possible, be the outcome of the united counsels of all those best qualified to advise, and so be rendered valuable as a guide to parent, principal, and pupil alike.

Since the feelings and opinions current amongst juniors of the profession would, in a matter of course, have to be taken particularly into account in preparing any such work, it occurs to me that we could not be doing amiss this evening to quietly discuss a few matters of which it might treat.

With this object I proceed to throw out suggestion or two for your consideration.

To begin with, then, it would not be inappropriate, by way of an Introduction, to call to mind what is usually comprised in an architectural practice,—to which his training is professionally preparation,—and to afford some conception of the wide range of subjects he is expected to deal with. How, for instance, he is of course supposed capable of designing almost anything from a Christmas card to a cathedral; and liable at any moment to be appealed to as an authority on nearly all conceivable matters from a leaking gas-pipe to a question of Church ritual-arrangement; or again, to be called upon from playing the part of a building detective to decide upon a doubtful point of archaeology; or to mention other things innumerable; showing clearly that, although architecture is the work of architects, the converse will scarcely hold invariably.

It might be interesting and instructive, at the next place, to follow this up with a sketch of the means commonly taken to equip the aspiring youth for an enterprise of such magnitude, giving a brief unvarnished recital of the time-honoured course of procedure so familiar to us. I will not say endeared,—to most of us, recounting how the raw pupil, all-unprepared, he is, gets pitchforked into an office,—the busier the better; and how only too frequently the wasted years of innocence are terminated by a rude awakening to what he ought to have been learning all the time, on finding himself, at the expiration of his articles,—helpless.

This, to anybody of an inquiring turn of mind, must bring home the question,—supposing it has never occurred to him before, whether no improvement is possible, whether no saving of valuable time can be effected in



pupil's usual course of training; and if it can, how?

Even so much as to put him into the way of teaching himself, to show him how to use his eyes and pick up what he can on his own account, is not unfrequently to do him quite a good turn, as elementary instruction for architects goes now-a-days.

Hitherto, a lurking sort of idea seems to have possessed parents, architects, and pupils alike, that for about the first year, at any rate, it cannot really matter so very much how a pupil is employed, and—as I have even known to be said, by an architect too,—that “a year or so of office drudgery will do him good!” Will it? May we feel quite certain it will do no harm?

Herein, possibly, lies a clue to the mystery of that spectral apparition, we so often see, calculated to touch the conscience of architects,—if anything will,—I mean the time-expired pupil, wandering round disconsolate in search of his first berth as an assistant; whilst his good friends and relations are growing every day more and more concerned about him, marvelling how it is he does not manage to “do something.” Poor fellow! alas, generally speaking, it is so very little he can do. He tells you naively how he would like to get with some “good man,” where he could “learn something.” That alone speaks volumes.

He finds, in fact, he has just come to a most critical turn in his course. For a last resource, perhaps he goes, out of sheer desperation, as an improver, in hopes of learning something. Save in certain exceptional cases, I can seldom hear of an instance of that nondescript,—the improver,—without suspecting there must be something wrong somewhere, and, not improbably, as much of misfortune as fault on his side.

Altogether, is it not enough to suggest a doubt, whether the ordinary architect's office is invariably the best possible place for a boy fresh from school; and whether the practising architect, be he prosperous or struggling, is precisely the man to undertake the responsibility of such a charge?

Almost any head-draughtsman can tell you young pupils are usually regarded as a nuisance in an office, secretly or openly, until they have proved themselves to the contrary; but how they must, of course, be tolerated for the sake of their premiums and the dim hope of one day making themselves useful some day before the term of articles is “up”; and how it is time enough to trouble much about them, when (if or before then) they become, somehow or other, sufficiently advanced to be trusted with the work of any consequence.

To slightly vary the well-worn metaphor,—as the boy is to the man,—so is the pupil to the architect. We do not find the question of bringing-up lightly regarded by the majority of thoughtful parents in respect of their children,—not, at least, so long as they are still young to take to architecture as a profession, and seeing that, in other branches of education, the art of teaching is generally held to require some sort of special training, and even special gifts, for it to be followed with success, we wonder how intelligent men of the world, who have to decide on a career for their sons, can go on supposing that corresponding conditions may be dispensed with in an architectural education. But, as yet, how are they to be wared, whether or not they ever incur any risk; all of such conditions being unfulfilled, less, indeed, the architects they treat with could tell themselves as much; a course of conduct only conceivable on the assumption, the first place, that even they are firmly resolved to that effect.

Happily, at last there does appear a tendency, faintly amongst architects, towards agreement in this much, at any rate, viz., that a regular course of distinctly preparatory training is most essential for a pupil, before being unchained straight into an office, if he is to derive full benefit from what he sees going on there. This point, finally accepted, would involve a further one, as to what should be the nature of such preparatory work; in short, how best to begin an architect's training. Or is this ever remain a case for “toss up”?

By no means the least part of the difficulty deciding on any course arises from the very variety of studies the pupil might begin with, ranging under the four main heads of Art, Science, Literature, and Practice. One thing,

at any rate, is pretty certain,—he cannot plunge indiscriminately into them all, just at first.

No sensible man, with a dozen important affairs to attend to, will attempt to take them together in a lump, but will at once set about arranging them in some suitable order.

No beginner at architecture can be reasonably expected to acquire a dozen branches of professional knowledge all at the same time; he needs careful guidance,—now-a-days more than ever,—as to the best order in which to proceed; even supposing the economising of time be his sole object.

Then, another difficulty meets us in the fact that the same course may not be equally well suited to varying capabilities.

Yet, surely, it ought to be possible to indicate a path which no one could be any the worse for pursuing, a certain distance at least, to begin with; that is, if he is ever to be an architect at all.

Doubtless we shall hear plenty of excellent and powerful arguments in favour of a preliminary course of technical education or applied science rather than purely artistic training.

I venture, with all respect, to put in a plea for the latter being made, much more than it is, the basis and backbone, as it were, of an architect's education and whole career, the very foundation to build up from.

I should like to see an architect commence oftener with a sound artistic training, including geometry and perspective, in a school or studio side by side with other art students.

It is rank heresy, of course, to breathe the shadow of a doubt as to the immense advantages of a so-called practical training; but it may be at least permissible to discuss whether this is always the best way of beginning; and whether a thorough knowledge of what comes under the head of practical work might not be acquired by a student just as well, or even better, and in shorter time, after he had advanced somewhat and there was a likelihood of his perceiving the bearing of such studies and of then realising the unquestionable necessity for his mastering them, as one main condition of ever being able to practise his profession.

It will be allowed, I think, that no more potent influence was ever invoked in aid of successful teaching of any sort, than the infection of the pupil himself with a desire to learn. This, if possible at all, is most likely to be brought about with work he most cares for at the time.

If, therefore, an architectural beginner's own inclinations lean, ever so slightly, towards art rather than science, would it not be a trifle unwise to disregard them, and to court failure, by putting him through the “mill” of a scientific or practical training from the first,—beginning, as it might prove, at the wrong end? The consideration of what he himself may want to be taught, will perhaps be hardly worth neglecting entirely, for the sake of compliance with some supposed infallible programme of cut-and-dried correctness.

Rather, I would say, let the loose rein, given in the first place to his natural tendencies, be used as a means to lead him little by little. All in good time, no doubt, he will want to know about practical matters, and will be far more disposed to devote himself to the intelligent pursuit of them,—in view of their absolute indispensability to him as a practising architect,—when he is old enough to feel clearly convinced of this fact. And it is a fact, the full weight of which, he will never be made to feel by mere reiteration.

Again, even in the case of those who may not, so far, have given unmistakable indications of genius, or whose natural bent still rests undefined; just average young beginners,—say,—with all their inherent imperfections, carelessness, ignorance, laziness, or stupidity; a preliminary trial of artistic instruction is still as likely as anything else to enlist their better qualities, and has at least the recommendation of leaving no unpleasant distaste or harmful results,—supposing it should, after all, fail to disclose latent talent. Nor need it be lost time, since every architect, to be worthy of the name, must at some period or other attain to a certain amount of proficiency in freehand drawing,—as distinguished from mechanical,—and the earlier he does this of so much the more service will it be to him. It is something he can apply in his everyday work, and thus, at the same time, ensure from becoming rusty and useless, as

may easily happen with some kinds of knowledge if acquired sooner than need be. How an architect can gain command of his pencil too soon is difficult to make out.

But beyond all this, is it not also worth our while to consider, for a moment, the positive harm that may be done to any youth blessed with so much as a single spark of artistic fire, by deferring the careful and systematic development of such a gift until after he has been wearied and nauseated with what may well appear to him, at first, as the less attractive and less stimulating side of his profession?

If there be one thing more than another that needs, and at the same time repays, skilful tending, from boyhood upwards, it is surely this lamp of art; whereas, on the other hand, its flame is by no means to be kindled at will, just any moment a man may decide to “go in for the artistic.” The comparative rarity of a wild plant may sometimes be apparent only, rather than real, owing to its general unobtrusiveness; but granted, that, in this case, the shoot might be but a feeble one,—the smaller the growth, the greater the need, perhaps, to prevent its being blighted and hidden for ever; and the season for bringing it forward to good purpose, once let pass, may never recur. In such an instance, it would seem, anyhow, to be running a smaller risk to postpone awhile the taking-up of some other branches of study.

Every now and then, in looking at executed designs, one cannot help feeling that the authors might easily have been made so very much more of as artists, by other training; to judge from the evidences of considerable artistic power,—somehow strangely undeveloped,—marking their work, which differs, at the same time, distinctly from that of the simply feeble designer, destitute of any ideas of his own, and only just sufficiently clever to ape the art of better men. Ask many a worthy practitioner whether, in his heart of hearts, he does not deplore his lack of early artistic encouragement and guidance, and feel that this might have made just all the difference.

To save even a single student from the fate of turning out, in an artistic sense, a dwarf or a cripple for life,—if it can be prevented,—appears well worth the attempt.

To catch hold of him and bring his brighter side to the light; to draw out his finer feelings, whilst yet unblunted; to arouse in him a healthy enthusiasm through the sympathy of fellow-workers in a congenial pursuit, just at an age when he is most impressionable,—may be doing a truer kindness than to ply him with all the most admirable instruction in the world, before he can half-appreciate the good of it.

As I believe in a good art school for the beginning, so, I must say, I know of nothing equal to a good office for the finishing of an architect's training,—out-door study and travel coming in very largely between whiles.

I am not prepared now to talk about these latter, among many other things I should have liked to touch on; but I will just allude,—with your permission,—to a proposal I made here, on a former occasion, for obtaining the privilege of a seat in a good office, by way of a “finishing,” for such as should distinguish themselves in preliminary study.

Might not the Architectural Association set an example of founding scholarships entitling the holders to serve, for a period, a sort of advanced pupilage in one or another of the leading offices, where they would have the advantage of doing good work along with other picked men?

Any number of poor students would, I suspect, regard such a prize as indeed something to aim at; and further, we should be thus helping, in a way, to bring on a more accomplished race of architects. For, whatever is gained from any course of instruction depends, not only on whom it is the pupil works under, but quite as much on those he has to work with; figuratively speaking, they constitute the very atmosphere he breathes. Indeed, oftentimes in after-life, on looking back to such days, a man may be able to trace some decided change of direction in his career to the fact of his having then chanced to come in contact with certain other minds of different calibre from his own.

A paper on “Architectural Training,” however limited in scope, would be incomplete without some reference also to the Examination. Now, the architect's calling may be said to combine the pursuit of an art with the practice of a profession. No man may lawfully set up as an attorney, a doctor, or even a druggist



without first satisfying an examination test. Anybody may dub himself "architect" who chooses to, but so can anybody proclaim himself a painter, a sculptor, or a musician, without, however, any other folks taking it very seriously to heart. In these cases an abuse of the title corrects itself in the long run. May not a like result be looked for in architecture, if only the standard in it of artistic attainment be more and more raised?

But yet, on the other hand, how is it that people do not, as a rule, seem to put such implicit faith in their architect as they will, for example, in their legal or medical adviser? Is it not mainly because these latter can invariably offer a sound guarantee to begin with, of proficiency in their work, up to a certain point?

If, then, this be the true reason it must manifestly tell to the architect's advantage also,—as well as to his client's satisfaction,—to have a similar assurance to give, so far as any examination test can be fairly applied and without prejudice to his position as an artist, still leaving that point to be determined in the same way as in the sister arts.

I make no apology for assuming all along the possession of artistic ability to constitute one of the truest claims to the title of "architect." To some, of course, it may seem but a small matter for regret if by clumsy nursing we do manage to "choke off" or maim so many "budding artists" a year, leaving only the harder survivors to flourish in spite of it; but do not let us forget that in the training of our pupils lies the key to the future of British architecture; and even for the present one does not hear many serious complaints of our poor profession being actually glutted with artists, whatever other forms of depression it may be labouring under.

It is to be hoped there may ever continue to be pupils who, by force of talent, with or without good training, will in due time win credit to themselves and their profession; but we are dealing with a matter affecting not a small minority only of exceptionally clever men, but that vast majority of average mortals like ourselves, who, whether or no, are some day to adorn or disfigure with their works our streets and suburbs and fair country-side.

It is not my object to pursue the subject further, though much might be said, of course, about a student's more advanced work and his preparation for practice. Important and interesting as these questions would be found, they must sink into insignificance beside the great initial one, of how the training of an architect should be commenced; since in this, as in many another undertaking, it is the first move,—the easiest one to make,—which may influence so tactfully all that follows.

And together with this point goes the one,—at the root of the whole matter,—whether some means or other cannot be devised for putting things a little more clearly and fairly before parents and guardians.

In pursuance of my endeavour throughout to regard this subject in as broad a light as possible, rather than in detail, I will conclude with a proposition that may now appear to many self-evident,—but, nevertheless, one, if true, whose more universal and loyal acceptance by architects in days past might perhaps, among other results, have rendered needless, not only this evening's discussion, but the very existence of the Architectural Association itself,—viz., that our whole profession, as a body, is responsible for the training of its pupils.

#### SAN VICENTE, AVILA, SPAIN.

THE restoration of the Church of San Vicente, in the picturesque old town of Avila, in Spain, is not being unnecessarily hurried on, having already been in progress for three years and a half, and, unless funds are forthcoming sooner than are expected, it is computed that the church will not be completely restored until the end of at least three years hence.

The work is under the direction and supervision of Señor Don Enrique M. Repullés, who is architect to the Ministerio del Fomento (freely rendered, Department of the Minister of Fine Arts), at Madrid; all his drawings are, however, subject to the approval of the Academy of San Fernando, also of Madrid, so that no vandalism can be perpetrated without the full cognisance of the most competent authorities of Spain.

The restoration, however, as yet completed, is extremely satisfactory, viz., the whole of the south façade, with the exception of the roofing in of the blue granite loggia, which extends from the south porch to, and slightly beyond, the west façade, the whole of the exterior of the apse with the cimborio, the porch of the north façade, and the south tower of the western façade. Before the north front a terrace, 18 ft. wide, of the same level as the west entrance, has been thrown up so as to prevent any chance of the earth falling away, and so endangering the structure.

The restoration of the magnificent west porch, recessed between the two towers, will shortly be commenced; and if the same standard is kept in this, as in the work already completed by Señor Repullés, there need be no anxiety as to a satisfactory result; especially as the Academy require a careful drawing to be submitted of the proposed rendering of any portion of the carving which is so broken or worn away as to give no tangible clue as to the original design. And this in backward Spain, while we allow a Parliamentary lawyer and newspaper controversialist to "during off-hours exhibit his powers" on one of our finest abbeys, and then, forsooth, place a coronet on his learned brow for the benefit he has rendered to his fatherland!

But, to return to Avila. Señor Repullés has submitted two proposals for the completion of the western towers,—one is for the demolition of the later date portion of the existing north tower, i.e., from the point where it becomes entirely detached, and the substitution of another story and spire of his own design, in the style of the same epoch as the rest of the façade; the alternative is to preserve the present north tower intact, and add another story to the southern tower, which shall bring both to the same height. The Academy have not yet given their decision, but, should they decide on the former proposal, the loss of the upper part of the northern tower need not be deplored, as its only beauty is the colour that the granite has acquired, and there is abundance of the same stone round Avila. The three windows now blocked up in the north front are to be opened out, and the grass-grown blue granite buttresses, which are a later addition, are to be cleared away.

Nothing is yet settled about the restoration of the interior of the church, but, fortunately, there is little that calls for the chisel of the nineteenth century.

The whole of the exterior of the church, with few exceptions, is built of the red granite so plentiful around Avila, the new stone required for the restoration being quarried from La Colilla, a small village about one mile and a half from Avila. This red granite weathers into most delightful and various tints, from bright reds and burnt sienna to deep purples, as may be seen especially in the picturesque old battlemented walls or in the Church of St. Pedro. The exterior of the apse of this church, with a bright sun shining on it and with groups of the brightly-clad and picturesque peasants leading their mules about the plaza as a foreground, would be as delightful a subject for the water-colour painter as he could well wish for.

The blue granite round Avila is, perhaps, more plentiful than the red, and, although it has not the special charm of colour, it can be quarried in extremely large blocks, and many fine effects are produced in the town by the great dimensions of these stones.

#### Illustrations.

**W**E this week illustrate various buildings by Messrs. Ernest George & Peto, the drawings of which (except those of the cottages) are now on the walls of the Royal Academy.

#### HOUSES IN CADOGAN-SQUARE, S.W.

The first of these is a large house for Mr. T. A. De la Rue in Cadogan-square.

The front is of red brick, with buff terra-cotta dressings from Messrs. Doulton & Co. The quaintly-shaped bay-window forming the porch underneath is a specially picturesque feature. The roof forms one large gable, and is covered with red tiles. The interior of this house will be finished with fine oak panelled rooms, which we hope to illustrate in a later number.

On the ground-floor is an entrance-hall with

mullioned windows down one side and a large stone fireplace carried up to the ceiling. In the front of the house, on the ground-floor, is the quaintly-shaped drawing-room, with small boudoir or music-gallery looking down into it from a higher level.

At the back of the house, and beyond the arcaded oak staircase, is placed the dining-room, and beyond the dining-room are the stable-buildings, with access from the house.

On the first-floor are a billiard-room, library, and Mr. De la Rue's own suite of rooms.

The hall has an oak-beamed ceiling, and so does the dining-room.

The billiard-room has an open-timbered roof with a lantern light.

The house will be fitted with electric light. All the kitchens and offices are lined with white tiles from floor to ceiling.

Messrs. J. Simpson & Son are the builders.

#### CHAMBERS, MOUNT-STREET, GROSVENOR-SQUARE

The range of buildings next to the Vestry hall, in Mount-street, Grosvenor-square, is a stack of very complete chambers, giving various amounts of accommodation, which are being built for Mr. W. Warner, commodious shops being arranged on the ground-floor, with a separate entrance for the chambers. These are ranged round an amply-lighted court, of white glazed brick. These chambers obtain excellent light at the back as well as the front, and great care has been taken to make every suite, however small, as convenient as possible. The style chosen for these buildings is the French Flamboyant.

Adjoining these is another stack of chambers by the same architects, for Mr. J. Andrews, containing flats of very ample dimensions, each with their own kitchen and offices, these flats in each case being on a floor higher than the respective chambers, and having their own little private staircase leading thereto in addition to the entrance from the main stairs.

The design for these chambers is Late Renaissance, the terra-cotta architraves and mouldings being ornamented with egg & tongue and other Classic enrichments.

This building is also of terra-cotta, from Messrs. Edwards; that for Mr. Warner being from Messrs. Doulton.

Messrs. Stephens & Bastow, of London & Bristol, are the builders for Mr. Warner's buildings; Mr. Andrews (of Mount-street) being his own builder.

#### "BUCHAN-HILL," SUSSEX.

These drawings illustrate some portions of the interior of this house, which Messrs. George & Peto have been building for the last three years for Mr. P. Saillard.

They show the two ends of the great hall, of the fireplace end, and the other of the gallery across the hall and opposite the fire. The gallery, like much of the rich work in this house, is of oak, very beautifully carved.

The grand staircase is also shown. It is in the tower and is arranged round an open well with a massive oak post at each corner, carrying the flight overhead.

Each step is moulded from a solid block of oak.

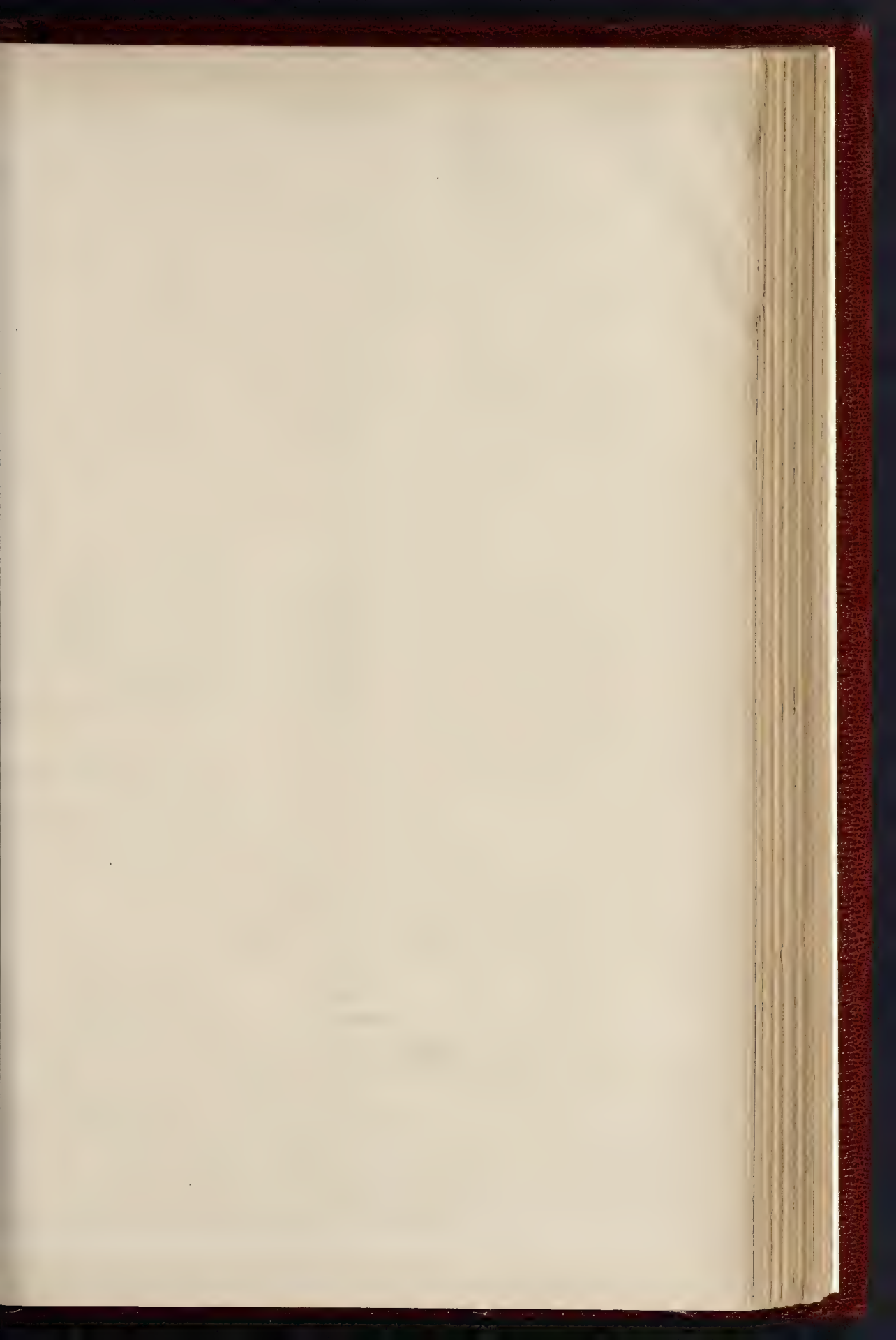
Above the panelled dado the walls are lined with stone, which is obtained on the estate.

#### COTTAGES AT LEIGH, KENT.

Our fourth sheet shows a group of cottages for Mr. Samuel Morley, which are ranged round a small open green, with a red brick path leading to the different cottages.

The gables and other portions are of oak timbered. Two of the cottages are of the local stone; some have their upper stories of oak shingle; and a portion of the work is thatched, the buildings thus forming a quaint and quiet group.

**Proposed Public Baths in St. George's, in the East.**—The Rector of St. George's, in the East, the Rev. C. H. Turner, has made an offer to the local Vestry to the effect that, on behalf of himself and friends, he is ready to erect public baths in the parish provided the Vestry will undertake the maintenance and management of the same, including the payment of the ground-rent of the land on which the baths are proposed to be erected, at which amounts to £21. 10s. per annum. The Vestry having taken the matter into consideration have decided to accept the rector's offer.







COTTAGES AT LEIGH KENT, FOR SAMUEL

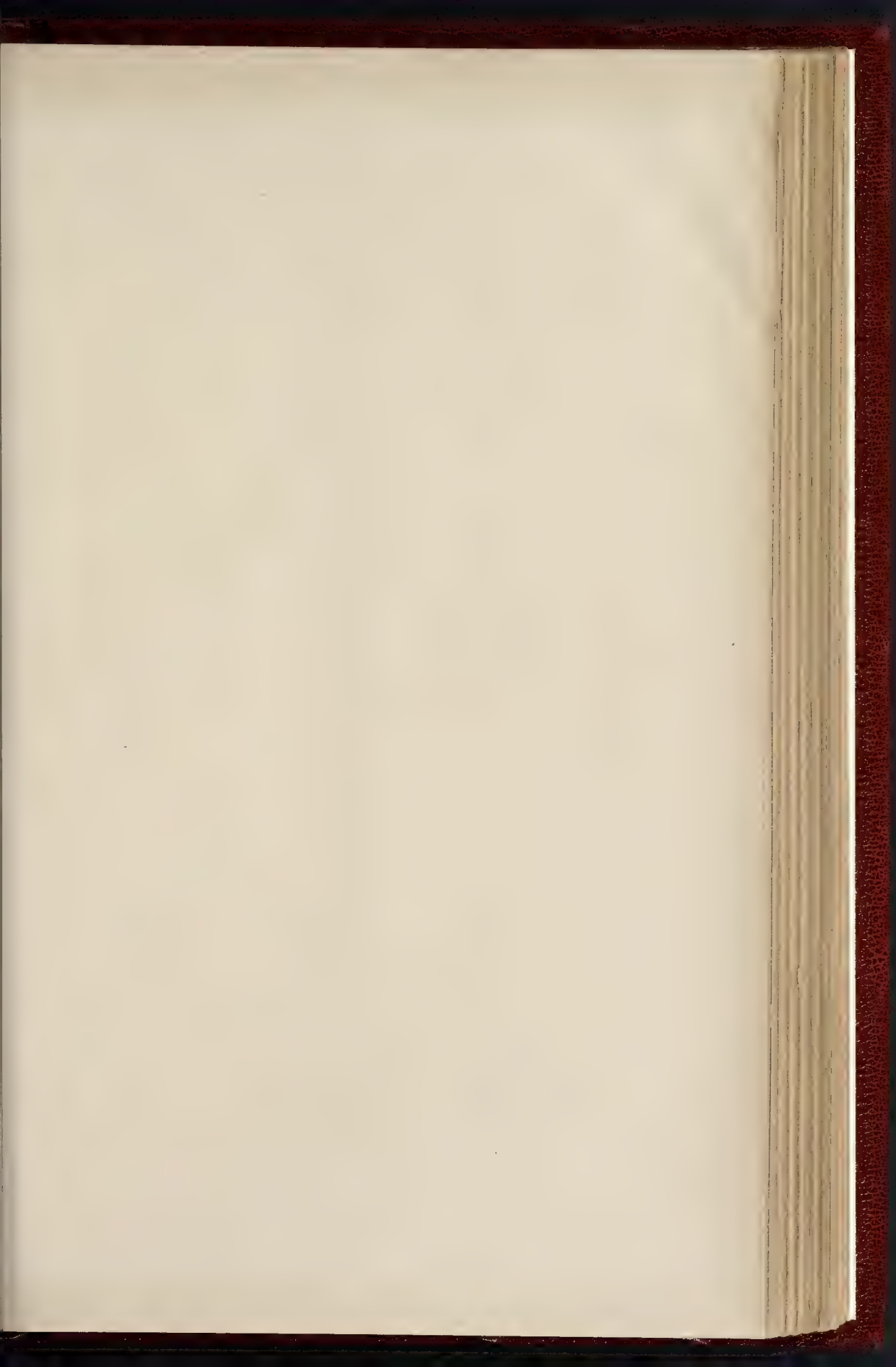


SCALE OF FEET  
0 1 2 3 4 5 6 7 8

PHOTO-LITHO SPRAGUE & CO. LONDON











GALLERY ACROSS HALL

BUCHAN HILL, SUSSEX.  
 ERECTED FOR  
 P. SAILLARD ESQ<sup>RE</sup>  
 ERNEST GEORGE & PETO, ARCH<sup>T</sup>S





INK PHOTO SPRAGUE & CO LONDON



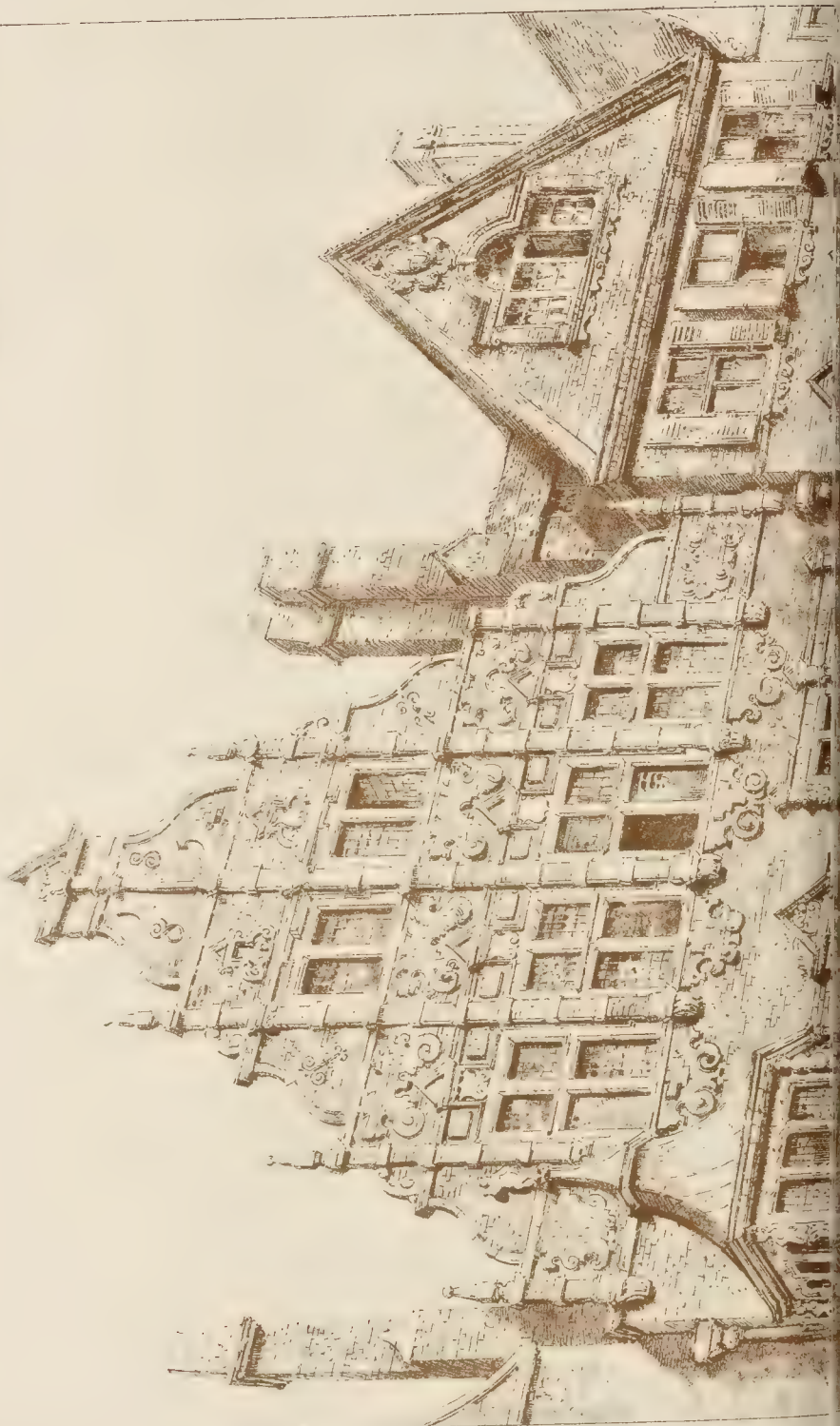






THE BUILDER, MAY 15, 1886.

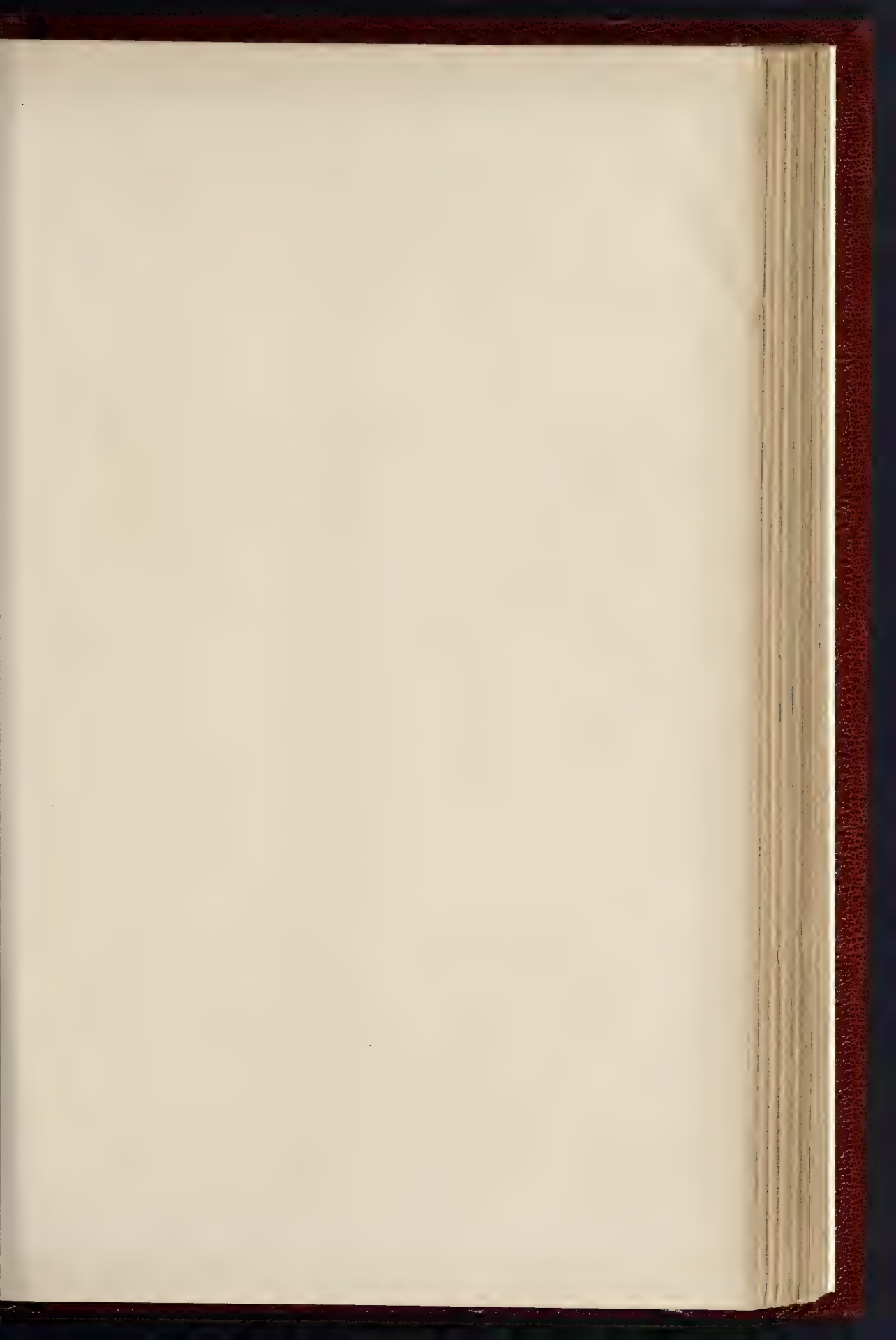
HOUSES IN CADOGAN SQUARE.  
designed by T. A. DELARUE, ESQ., & COL. THYNNE.  
ERNEST GEORGE & FETTO, ARCHTS.













Chambers & Shops Mount St. W  
for Mr Warner & Mr Andrews.  
Ernest George & Peto, Architects.











Church of St. Laurence, Catford.

#### CHURCH OF ST. LAURENCE, CATFORD.

The foundation-stone of this church is to be laid to-day by the Viscountess Lewisham. The church is founded under the auspices of the Catford Church Extension Association, the object of which is to provide additional church accommodation for the parish of St. Mary, now numbering a population of 15,000, by building churches at Catford, Hither Green, and St.oley.

The Catford Church, of which a sketch is enclosed, is designed by Mr. H. Rounie, architect. For the present requirements of the parish it has been considered sufficient to erect a nave and aisles, a portion of the transepts, and a temporary chancel, providing accommodation for 600 persons, at a cost of about 3,500l. The church has been given by Major Foster.

#### THE "SHIPPERIES" EXHIBITION, LIVERPOOL.

The International Exhibition, which was opened by the Queen on Tuesday, the 11th inst., is probably on the largest scale that has ever been attempted in a provincial city.

The building itself, as is well known, is the former building which was formerly used for a like purpose at Antwerp, and it has been re-erected on the present site under the superintendence of Mr. J. W. Sturges, architect, of Liverpool.

The building is built on land on the south side of Edge Lane, and in close proximity to Edge-hill Station, which a new road has been opened for the convenience of visitors.

The Exhibition building itself occupies twelve acres, and the grounds around it, which have been laid out and planted with considerable numbers of trees in all about forty-two acres in extent.

The interior consists of a vestibule and main hall, running from west to east, and intersected at right angles by other wings and aisles.

There is a central cupola or dome, at the intersections, rising to a considerable height; and under these is placed a very conspicuous "trophy" of Donlon's manufacture, of which we shall have more to say hereafter.

There is also another large "trophy" of Liverpool exports and imports at the further end of the building, beyond which there is a large concert-

room which terminates the building eastwardly.

The general decoration of the interior is pleasing. The walls are stone colour, relieved by attached columns at intervals. The iron-work of the roof is a pale blue, while below the sky-lights are ornamental panels with figures and geometric devices. The principal colours of these are grey and brown, picked out with gilt, the whole being relieved by crimson draperies. The vista from end to end of the main avenue is very effective.

Little attempt is made at external ornament, and what there is is confined to the principal entrance.

On entering the grounds from the north end the first object that attracts attention is an exact facsimile of the Eddystone Lighthouse, and from this the electric light is intended to be exhibited.

The immediate objects of the promoters (to use the words of the Mayor's address to the Queen) are "to illustrate the art and science of navigation in ancient and modern times, the means by which the achievements of modern science are abridging the distances between the nations of the world, and the beneficial results which have followed therefrom, viz., the extension of commerce and commercial industry, the development of trade and manufacture, &c."

The Exhibition is at present in a very unfinished state, and in a note to the first edition of the Catalogue, the Executive Council say, "that in consequence of the many alterations necessitated by the official opening being performed by Her Majesty in person, and the number of season-ticket holders requiring to be accommodated, it had been found absolutely necessary to defer the installation of a great number of important exhibits until afterwards."

These exhibits were on Wednesday being busily brought in; and we hope to return to the subject next week, when we shall be able to give a tolerably full description of the Exhibition.

**Society of Arts.**—The loan collection of Japanese art at the Society of Arts, John-street, Adelphi, will remain open during the ensuing week. Admission by presentation of visiting card. A classified catalogue by Mr. Hayashi has been printed, which is of unique value for the study of the periods of Japanese art.

#### ARCHITECTURAL SOCIETIES.

**The Architectural Association.**—A visit was made by this Association last Saturday afternoon to the National Liberal Club, now being built at the bottom of Northumberland-avenue from the designs of Mr. A. Waterhouse, R.A. The building (of which we published views and plans a year ago) has been carried up to the level of the second floor. The general arrangement of the plan is as follows:—On the basement floor are the smoking-room, storage space for members, and men-servants' dining-room and bedrooms. On the lower ground-floor are the billiard-rooms, seven in all; card-room, dressing and bath rooms, conference-room, and entrance to the club, and public entrance to the Gladstone library and chambers. On the upper ground-floor the grill-room, dining-room, serving-room, and Gladstone library,—the dining-room communicating with the terrace over the billiard-rooms. On the first floor the reading and smoking rooms, drawing-room, private dining-room, and committee-room, and secretary's office. The second, third, and fourth floors are devoted to chambers,—the kitchen being also on the fourth floor. The foundations, which are on an average 25 ft. below the surface of the ground, are on a bed of gravel. The whole of the stonework is brown Portland, and all the bricks are gault, which have been tested to a pressure of 48 tons. The floors are all fire-proof, of steel decking and concrete; and all the lintels and fixing-blocks are of breeze concrete.

**Exeter Diocesan Architectural Society.**—The quarterly meeting of this Society was held on Thursday, May 6th, in the hall of the Vicar's College. The Ven. Archdeacon Earle was in the chair. The report, read by the Rev. E. V. Freeman (secretary), dwelt principally on the recent decease of Lieut.-Col. Harding, of Upcott House, Barnstaple, at a very advanced age. Allusion was made to the various papers contributed by Col. Harding from time to time to the Society's Transactions during his Secretaryship from 1851 to 1865. These papers, which were enumerated, were chiefly upon old churches and their monumental effigies, chapels difficult to find, and matters of antiquarian interest in the diocese. Mr. Ashworth, architect, then read a paper illustrated by many



plans and drawings of portions of Exeter Cathedral not generally known. It chiefly described two opposite chapels in the choir aisles, St. Andrew's and St. James's, of good decorated work, each having an archway chamber over its vaulting, also vaulted, and floored with encaustic tile work of the fourteenth century. Under the latter chapel is an interesting crypt of Early English character, scarcely accessible before the improvements carried out some years since under Sir G. G. Scott. The ancient Chapter-house was described, erected on a portion of Bishop Bruere's garden, given about 1230, the lower portion good Early English, and the upper Perpendicular, with a highly decorated roof, dating in Bishop Lacey's episcopate 1430-40. The absence of an effigy or memorial of Leofricus, the first Exonian bishop, was remarked, with the supposition that a monument of pyramidal form in St. James's Chapel, enclosing a cinquefoiled arch, must have been to his memory. Grandison's work in the nave from 1327 to 1369 was described, and his place of sepulture, a small chapel within the western screen, of sixty-five niched statues of apostles, prophets, English kings, crusaders, &c. In concluding the proceedings, the Archdeacon observed that it would be well if greater facilities were given for visitors to view the cathedral by abolishing the fee of 6d. for seeing certain portions, also that it would be an excellent thing if arrangements could be made by which eminent authorities might give lectures (in the north transept) on the history of the cathedral, which really meant the history of the church,—that such lectures would be much appreciated, especially by working men, and that much good would result from them.

*Edinburgh Architectural Association.*—On Saturday last the members of the Edinburgh Architectural Association visited Kirkton and Burntisland parish churches, and also Rosend Castle, under the leadership of Mr. Hippolyte J. Blanc, architect. After giving some historic notes of the ancient burgh from the Roman Invasion under Agricola, who encamped on Duncarn Hill, down to recent times, Mr. Blanc described the features of the parish church, which is recorded to have been built in 1592. It is of rectangular outline, and bears a strong resemblance to the North Kirk at Amsterdam, at that time the chief mercantile city in Europe. Within the edifice are four massive pillars connected by semicircular arches. The walls resting on these are solid to the roof, and, rising above it, terminate in an octagonal tower. There are arches of masonry between the external angles of the tower and the inner angles of the exterior walls, intended as buttresses. An outside stair gives access to one part of the gallery, probably for private use; the wainscot panelling contains some interesting specimens of decorative emblems suggestive of ship's cabin design, dated 1608. The church was erected by the inhabitants, not by the heritors. The party then visited Kirkton, about half a mile to the westward, where are the ruins of the pre-Reformation Parish Church, which consisted of a nave and chancel. They then passed to Rosend Castle, in the neighbourhood, built by the Durio family in 1382, Abbots of Dunfermline. Its form is that of the old Scotch peel. It is now occupied by Mr. Shepherd, and is well cared for.

*Leeds and Yorkshire Architectural Society.*—The members of the Associates' Sketching and Art Club held their first meeting for this session in the Society's Rooms, Albion-street, on Monday evening, when a series of drawings and sketches produced by the members during the last month were on exhibition, the most interesting works being "Sketches from Lincoln," Mr. J. W. Twist; "Old Oak Chest," Mr. H. P. Buckley; "St. Michael's Church, Coxwold," Mr. Frank Haigh; "Riddlesden Hall," Mr. Alfred Whitehead; and "Wall Arcading, Lincoln," Mr. F. W. Bedford. The evening was spent in criticising the sketches and transacting the business of the Club.

*The Old Workhouse at Lambeth.*—The Lambeth Guardians, at their meeting on Wednesday, adopted plans submitted by their architect, Mr. T. W. Aldwinckle, for reconstructing and partially rebuilding the old workhouse in Prince's-road, and adapting the same as a test house for the able-bodied poor of both sexes, at a cost of 16,000l.

#### ARCHITECTURAL ASSOCIATION: ITALIAN EXCURSION.

We have received the following further notes: "Before leaving Rome the party on Thursday visited the Forum, the Colosseum, the Arches of Titus and Constantine, the Nymphaeum of Marcus Aurelius, the Church of St. Stefano Rotondo, the Basilica of Constantine, and St. Pietro in Vincoli.

Friday morning was spent in the Vatican, and in the afternoon St. Peter's, St. Maria in Trastevere, the theatre of Marcellus, the temples of Hercules and Fortuna Virilis, the House of Rienz, St. Maria in Cosmedin, the Arch of Janus, and the Arch of the Goldsmiths were seen. On Saturday morning the Museum on the Capitoline Hill and in the Tabularium, and the Mamertine prison; and in the afternoon the Baths of Caracalla, the Arch of Drusus, the Porta Appia, the Circus of Maxentius, and the tomb of Cecilia Metella were visited. On Monday the following buildings were visited, viz., St. Maria degli Angeli, St. Maria Maggiore, the Porta Maggiore, the tomb of the baker Euryaces, St. Croce, and St. John Lateran; and in the afternoon we left Rome for Pisa, which was reached at 10 p.m. on Tuesday morning. The cathedral tower, Baptistery, Campo Santo were visited, and the train taken for Lugano; and on Wednesday for London, where we arrived at 5.30 p.m. on Thursday.

The excursion of twenty-one days was carried out on the following time-table, and proved to be a great success. The estimated cost of 25l. was found to be fairly correct. Several of the members of the excursion started on Monday, the 12th of April, and included Venice and Verona in their programme.

#### Time Table of Architectural Association Italian Excursion.

April, Friday, 16.—Left London, Charing-cross, 10.35 a.m.  
Saturday, 17.—Arrived at Milan, 7.40 p.m.  
Sunday, 18.—Milan.  
Monday, 19.—Left Milan, 9.40 p.m., arrived at Piacenza.  
Tuesday, 20.—Left Piacenza, 9.6 a.m.; arrived at Bologna, 1.40 p.m.  
Wednesday, 21.—Left Bologna, 2.20 p.m.; arrived at Florence, 8.1 p.m.  
Thursday, 22.—Florence.  
Friday, 23.—Florence.  
Saturday, 24.—Florence.  
Sunday, 25.—Florence.  
Monday, 26.—Left Florence, 6.55 a.m.; arrived at Siena, 9 a.m.  
Tuesday, 27.—Left Siena, 9 a.m.; arrived at Orvieto, 1.25 p.m.  
Wednesday, 28.—Left Orvieto, 3.38 a.m.; arrived at Rome, 6.20 a.m.  
Thursday, 29.—Rome.  
Friday, 30.—Rome.  
May, Saturday, 1.—Rome.  
Sunday, 2.—Rome.  
Monday, 3.—Left Rome, 3.40 p.m.; arrived at Pisa, 10.30 p.m.  
Tuesday, 4.—Left Pisa, 9.14 a.m.; arrived at Lugano, 10 p.m.  
Wednesday, 5.—Left Lugano, 9.44 a.m.  
Thursday, 6.—Arrived in London, 5.31 p.m."

It may be said that it was hardly worth while to see a number of great monuments in such a hurry, and of course real study of them was out of the question. But we sympathise with it as a spirited effort for which much credit is due to Mr. Blashill, who originated the idea and conducted the party; and it is better to see the real thing with your own eyes, if only for a few minutes, than not to see it except in books.

#### ARCHITECTURAL ASSOCIATION.

The thirteenth ordinary meeting of this Association for the present Session was held on the 7th inst. at 9, Conduit-street, Mr. C. R. Pink (President) in the chair.

Messrs. J. C. Anderson and S. C. Arding were admitted as members.

Mr. H. D. Appleton (hon. secretary) read the House List nominating the officers for next session, Mr. J. A. Gotch being put down as President; and Messrs. J. Slater, E. J. May, and Henry Lovegrove as Vice-Presidents.

A vote of thanks was accorded to Mr. R. W. Edis for permitting the members to visit the Constitutional Club, Northumberland Avenue, and for kindly conducting them over the building.

The Chairman referred to the Examination in Architecture commencing on the 22nd of November next. This had been arranged to enable many who had been preparing to have another chance of qualifying this year for the Associateship of the Institute. Papers and rules could be had on application to the secretary of the Institute. It would be

observed that the questions set at the last examination had been published in these papers, which they would all agree was a very necessary and welcome improvement. (This announcement was received with applause.)

Mr. Appleton, at the request of the Chairman, made a few remarks on the Italian excursion of the Association, which started on the 16th of April, and consisted of twenty-four members. The whole of the programme had been carried out without the slightest hitch, Milan, Bologna, Florence, Siena, Orvieto, and Rome having been visited. Although it was impossible to "do" these cities thoroughly, still they had seen enough to make them wish to return again next year.

Mr. W. J. N. Millard then read a paper entitled "Some Thoughts on Architectural Training," which we print on another page.

The Chairman, in opening the discussion, referred to the fact that the Committee of the Institute appointed to consider the question of architectural education was doing its work with great earnestness, and he hoped it might bring about the publication of the text-book they had been so long looking for. There was no doubt that the student required some direction much better and more definite than he at present possessed, to indicate what would be required in the practice of his profession. Anything that could be devised which would inform parents and guardians as to the nature of the profession would also be of the greatest possible value, as many boys entered it knowing nothing of what would be required of them. Some preliminary training was very essential, and without going into details, it should include the grammar of art-expression, which could be gained at an art school, besides a knowledge of mechanics and of applied mathematics generally, without which artistic knowledge would not be of any great practical advantage. When fairly launched as a pupil, he should be encouraged by his principal to make use of his eyes, and observe what was going on both inside and outside the office.

Many years since the Institute published a suggestive pamphlet, entitled, "How to Observe." He did not think it was of much practical use now, but at the time it directed the student, when on the building, what he should look for; therefore, some such guide might be devised which would be valuable to the boy on his first entering the office. There he should see "how it was done" from inception to conclusion, as this was the only way in which he could obtain intelligent knowledge. He would like to enter a strong protest against giving the pupil office-work merely to kill time; it would be better rather to send the lad to study some building. The architectural examination, as it was and would be further developed, might be regarded as the true diploma of the profession. The supposition that the profession would ever be made a close one by statutory powers was a mere chimera; he did not think the thing was possible, and he was not sure, in the true interests of art, that it was to be desired. But it was advisable that the architect should be able to show a direct certificate of competency; therefore let science go with art, for in architecture it was impossible to divorce the two. He was not sure that there were not more "artistic" architects than really scientific ones at the present time, and unless science and art were studied together there could be no possible progress in the future for the architecture of this country.

Mr. Cole A. Adams proposed a vote of thanks to Mr. Millard, who he thought took a rather too despondent view of the whole question of architectural education. The advantages enjoyed by students in the present day, were largely in comparison with those enjoyed not so very many years ago, though, no doubt, capable of improvement, and he had always urged the importance of this. This improvement was the more necessary because while the standard of education had advanced in the other professions that of architecture was the only one which seemed to have held back. The Architectural Association was doing good work, but there was a demand for something higher, and the question of how it was to be met was an exceedingly difficult one to answer, owing to want of funds. Last session the matter was brought before the members of the Association, and a proposal made to raise the subscription, but this was not voted. Thus, the sinews of war were cut off, though he believed the Association would some day see how essential it was to supply



them, and another effort would have to be made, if they wished for higher education. Doubtless the Institute would have voted funds for the endowment of "Chairs" had they possessed the means, but the figures of its balance-sheet did not give much hope of any assistance from that quarter. Parents and guardians who wished to put youths into an architect's office would surely make some inquiries before doing so, and therefore he failed to see that any pamphlet would have much chance of reaching them; still, such a work as Mr. Millard advocated would have its use. All would agree that the artistic was the higher side of the profession of architecture, but he concurred with the Chairman as to the great importance of studying the scientific side. If our present system was so thoroughly bad, how was it that his country had turned out such excellent work during the last fifty years? Many of the fine designs which were published in the professional journals were a source of wonder to our Continental brethren. The drudgery of the office was not at all a bad thing for the pupil, and had its use; if he had good stuff in him he could hardly fail to rise in his profession if he seized and made use of his advantages.

Mr. W. H. Atkin Berry, in seconding the vote of thanks, thought that Mr. Millard's remarks would be useful to many a parent and guardian who were asking the well-worn question,—"What shall I do with my boy?" Mr. Millard carefully weighed the relative importance of art and science in making a start, and had indicated art as the more important. But it was not always a matter of choice with the pupil as to which he should adopt. Before taking out his course of training, the pupil would ask himself two questions,—1st, Why he as an architect? 2nd, What were the duties of an architect? If a man were an architect from a sheer love of his art, he would doubtless follow art first; but if he had to follow the common-place pursuit of making his living, he would be careful before disregarding the science of his profession. Now-a-days there seemed to be no profession which was not included in that architecture,—a knowledge of law, science, and "business" being necessary for the protection of the client. A knowledge of science was not more capable of being adequately tested than an accomplishment in art; the first, therefore, should form the principal basis of test for diploma. He would like to know where the scientific knowledge of some of the profession could be, if the practical man behind the scenes are withdrawn?

Mr. Leonard Stokes did not understand that Mr. Millard had pooh-poohed the scientific side of the question. He had merely said that the artistic part should be taught first, for if a man first taught his art the scientific part would work in his hand-in-hand. All pupils should attend an art school before entering the office, and as to the troubles of parents and guardians they were much the same in connexion with other professions. Then, again, it was an impossibility to teach everything in three or five years, when men who had been twenty years in a profession felt they had still much to learn. The question was, how much could be taught, and the architect should, therefore, give his pupils as much attention as he possibly could. Though many architects were to blame for the manner in which they treated their pupils, yet many pupils were more to blame for the way in which they treated themselves.

Mr. Sydney Vacher would like to see the statute lay it down as a law that the masters who took pupils should do so with the idea of teaching them something for their money. If this course had been pursued, there would have been no necessity for such a paper they had heard that evening.

Mr. Brodie believed that the proper place for a pupil was in an office rather than in a school, and the practical side of the question would be so thoroughly intertwined with the artistic that they could not be divided. At the same time, the pupil should have some knowledge of drawing before he entered an architect's office.

Mr. Appleton thought that Mr. Millard's idea of contention in regard to art-training was that the pupil, if he wished to learn, must be able to express his ideas with the pencil. It was one canon of taste in regard to art, and that was appropriateness. Indeed, an architect must have a certain amount of scientific knowledge to make a design appropriate.

Mr. J. F. Curwen said he wished they had preparatory examinations, as in the Law. The vote of thanks was then put and carried, and Mr. Millard having made a few remarks the proceedings terminated.

#### COMPETITIONS.

*Proposed Municipal Buildings, Sunderland.*—At a special meeting of the Sunderland Town Council, held last week, a report was received from the Corporation Buildings Committee as to the award of prizes for competitive plans in connexion with the proposed new municipal buildings. The Mayor (Alderman Preston) occupied the chair, and there was a large attendance of members. The Town Clerk (Mr. Bowey) read the report to the committee from Mr. Alfred Waterhouse, R.A., who had been appointed to advise as to the merits of the plans, and who stated that he had gone through the designs submitted by the twenty-three competitors, and had carefully examined them, both as regarded their compliance with the conditions laid down and their merits of arrangement and design. He was of opinion that the plan sent in under the motto "Stabilitas" was the best. It complied with the conditions, and was in every way deserving of the first premium, it being of unusual merit and showing great care and skill in design. The second premium he awarded to the plan bearing the motto "Nineteenth Century," and the third to "Time and Tide." Taking into consideration the lowness of prices at the present time, he thought that all the above-mentioned designs could be executed for the sum named by the architects. The Corporation Buildings Committee accordingly recommended that the premiums be awarded as follows:—First prize, 100*l.*; second prize, 75*l.*; and third prize, 50*l.*—On the motion of the Mayor, the report was adopted by 33 against 2.—The sealed envelopes being opened, the respective competitors were found to be as follows:—"Stabilitas," Mr. Brightwen Binyon, Ipswich; "Nineteenth Century," Messrs. Grayson & Ould, Liverpool; "Time and Tide," Messrs. Doubleday & Caws, Wolverhampton.

#### THE CHURCH OF ST. BARTHOLOMEW THE GREAT.

SIR,—In your able notice of the restoration of the ancient church of St. Bartholomew the Great, you make an appeal to the City companies to aid in the carrying out of this important work; nor do I doubt that the appeal will be generously responded to. There is, however, an important profession to whom an appeal should also be made. To the founder of this noble church the medical profession are indebted for the foundation of St. Bartholomew's Hospital; to the energy and piety of Rahere the two buildings owe their existence. There is no church in London which would probably be so interesting to the members of this great profession, and I doubt not they would come forward liberally to aid the fund for its restoration. Belham, May 12th. W. H. S.

#### BREWERY CHIMNEY SHAFT.

SIR,—Replying to some of the questions of your correspondent "J. H. G." [p. 694, ante], I consider that no good, but rather harm, results from using Portland cement in occasional courses of the brickwork, as it expands differently under the influence of heat to lime cements. Exhaust steam does no harm to the brickwork of the shaft, but the condensed water which falls down will, in time, soften the foundations unless special provision is made to carry it off.

I know one or two instances of chimney-shafts standing for some years slightly out of the perpendicular.

I consider mortar the better of the two for chimney-shafts. Portland cement seems to crack so readily under heat.

The flues from the boilers and coppers in a brewery should be so arranged that the heat is absorbed in doing useful work,—producing steam and boiling the wort,—so that what remains enters the chimney at a moderate temperature. Neglect of this will crack your chimney, besides being a great waste.

G. R. WILSON  
(Brewers' Engineer).

SIR,—With reference to "J. H. G.'s" questions on the construction of a brewery shaft, I consider the only courses in cement should be at each "offset" in the shaft where the brickwork is reduced

in thickness, and should be about four courses above and three courses below the offset, making seven courses in cement. I have not heard of shafts being constructed entirely of concrete. I should consider it a risky experiment to try. Brickwork in lime mortar is about the best construction. There is an elasticity in lime mortar that is an advantage over cement mortar, for such work as this. It is not advisable to discharge much steam into a shaft, because it tends to keep the brickwork damp, ruins the mortar joints, and there is likely to be trouble in keeping the flue clean. W. J. S.

#### SKYLIGHTS GLAZED WITH PLATE-GLASS.

SIR,—In your issue of the 8th inst. (p. 696), you say, re "a warehouse roof in Fore-street" that the skylights are glazed with polished plate-glass in sheets 10 ft. long, and add that you have been informed that sheets of polished plate of such a size have never been fitted up in a roof before. I have frequently glazed in sheets of this length. T. W. HELLIWELL.

#### The Student's Column.

##### OUR BUILDING STONES.—X.

ON THE ORIGIN AND STRUCTURE OF THE STONES.

To properly understand the structure of rocks, which, as we have pointed out, is a very important element in considering their eligibility for building purposes, it is desirable that we should know something of their origin.

The principal rocks used in building have been formed (1) by the cooling of masses which were once in a molten condition; (2) they may have been gradually laid down as sediment in water; or (3) by the petrification of organic remains on a large scale.

The rules which apply to the selection of building stones formed in the manner firstly described, will be quite different from those made in the second and third manners, and we ought, therefore, to be able to distinguish at once the stones belonging to either group. We will first consider

##### Granite.

This rock has been formed at great depths within the earth's crust, and the reason why it is now found at the surface is because the rocks which once overlaid it have been removed by denudation. It seems at first sight almost incredible that so many thousands of feet of strata could have been worn away by the action of rain, frost, and other atmospheric agents, but that such is the case has been proved beyond the shadow of a doubt. Nature works slowly but surely. From an examination of ancient volcanoes in various stages of denudation, it is found that the rock which flows out at the surface as a lava, when traced downwards, generally becomes more and more thoroughly crystalline in character as it approaches its reservoir. If we examine a lava we shall find that it is by no means crystalline. Minute crystals may be seen enveloped in a matrix, and crystals which it detached from the sides of the "neck" of the volcano on its way up may be found in the lava, but its structure is more like that of glass, with various impurities in it, than that of a crystalline rock. The reason why lavas are not crystalline rocks is simply because they have cooled at the surface of the earth, and so, under very little pressure. If the same materials had consolidated at greater depths within the crust of the earth the superincumbent rocks would have exerted a much greater pressure upon them, and they would consequently have become more crystalline. This condition of things would go on until the materials, being very deep-seated, would, on solidifying, form a thoroughly crystalline rock, i.e., one having no glassy matrix whatever. Granite is a good example of such a rock, and thus we see how it is that, having once been in a molten condition, it contains no fossils or organic remains.

The following illustration is a microscopic section of a typical granite, magnified about twenty-five diameters.

The white portions marked *a* are quartz, with fluid cavities and inclusions dotted over it. It will be observed that the dots sometimes occur in lines. The turbid-looking mineral *b*, irregularly striped, with lines running across it, is felspar. The mica, *c*, is finely striated, presenting a ragged appearance. Parts of it,



especially near the edges of the mineral, are very frequently seen as dark, almost opaque, patches. Any one looking at this section will see at once that in their endeavours to crystallise out, the different minerals have become



interlocked with each other in such a manner as to present very irregular outlines, and they have crystallised so closely together, as to leave no room whatever for a matrix to form. The quartz is often seen wrapping round the other minerals.

Seeing that the intensity and amount of heat and pressure, rather than chemical composition, so much influence the state of crystallisation of the minerals of rocks which were once in a molten state, we must not wonder that there is such an intimate connexion between the chemical composition of a rock that is crystalline and one that is non-crystalline. For instance, there are numerous examples of granitic rocks having precisely the same composition as lavas in their immediate vicinity. We need hardly remark that such lavas are not, as a rule, by any means so durable as their crystalline representatives, another instance in which *structure* greatly conduces to the durability of a stone. Lavas are only used locally as building materials in this country, but at several places on the Continent they are very extensively employed.

From what has been said, it appears that granite is the consolidated reservoir of a volcano; but all such reservoirs are not granites; some of them are syenites, gabbros, &c.,—equally crystalline rocks. Neither is it absolutely necessary that a volcano should be involved in the construction of granite. The fact that the molten mass is of the necessary composition, and that it cooled under sufficient pressure, is quite enough for the purpose. It may not have had any vent to the surface at all.

The depth at which granite may form depends on a variety of circumstances. It would only be when a considerable proportion of the pressure (which kept the mass in a liquid condition) had been removed that it would solidify, and as this removal would be very slowly effected, it follows that it would cool with extreme slowness.

We know that the general directions along which mountain ranges run are lines of weakness in the earth's crust, and that the ranges themselves have been formed by tremendous lateral pressure. We will not now inquire into the causes of this pressure, but at once state that, under these circumstances, the conditions for the formation of granite are present.

Strata which were originally laid down in water have often been squeezed to such an enormous extent in the elevation and formation of mountain ranges, that they have been unable to withstand the pressure and consequent heat; so they have been melted up, and on re-consolidation formed granite. Subsequent dissection of the mountains in various stages, by atmospheric agents, shows us this, and also the innumerable veins springing from the granitic mass, filling cracks in the surrounding rock.

As might be expected, the rocks through which such veins run present an altered and baked appearance, and the compressing forces have frequently been so great that thousands of feet of strata have been twisted, contorted, and inverted like so many sheets of paper crumpled up.

Since the overlying rocks have been denuded and the granite brought nearer the surface of the earth, the cracks and interstices which existed in them have often been filled with secondary quartz, calcite, and other minerals.

The variations in colour presented by different granites are due, to a great extent,

to the predominating tint of the felspar. Some Aberdeen granites are of a bluish colour when seen from a little distance. This, in the majority of cases, is due to the presence of dark mica in minute flakes showing up against the clear quartz. When iron is present, felspar would be different tints of red, occasionally approaching a dull yellow colour.

The large flesh-red felspar crystals seen in the granites of Galway and Shap Fell are shown so prominently that these stones are appropriately called porphyritic granites.

#### Syenite.

Respecting the rock known as syenite, we have only a few words to say. According to the majority of British authorities, its essential minerals are quartz, felspar, and hornblende. The rock, both in origin and crystalline structure, has many of the characters of granite. Indeed, it is not easy to draw the line in some cases between the two. Much of the stone largely quarried for architectural purposes at Mount Sorel, in Leicestershire, and known as syenite, contains a considerable proportion of mica in addition to the above-mentioned minerals, and would, therefore, be more correctly called hornblende granite. We get syenite from Guernsey and Jersey, but as it is mostly used for road metal and similar purposes, it does not concern us at present.

#### Porphyry.

The rocks included under this heading vary greatly in chemical composition, colour, &c., because, as we have before stated (p. 459), it is from their physical characters that they are so-called. Quartz porphyry and its ally, elvan, are used principally as ornamental stones. They are also in some measure used in building, especially locally. In mineral composition they consist of a felsitic ground mass, in which orthoclase felspar and quartz are porphyritically developed.

The following remarks by (Sir) H. T. de la Beche are of interest:—"For durable stone the harder elvans of Devon and Cornwall, particularly when of good cream and other light colours, may be considered the best building materials (in those counties). . . . Occasionally the felspar crystals may have been decomposed and have been washed out, but the siliceo-felspathic base has remained firm, thus preserving the sharp character of the work. . . . When, however, in an incipient state of decomposition, and then too frequently prized by the mason for his work, they cannot be trusted for durability, though they often have a good appearance. They would sometimes be mistaken for fine light-coloured sandstones."

The origin of elvan is very similar to that of granite, being, in fact, mainly offshoots or veins from that rock.

Porphyries are principally used for caseway stones and road metal, and, as a rule cannot be raised in large blocks from the quarry.

#### Slate.

When strata originally made of clay have undergone great pressure, but not quite enough to cause them to melt, we get the conditions necessary for the formation of slate; for that useful roofing material is simply clay in another form. Pressure has caused a molecular rearrangement of the particles which composed the clay. A microscopic examination would show that the longer axes of these particles have assumed a position at right angles to the direction of the pressure. Thus a fissility was produced in the mass, the fineness of which, for the most part, depended on the purity and structure of the argillaceous deposit. For instance, if the clay when originally deposited was not intermixed with many impurities, such as sand, pebbles, &c., it would assume a more minute "cleavage" character, as it became highly compressed, than when those impurities were present. Consequently we find in slate quarries that beds of sand which were mingled with the clay have not taken on a "slaty cleavage," whilst all the surrounding clays, free from such impurities, have.

Large cubical yellow crystals of iron pyrites are sometimes found in slates. If marcasite is present in the pyrites, they may decay, leaving holes in the slate; if, however, this mineral is absent, the pyrites yield very slowly to weathering, and some Scottish slates may be seen which

have been exposed to the atmosphere for centuries with the pyrites still sticking up from them, as fresh as on the day they were built up. Slates for roofing should be compact, and absorb but little water.

#### VARIORUM.

VISITORS to the International Exhibition of Industry, Science, and Art, now open at Edinburgh, will, as a matter of course, purchase the Official Catalogue, a copy of which has been sent to us. It is a well-printed and clearly-arranged guide to the contents of that interesting display. So far as we have been able to test it we find it freer from errors than is usually the case with such compilations. Quite as necessary as the "Official Catalogue" to all visitors who wish to bring away with them an agreeable souvenir of the Old Edinburgh Street (which has been designed by Mr. Sydney Mitchell, architect, and is a worthy rival of the "Old London" at Kensington) will be found "The Book of Old Edinburgh," by Messrs. John Charles Dunlop and Alison Hay Dunlop, containing seventy-eight illustrations, drawn by Mr. William Hole, A.R.S.A. The book, which is published under the auspices of the "Old Edinburgh Committee," contains sketches and pleasantly-written archaeological notes of all the buildings represented in the street, and many picturesque and humorous sketches, accompanied by amusing anecdotes, besides. In typography, paper, and general get-up it is a marvel of cheapness, being obtainable at the same price as the Official Catalogue, viz., one shilling. Both these indispensable handbooks are printed within the Exhibition by Messrs. T. & A. Constable.

—Two or three books of reference which came to hand recently deserve mention. "Whitaker's Almanack" (London: J. Whitaker; Warwick-lane) in its latest edition, with supplement, contains a fund of information, carefully collated, arranged, and indexed, on a great variety of matters, and its value and usefulness are so well known that we need not say more about it here.—"The Electrician's Directory and Handbook for 1886" (London: Electrician's Office, Salisbury-court, Fleet-street), is exactly what its name states it to be. The information which it gives is very complete and varied, and an interesting part of the work is the biographical section, in which are given short biographies (in some cases accompanied by portraits) of most of the leading electricians and electrical engineers of the day.—"Sells' Dictionary of the World's Press for 1886" (London: H. Sells, 168, Fleet-street), contains a variety of interesting information concerning the history and development of the Press, and it exhibits some commendable improvements in arrangement as compared with last year's edition,—improvements which make it much more convenient for reference. It is a very useful volume for the office or library. —Handbooks of a kindred character to the foregoing, are "Successful Advertising" (published by Mr. Thomas Smith, of the Mutual Advertising Agency, 132, Fleet-street) and the "Advertiser's Guardian," issued by Mr. Louis Collins, of Wine Office-court, Fleet-street. Both of these hand-books contain some entertaining reading. —From the *Buxton Advertiser's Office* we have received a well-got-up and useful illustrated supplement forming a guide to that pleasant Derbyshire watering-place.—"The Life and Teachings of Joseph Livesey," comprising his autobiography, with an introductory review of his labours by John Pearce (London: National Temperance League, Depot, 337, Strand), contains some interesting particulars of the life of a well-known social reformer. The late Joseph Livesey was one of the "Seven Men of Preston" who initiated what is known as the Temperance movement, but he was by no means "a man of one idea." On the contrary, he was possessed of broad sympathies, and more than fifty years ago, in periodical publication he edited (the "Moral Reformer"), he called attention to the wretched way in which the poor were "housed" in Liverpool and other towns. He exposed the exactions of the house-farmer and middleman, and asked the question "Shall the bitter cry 'woe never ceases'?" So that some of the gentlemen who raised the "bitter cry" a year or two ago at the East End of London were anticipated even in the title which they gave to their agitation. Mr. Pearce has done his part of the work well, and the volume will

\* Rep. on Geol. of Cornwall, Devon, and W. Somerset (1839).







FRIDAY, MAY 21.

*Architectural Association.*—Mr. R. L. Cox on "Books." 7.30 p.m.  
*University College.*—Professor C. T. Newton, C.B., on "Greek Inscriptions."—III. 4 p.m.  
*British Museum (Archæology Room).*—Miss J. E. Harrison on "The Technique of Greek Vases."—II. 11.45 a.m.

SATURDAY, MAY 22.

*Architectural Association.*—Visit to the National Agricultural Hall, Kensington. 3 p.m.  
*Society of Arts (Special Lecture).*—Professor George Forbes, M.A., on "Electricity."—VI. 3 p.m.

### Miscellaneous.

**County Surveyors' Society.**—The annual meeting was held at the Holborn Restaurant, on Tuesday afternoon last, Mr. C. H. Howell, County Surveyor, Surrey, in the chair. The members were engaged for a considerable time discussing the proposed by-laws for regulating the business of the society, as drawn up by the honorary secretary, Mr. T. H. B. Heslop. These were agreed to, and ordered to be printed and circulated amongst the members. The honorary secretary was requested to obtain certain particulars as to the duties, &c., of county surveyors in England and Wales, the cost of main roads, bridges, county buildings, &c., and to prepare a tabulated statement for the use of members of the Society. A general discussion, which was of a very interesting character, took place as to the scope and working of the Society. The members dined together in the evening, the Vice-President, Mr. F. H. Pownall, Middlesex, being chairman, in the unavoidable absence of the President.

**Unemployed Fund.**—At a meeting last week of the Committee of the London District Government Building Employed Unemployed Fund, a matter relative to the balance in hand was taken into consideration. The accounts show that the total amount received from the six weeks' subscription amounted to 1681.10s. of this amount the Government contractors, Messrs. Perry & Co., generously contributed 60l. Consideration had been given to 135 applications, of which only ten were disqualified from participating from the fund. The total number of cases relieved after full investigation was ninety-eight last, twenty-two second, four third, and one fourth application, the third and fourth being in extreme distress, and very deserving cases, each applicant receiving 1l. The expenses incurred in the management and distribution of the fund over a period of nine weeks amounted to 3s. 8d., leaving a balance in hand of 43l., which was unanimously ordered to be invested in the Post-office Savings Bank, in the names of the three officers of the fund as trustees, which will form a nucleus for a like purpose should the necessity arrive in the ensuing winter.

**Kingsbury.**—The proposed restoration and additions which will be carried out at Kingsbury Church, from the designs and under the superintendence of Messrs. Newman & Newman, in conformity with the views of Mr. Ewan Christian, the architect to the Ecclesiastical Commissioners, will consist of a thorough restoration upon the most conservative principles of the church, as it now stands. The present modern gallery will be removed; the ancient arch on the south side of the church, which has for many years been bricked up, will be opened out, and an open-timber porch erected to correspond in all respects with the original, of which engravings have been found. Upon the north side, it is proposed to erect a vestry and organ-chamber, under which will be placed the heating apparatus. The seating, which is unfit for re-use, will be removed, and replaced with new; and it is hoped that the funds will permit of the erection of a rood-screen, which appears to have formerly existed, and which no doubt formed a great feature.

**An Australian Railway Viaduct.**—The Werribee Viaduct, which has just been completed in the colony of Victoria, is the longest work of the kind in Australia. The structure consists of lattice-girder work. It is 1,230 ft. in length, and runs to a height of 125 ft. above the level of the Werribee river. The viaduct has fifteen spans each of 60 ft., and thirteen spans each of 30 ft. The total cost of the bridge was 120,000l. On completion the structure was submitted to a severe test, which it stood with perfect success.

**Appointment.**—By a unanimous vote, the appointment of Clerk of Works to the Chapels and Mortuary of the new Cemetery at Edmonton has fallen on Mr. Thos. Peto Ward, of Hornsey.

**Rebuilding of the "Horns" Tavern and Assembly Rooms, Kennington.**—That well-known hostelry, the "Horns" Tavern, Kennington, and the Assembly Rooms adjoining, are about to be rebuilt. The new structure will have commanding frontages towards Kennington-road and Kennington Park-road. The assembly-room portion of the premises as rebuilt will form a principal feature in the building. On the level of the first-floor, in the rear of the tavern, with its frontage to Kennington-road, will be the large and chief assembly-room, an apartment 76 ft. in length, and 40 ft. in width, containing a floor area of about 3,000 ft. At the northern end there will be a stage, whilst at the opposite end there will be a gallery. In connexion with the hall, and on the same level, there will be two supper-rooms, a waiting-room, and lavatories. Under the large hall, on the ground-floor, there will be a minor hall, with a public room for use in connexion with the tavern. It is calculated that the large assembly room will seat an audience of about 1,000 persons. Messrs. Crickmay & Son are the architects.

**Staircase Construction.**—At the meeting of the Metropolitan Board of Works on the 7th inst., consideration was given to the subject of the disagreement between Mr. H. Jarvis, District Surveyor, and Messrs. Oliver & Leeson, relative to the construction of staircases at Allen's Boys' School, Dulwich. The Superintending Architect presented a report, showing that the staircases in question are 3 ft. 9 in. wide, and of solid oak. A representative of Messrs. Oliver & Leeson stated that the stairs, being of solid oak, were as safe as though they were of stone, and reminded the Board that the matter was within their discretion by the 30th section of the Act. Mr. Jarvis, the District Surveyor, said he had objected to the wooden stairs on the ground that the 22nd section of the Act required that they should be of some non-combustible material. On the motion of Mr. Selway, the Board decided the point in dispute in favour of Messrs. Oliver & Leeson. We think the Board has decided wisely.

**The Fireman's Exhibition.**—The account which we gave last week of this exhibition did not pretend to be exhaustive; it was only intended to give some idea of the nature of the exhibition, and consequently we only mentioned a few typical exhibits. Among others which we might have noticed then had time and space allowed were Cullen's patent nozzles for fire-hose; Feist's swing-joint for hydrants; and the "Phonix Automatic Electric Fire Extinguisher and Fire Alarm," exhibited by Messrs. Thompson & Ritchie, and shown in action above the seal-tank between the hours of two and six p.m. The exhibition closes this (Saturday) evening.

**Portable Fountains.**—An apparatus has recently been constructed by Messrs. Merryweather & Sons for exhibition at Lisbon on the occasion of the wedding of the Crown Prince of Portugal. It consists of a complete set of portable fountains, the water being supplied by two steam fire-engines, and the jets will be illuminated at night by powerful electric lights placed underneath, the effect being similar to that which was to be seen at the Inventions Exhibition last year. The lighting part of the arrangement is undertaken by Messrs. Siemens Bros. & Co. The fountains will be fixed in a barge moored in the Tagus, the engines being placed in another boat.

**Church Clocks.**—A large clock has just been erected upon Blyth Church Tower, Notts. It shows time upon one dial, 6 ft. across, strikes the hours and chimes the quarters. It is fitted with all the latest improvements brought out by the makers, Messrs. John Smith & Sons, of Derby. The same firm have also just completed a large church clock at Dinton, Wiltshire, which shows time on a skeleton dial 5 ft. across, and strikes the hours on a ton bell.

**The New Theatre at Derby** was burned down last week. Two lives were lost. The coroner's jury found that the fire arose from a portion of the raw edge or shred of cloth accidentally catching fire at the gas battens. The theatre was only first opened a few weeks ago.

**A New Cathedral at Ballarat.**—At the celebrated gold-mining centre of Ballarat, in the colony of Victoria, it has been decided to erect a cathedral for the Anglican Church. The estimated cost of the body of the buildings, exclusive of tower and steeple, is 35,000l.

**A Heredos at Stonehaven, N.B.**—A large and elaborate heredos has just been erected by St. James's Church, by Messrs. Earp, Son, & Hobbs, of London and Manchester. It is a stone, marble, and alabaster, in five divisions with crocketed and gabled canopies, supported by marble columns, enclosing statues in white alabaster,—that of Our Lord occupies the centre, and in the side niches are the figures of St. Peter, St. John, St. Andrew, and St. James. The work was designed by Mr. Sidney Gamble, Parry, architect, London, and was executed under his personal superintendence.

**Robinson's Cement.**—In reference to the comments made on this patent by some correspondent, Messrs. Joseph Robinson & Co. write to us to repeat emphatically that their cement is a new material not before made, and intended to supply the place of common lime plastering where something better than that is required at a lower price than has been charged for other substitutes previously used. We must leave the manufacturers and patentees concerned to settle it further among themselves.

### PRICES CURRENT OF MATERIALS.

TIMBER.		£.	s.	d.	£.	s.	d.
Greenheart, B.G.	ton	6	5	0	7	0	0
Teak, E.I.	load	12	10	0	15	0	0
Sapota, U.S.	load	0	2	4	0	2	4
Ash, Canada	load	3	0	0	4	10	0
Birch "	"	3	0	0	4	10	0
Elm "	"	3	0	0	4	15	0
Fr. Dantais, &c.	"	1	10	0	4	0	0
Oak "	"	3	0	0	5	0	0
Canada "	"	5	10	0	6	10	0
Pine, Canada red	"	6	0	0	6	0	0
" yellow	"	3	0	0	5	0	0
Lath, Dantais	fathom	3	10	0	5	0	0
St. Petersburg	"	4	0	0	6	0	0
Walnut, Riga	log	2	15	0	4	10	0
Odessa, crown	"	3	12	6	3	15	0
Doals, Finland, 2nd and 1st	std. 100	7	10	0	8	10	0
" 4th and 3rd	"	6	0	0	7	10	0
Riga	"	6	0	0	8	0	0
St. Petersburg, 1st yellow	"	9	0	0	14	0	0
" 2nd	"	7	0	0	8	15	0
" white	"	7	0	0	10	0	0
Sweden	"	6	0	0	15	0	0
White Sea	"	7	0	0	17	10	0
Canada, Pine 1st	"	17	0	0	30	0	0
" 2nd	"	12	0	0	17	0	0
" 3rd, &c.	"	6	0	0	10	0	0
" Spruce 1st	"	8	0	0	11	0	0
" 3rd and 2nd	"	5	0	0	7	10	0
New Brunswick, &c.	"	5	0	0	7	0	0
Battens, all kinds	"	4	0	0	12	0	0
Flooring Boards, sq. 1 in. - Free	"	0	8	0	0	13	0
pared, first	"	0	7	6	0	8	0
Second	"	0	7	6	0	8	0
Other qualities	"	0	6	0	0	7	0
Cedar, Cuba	foot	0	0	3	0	0	0
Honduras, &c.	"	0	0	3	0	0	0
Australian	"	0	0	2	0	0	0
Managua, Cuba	"	0	0	0	0	0	0
St. Domingo, cargo average	"	0	5	0	0	0	0
Mexican	"	0	0	3	0	0	0
Tobacco	"	0	4	0	0	0	0
Honduras	"	0	5	4	0	0	0
Maple, Bird's-eye	"	0	8	0	0	0	0
Rose, Rio	ton	7	0	0	10	0	0
Bahia	"	8	0	0	12	0	0
Bor, Turkey	"	8	0	0	15	0	0
Satin, St. Domingo	foot	0	0	7	0	0	0
Porto Rico	"	0	8	0	8	0	0
Walnut, Italian	"	0	0	4	0	0	0
METALS.							
Iron—Pig in Scotland	ton	0	0	0	0	0	0
Bar, Welsh, in London	"	4	10	0	4	17	0
" " in Wales	"	4	5	0	4	10	0
" Staffordshire, London	"	5	5	0	6	10	0
Sheets, single, in London	"	6	15	0	8	10	0
Hoops	"	6	0	0	7	0	0
Nail rods	"	5	10	0	6	10	0
COFFEES.							
British, rabe and ingot	ton	45	0	0	44	10	0
Best selected	"	47	0	0	46	0	0
Sheets, strong	"	50	0	0	0	0	0
" India	"	47	0	0	46	0	0
Australian	"	47	0	0	47	10	0
Chili, bars	"	40	17	6	41	0	0
YELLOW METAL.	lb.	0	0	42	0	0	0
LEAD—Pip, Spanish	ton	13	10	0	0	0	0
English, common brands	"	13	10	0	0	0	0
Sheet, English	"	11	2	6	14	7	0
BRASS.							
Silvan, special	ton	14	7	6	0	0	0
Ordinary brands	"	14	0	0	14	5	0
TIN.							
Banca	ton	84	10	0	0	0	0
Ballion	"	83	10	0	0	0	0
Strait	"	85	10	0	0	0	0
Australian	"	86	0	0	0	0	0
English ingots	"	99	0	0	0	0	0
ZINC.							
English sheet	ton	18	0	0	18	5	0
OILS.							
Lined	ton	10	15	0	20	0	0
Coconut, Cochín	"	28	10	0	29	0	0
Ceylon	"	24	15	0	0	0	0
Copra	"	0	0	0	0	0	0
Palm, Lagos	"	22	0	0	23	0	0
Palm-ut Kernel	"	0	0	0	0	0	0
Reprocessed, English	ton	21	10	0	0	0	0
" brown	"	20	0	0	20	0	0
Cottonseed, refined	"	16	10	0	17	0	0
Tallow and Oleine	"	25	0	0	45	0	0
Lubricating, U.S.	"	8	0	0	10	0	0
" refined	"	8	0	0	13	0	0
TURPENTINE.							
American, in casks	cwt.	1	5	0	0	0	0
Stockholm	"	0	18	0	0	18	0
Archangel	"	0	10	0	0	11	0



## COMPETITIONS.

MOSBOROUGH (Derbyshire).—For the erection of a  
age club and caretaker's house, for Mr. J. F. Swallow,  
Messrs. Rollinson & Son, architects, Chesterfield:—

Jas. Fidler .....	259	0	0
Geo. Stevenson .....	577	0	0
Bolsover & Lockwood (accepted) .....	474	0	0
Jos. Fidler .....	488	0	0
Taylor .....	450	0	0



**RICHMOND.**—For laying a running-path for the Richmond Athletic Association, at their new ground, Old Deer Park, Richmond. Mr. J. F. Brewer, architect.—  
F. Sims, Richmond ..... £269 0 0  
Austin, Battersea ..... 480 0 0  
Pierce & Lansdown, Richmond ..... 428 0 0  
C. Maton, Kew (accepted) ..... 419 0 0

**RICHMOND.**—For building a pavilion for the Richmond Athletic Association. Mr. F. J. Brewer, architect.—  
Street & Lansdown, Richmond ..... £264 0 0  
Pierce & Lansdown, Richmond ..... 427 0 0  
F. Sims, Richmond ..... 440 0 0  
C. Maton, Kew (accepted) ..... 439 0 0

**ST. MARY CRAY (Kent).**—For alterations to the shop of Mr. F. Stanger, St. Mary Cray.—  
Wood, Chislehurst ..... £112 0 0  
Hart Bros., St. Mary Cray ..... 98 0 0  
Jas. A. Taylor ..... 86 0 0  
Goodwin, Edenbridge (accepted) ..... 60 0 0

**SANDAL (near Wakefield).**—For two cottages, road-forming, and drainage of Church View-road. Mr. Abraham Hart, architect, Wakefield. Quantities supplied by the architect.—  
Eccavator, Bricklayer, and Mason.  
J. W. Woulas, Belle Vue (accepted) ..... £171 10 0  
Carpenter and Joiner.  
G. Ashton, Sandal (accepted) ..... 55 0 0

**SOUTHALL (Middlesex).**—For two pairs of cottages at Hayes Bridge, Southall, for Mr. W. Minot. Mr. Geo. Hubbard, architect, Finsbury-circus. Quantities by Mr. Sargeant, Holden-terrace.—  
W. Hunt ..... £299 2 0  
C. F. Kearley ..... 927 0 0  
J. Elder ..... 822 0 0  
A. & B. Hanson, Southall ..... 656 0 0

**STOKE NEWINGTON, N.**—For alterations and additions to the Black Bull, No. 192, High-street, Stoke Newington, for Mr. A. H. Mr. J. Waldran, architect. Quantities supplied by Mr. H. J. Treadwell.—  
Mortar ..... £4,352 0 0  
Shurmer ..... 4,236 0 0  
Rider & Son ..... 3,979 0 0  
Stimpson & Co. ..... 3,993 0 0  
Robt. Perkins ..... 3,867 0 0  
Hicks ..... 3,856 0 0  
Grover & Son ..... 3,623 0 0

**TROWSE (Norfolk).**—For widening road and widening and altering bridges, for the County Magistrates. Mr. T. H. B. Heap, Assoc. M. Inst. C.E., County Surveyor, Norwich.—  
G. E. Hawes ..... £247 0 0  
Horace Lacey ..... 405 0 0  
W. North (accepted) ..... 446 10 0  
[All of Norwich.]

**TOXTETH PARK.**—For the completion of Maple Grove, for the Toxteth Park Local Board. Quantities by the engineer, Mr. John Price.—  
Sayce & Randle, Widnes ..... £342 13 3  
W. F. Inglis, Castle-street, Liverpool ..... 338 17 6  
Ireland & Hurley, Liverpool ..... 222 19 3  
C. Burt, Wellington-road, Liverpool ..... 220 0 0  
J. Nuttall, Moss-lane, Manchester ..... 226 7 6  
Lomax, E., Alma-street, Eccles ..... 202 16 0  
L. Marr, Aspen Grove, Liverpool ..... 198 10 4  
McCabe & Co., Liverpool ..... 194 6 3  
Ansell & Co., Park-road, Liverpool ..... 189 1 9  
W. F. Chadwick, Liverpool ..... 186 13 1  
Walkden & Co., Bransome-road, .....  
Boole (accepted) ..... 167 0 0  
[Engineer's estimate ..... £185.]

**TOXTETH PARK.**—For the completion of Moss Grove, for the Toxteth Park Local Board. Quantities supplied by the engineer, Mr. John Price, Assoc. M. Inst. C.E.—  
Sayce & Randle, Widnes ..... £256 3 8  
Ireland & Hurley, Liverpool ..... 36 1 0  
W. F. Inglis, Castle-street, Liverpool ..... 319 0 10  
C. Burt, Wellington-road, Liverpool ..... 310 0 0  
L. Marr, Aspen Grove, Liverpool ..... 300 2 3  
J. Nuttall, Moss-lane, Manchester ..... 294 3 9  
R. Lomax, Alma-street, Eccles ..... 288 6 3  
W. F. Chadwick, Liverpool ..... 284 2 7  
Ansell & Co., Park-road, Liverpool ..... 272 2 0  
Walkden & Co., Bransome-road, .....  
Boole (accepted) ..... 245 19 0  
S. McCullagh, Toxteth Park ..... 231 16 3  
[Engineer's estimate ..... £260.]

**TOXTETH PARK.**—For the completion of Sefton Grove, for the Toxteth Park Local Board. Quantities by the engineer, Mr. John Price, Assoc. M. Inst. C.E.—  
Sayce & Randle, Widnes ..... £273 8 1  
Jas. White, Aigburth Vale, Liverpool ..... 211 2 11  
C. Burt, Wellington-road, Liverpool ..... 210 0 0  
Ireland & Hurley, Brase-street, Liver-  
pool ..... 209 17 9  
R. Lomax, Alma-street, Eccles ..... 207 13 0  
W. F. Inglis, Castle-street, Liverpool ..... 206 18 0  
Jas. Nuttall, Moss-lane, Manchester ..... 203 8 9  
McCabe & Co., Lambeth-road, Liver-  
pool ..... 198 11 3  
Ansell & Co., Park-road, Liverpool ..... 188 7 3  
L. Marr, Aspen Grove, Liverpool ..... 181 8 4  
W. F. Chadwick, Howard-street, Liverpool ..... 177 18 4  
Bennett & Co., Bransome-road, .....  
Boole (accepted) ..... 165 15 0  
[Engineer's estimate ..... £185.]

**TUNBRIDGE WELLS.**—For alterations and additions to Ferne Hill House, Tunbridge Wells, for Mr. W. H. Walley. Mr. D. Banks, architect. Quantities supplied by Mr. J. H. Pitman.—  
Bower & Son, London ..... £4,562 0 0  
Jones, London ..... 4,540 0 0  
Ellison, London ..... 4,522 0 0  
Sharp, Margate ..... 4,510 0 0  
Brass, London (accepted) ..... 4,500 0 0

**VAUXHALL.**—For making alterations and additions to the John Bull public-house, Tyer-street, for Mr. M. Bennett. Mr. J. W. Brooker, architect, Railway Approach, London Bridge.—  
W. & F. Croaker ..... £279 0 0  
W. Downs ..... 767 0 0  
E. G. Batley ..... 727 0 0  
J. Beale ..... 687 0 0  
A. Garratt ..... 681 0 0  
Burman & Sons (accepted) ..... 662 0 0

**WILTSHIRE.**—For the supply of 1,000 tons of Mendip Mountain stone (quarry No. 1), at per ton, broken to a 2-in. gauge, and delivered free at Woodborough and Pewsey stations, Wilts, for the Everleigh and Pewsey Railway Authority. Mr. James Bateman, surveyor, Woodborough. Pewsey. s.d. s.d.  
W. B. Beauchamp, Oramore, Shepton Mallet (accepted) ..... 8 8 ..... 7 2

**SPECIAL NOTICE.**—Lists of Tenders frequently reach too late for insertion. They should be delivered at our office, 46, Catherine-street, W.C., not later than Four p.m. on THURSDAYS.

## PUBLISHER'S NOTICES.

Registered Telegraphic Address, "THE BUILDER, LONDON."

**CHARGES FOR ADVERTISEMENTS.**  
SITUATIONS VACANT, PARTNERSHIPS, APPOINTMENTS, TRADE, AND GENERAL ADVERTISEMENTS.  
Six lines (about fifty words) or under ..... 4s. 6d.  
Each additional line (about ten words) ..... 6s. 6d.  
Terms for Series of Trade Advertisements, also for special Advertisements on front page, Competitions, Contracts, Sale by Auction, &c. may be obtained on application to the Publisher.

**SITUATIONS WANTED.**  
FOUR LINES (about thirty words) or under ..... 2s. 6d.  
Each additional line (about ten words) ..... 6s. 6d.  
PREPAYMENT IS ABSOLUTELY NECESSARY.  
\*\* Stamps must not be sent, but all small sums should be remitted by Cash in Registered Letter or by Money Order, payable at the Post-office, Covent-garden, W.C.  
DOUGLAS FOURDRINER, Publisher.

Advertisements for the current week's issue must reach the Office before THREE o'clock p.m. on THURSDAY.  
The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c. left at the Office in reply to Advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

**SPECIAL.—ALTERATIONS IN STANDING ADVERTISEMENTS OR ORDERS TO DISCONTINUE SAME,** must reach the Office before TEN o'clock on WEDNESDAY mornings.

PERSONS Advertising in "The Builder," may have Replies addressed to the Office, 46, Catherine-street, Covent-garden, W.C. Free of charge. Letters will be forwarded if addressed in envelopes are sent, together with sufficient stamps to cover the postage.

## TERMS OF SUBSCRIPTION.

"THE BUILDER" is supplied direct from the Office to residents in any part of the United Kingdom at the rate of 12s. per annum. For all parts of Europe, America, Australia, and New Zealand, 26s. per annum. To India, China, Ceylon, &c. 30s. per annum. Remittances payable to DOUGLAS FOURDRINER, Publisher, No. 46, Catherine-street, W.C.

## TO CORRESPONDENTS.

Registered Telegraphic Address, "THE BUILDER, LONDON."

R. B. Paris (photograph received).—B. & C.—L. A. B. (report received).—G. F. H.—J. S. Brisbane.—E. A.—E. A. H.—M. T. W.—T. R. R.—A. G. T.—G. J. Q.—H. D. A.—J. R. & Co.—G. J. B. (thanks).

All statements of facts, lists of tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

Letters or communications (beyond news-items) which have been duplicated for other journals, are NOT DESIRED.

All communications respecting literary and artistic matters should be addressed to THE EDITOR; all communications relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

## Best Bath Stone.

**WESTWOOD GROUND,**  
Box Ground, Combe Down, Wilt.  
Corsham Down, Wilt.  
And Farleigh Down, Wilt.  
**RANDELL, SAUNDERS, & CO., Limited,** [Advt.]  
Corsham, Wilts.

## Bath Stone.

BEST QUALITY OF ALL KINDS.

**PICTOR & SONS,**  
Box, WILTS. [Advt.]

**Doubling Freestone and Ham Hill Stone** of best quality, in blocks, or prepared ready for fixing. An inspection of the Doubling Quarries is respectfully solicited; and Architects and others are CAUTIONED against inferior stones. Prices, delivered to any part of the United Kingdom, given on application to CHARLES TRASK & SONS, Norton-sub-Hamdon, Ilminster, Somerset.—Agent, Mr. E. WILLIAMS, No. 16, Craven-street, Strand, W.C. [Advt.]

**Doubling Free Stone** For prices, &c., address S. & J. STAPLE.  
**HAM HILL STONE,** Quarry Owners, Stone-  
**BLUE LIAS LIME** and Lime Merchants.  
Stoke - under - Ham  
(Ground or Lump), Ilminster. [Advt.]

**Asphalte.**—The Seyssal and Metallic Lava Asphalte Company (Mr. H. Glenn), Office, 86 Poultry, E.C.—The best and cheapest material for damp courses, railway arches, warehouses, floors, flat roofs, stables, cow-sheds, and milk rooms, granaries, tun-rooms, and terraces. [Advt.]

**Asphalte.**  
Seyssal, Patent Metallic Lava, and White Asphalts.  
**M. STODART & CO.**  
Office:  
No. 90, Cannon-street, E.C. [Advt.]

**MICHELMORE & REAP**  
Manufacturers of

CHARLES COLLINGS'S PATENT.

**COLLINGS'S PATENT HINGES**  
LEVER, SCREW, & BARREL BOLTS  
Self-acting "FALL DOWN" GATE STOPS  
and IMPROVED GATE FITTINGS of every Description.  
364, BOROUGHO ROAD.

DISCOUNT TO BUILDERS. LONDON, S.E.

GOLD AND SILVER MEDALS AT AMSTERDAM EXHIBITION.

# ZINC ROOFING.

# J. B. BRYCE & CO.

LONDON. \*\* LIVERPOOL. \*\* GLASGOW.

## VIEILLE MONTAGNE SOLE MANUFACTURING AGENTS.

## NO SOLDER. NO EXTERNAL FASTENINGS

Particulars on Application. Chief Offices:—352 to 364, EUSTON ROAD, LONDON, N.W.



# The Builder.

VOL. L. No. 2239.

SATURDAY, MAY 22, 1886.

## ILLUSTRATIONS.

Competition Design for the New Church of St. James, Spanish-place: South Transept and Porch; Interior, looking East.— Mr. Leonard A. S. Stokes, Architect.....	744-749
The New Homoeopathic Hospital, Liverpool.—Messrs. F. & G. Holme, Architects.....	752
St. Bride's Vicarage.—Mr. Basil Champneys, Architect.....	753
Some Woodwork at the Charterhouse.....	756
The Sower (from a Sketch by the Artist).—Mr. Hamo Thornycroft, A.R.A., Sculptor.....	757

## CONTENTS.

Windows.....	733	Old Woodwork at the Charterhouse.....	759	Belper Union Infirmary Competition.....	769
Shakespeare Plays in London.....	734	Sculpture at the Royal Academy.....	759	Provincial News.....	761
Architecture at the Royal Academy.—IV.....	735	The Recent Municipal Works in Rome: Surveyors' Institution.....	759	Roman Catholic Church Building News.....	763
"Shipperies" Exhibition, Liverpool.....	737	The Superintending Architect: Metropolitan Board of Works.....	760	Stained Glass.....	763
Regent-Yard and an Old Play-House: A Memorial of Dickens.....	738	Architectural Societies.....	761	The Student's Column: Our Building Stones.—XL.....	763
Sculpture at the Royal Academy.....	739	Obituary.....	761	Recent Patents.....	764
Buildings at the Royal Academy.....	740	Builders' Benevolent Institution.....	761	Recent Sales of Property.....	764
Architecture at the Royal Academy.....	741	Cases under the Metropolitan Building Act.....	761	Meetings.....	765
James (R.C.) Church, Spanish-Place.....	742	Tall Chimney Construction.....	761	Miscellaneous.....	765
New Homoeopathic Hospital, Liverpool (with Plan).....	742	Architectural Association.....	762	The Proposed New Bridge at Battersea.....	765
St. Bride's Vicarage (with Plan).....	743	Architectural Association Extension to Rome.....	762	The Jamaica Yacht.....	765
	749	Fulham Vestry Hall Competition.....	762	Prices Current of Building Materials.....	766

### Windows.



OUR earliest forefathers got on without windows, and only went indoors to sleep or to protect themselves from storm or danger, so that their indoor occupations must have been very limited.

We have better use to make of our time, most of which is spent indoors, and the admission of light and air into our buildings has been the chief consideration amongst all civilised nations.

The word "window" is used a few times in the Bible, but there is not much indication of its origin, except such as we may gather from the description of Jezebel looking out of one, proving that the sill must have been near enough to the floor for that purpose, and the opening large enough for Jezebel to be thrown out of. The ancient Egyptians seem to have used all windows, as may be seen in the Pavilion, the Abou, and in a wall painting, both illustrated in Fergusson's "Hand-book of Architecture," pp. 247-248. There is also a most interesting model of an Egyptian house in one of the glass cases at the British Museum. This model contains a range of first-floor windows, divided up by mullion and transome; the second-floor windows (?) contain an indication of something that looks uncommonly like diagonal quarry glazing. The palace of Darius at Persepolis, B.C. 521, contains a range of rectangular windows; but the neighbouring country of Assyria there does not appear to have been such windows. Indeed, in Egypt, Persia, and Assyria, the admission of light and air into the temples and houses seems to have been usually obtained through the interstices between the columns instead of a raised superstructure. As to ancient temples, the absence of any actual remains of windows,—except in the Erechtheum, the great temple at Agrigento, and that at Paestum,—has provided food for endless discussion as to the means of lighting their interiors. The Romans used arched windows in their public buildings, but do not seem to have used much for them in their houses, being satisfied with the doors looking into the atrium or peristyle; the dining-room, however, or triclinium, was sometimes provided with a large window. The Saracens used windows certainly, but only to admit a subdued light through trellised openings.

Thus the constant and regular provision of windows in ordinary buildings for everyday

purposes, and with the special object of providing abundance of light, seems to belong to a comparatively modern period of architecture.

It is observed by Viollet-le-Duc in his article on windows (*Dic. Raisonné*, vol. v.), that the daylight introduced through an opening into a building is pyramidal or conical in form, diminishing inwards. This is so contrary to the divergent appearance of the light that it is difficult to believe the statement. The proof of it lies in the fact that a small opening admits a shorter pencil of light than a large opening. This is easily proved by holding a sheet of paper farther and farther away from a small opening until the light fades away and ceases to illumine it. Then, by enlarging the opening, light will reappear on the paper. The distance travelled by the light, therefore, depends upon the area of the opening forming the base of a cone or pyramid.

This is a most important fact as abolishing the notion that two quite separate windows of, say, one square foot each will admit as much light as one window of two square feet. And it opens up great possibilities in the arrangement of light. Some light there must be in every part of a building, but equal light diffused over every part of it is "flat, stale, and unprofitable." Keep the greater part of an interior just sufficiently lighted for practical purposes, and cast a brilliant flood charged with the rays of the sun, on to the most important feature in the building, and there will be seen an effect worth living for.

To this calculation of effect Viollet-le-Duc attributes the huge rose-windows occupying the gable ends of Mediaeval churches; their superior lighting power overruling the clear-story, and casting shadows without which all the moulding and carving in the world would be mere waste of labour. The interior of Polebrook Church, not far from Peterborough, is one that leaves an indelible impression on the mind, owing to a most artistic disposition of the windows.

It seems to have been a fate common to all styles of architecture, not excepting Greek, to become lighter and slenderer in construction as they went on; and partly from this cause, and partly from the fascination of crowding more and more stained glass into the wall surface, Gothic buildings became, as has been said of "proud Hardwick Hall, more window than wall." It is needless to repeat here that, so far as circumstances allowed, civil architecture went hand in hand with ecclesiastical, and that, so far only as requirements demanded, they differed, but no farther; it being reserved for the imitative architecture of recent times to adopt one style for churches and another for civil buildings.

The artistic effects of lighting must have

suffered from this rage for glazing, though a redeeming opportunity was given by the various tones of the glass itself.

There is a danger just now of our using more stained glass than we really want. One of the most original and refined churches of modern times, Christ Church, Streatham, is, from this cause, dependent upon gas for its light, and the fashion for stained glass in our houses has deprived many a family of the wholesome view of the sky by substituting in the upper panes such glass as the speculative builder will get at the "lowest quotation." If we would only put stained glass where we want it,—and it is undoubtedly useful in many situations,—we should be better off, and the cost of the useless glass could be concentrated into the price of the right glass in the right place.

As an instance of misplaced light, a London church may be mentioned where a little apse and elaborate fittings have recently been added at a cost that would pay for two or three complete and handsome churches. Here every pennyworth of the pains taken by the designer is wasted by the glare of two brightly-coloured windows that strike the eye from every point of view, and cast the costly materials, the delicate carving, and the rich painting into chaotic shade. If these two windows were blocked up, and the next pair, which are almost out of sight, were filled with white glass, the money's worth would be seen.

Many people, even those of such a practical turn of mind as the eminent architect to the Ecclesiastical Commission, like clear quarry glazing in their own houses, and there is undoubtedly a great charm in the comfortable "indoor" feeling produced by the visible network of lead lines between us and the outer air. Great care is, of course, needed in properly cementing the quarries into stout lead-work. To go to the other extreme, and to use huge sheets of plate glass, simply because such can be purchased for money, seems to be illogical reasoning.

The advantages of plate glass are its strength and clearness: no one wants to see a distorted image through a window; but having secured these advantages, all other practical requirements are best fulfilled by dividing the window into panes with sash-bars. They materially strengthen the sashes, and the panes are more easily and cheaply replaced if broken. If kept at least 12 in. apart, they do not materially obstruct the view; at all events, the slight obstruction is more than compensated for by the sense of indoor comfort that they supply. Let any one who doubts this try the experiment of living in a room fitted with both kinds of window.

Bearing in mind Viollet-le-Duc's demonstra-



tion as to lighting power, it will be seen that the size of the windows of a room will be regulated by the dimension of length or width that subtends them, and that an end light must be made more powerful than a side light. This, of itself, will furnish a variety of window size or window spacing that will at once relieve a building from slavish (so-called) Classical monotony. While using windows enough, and being duly thankful that we do not live in the days of the window-tax, we have to avoid the danger of too much window-surface, especially in a moderate-sized living-room, otherwise the occupants will have no choice between "melting moments" right over the fire and freezing moments in other parts of the room. The right amount of light, in the right place, not forgetting a well-lighted wall or two for pictures, and the avoidance of a blinding glare in the eyes as one enters the room, are the items of a problem that has to be solved. There is a prevalent rage for "French" windows, leading into the garden, of which fashion one can easily have too much. The draught from such windows is sharper than from an ordinary window, and if any other way can be contrived to go from a smallish room into the outer air, by means of a side lobby, so much the better.

Many people like the complete opening that can be obtained by means of French and other casement windows; but the difficulty of using sunblinds if they open outwards, or of using inner blinds, shutters, or curtains, if they open inwards, seems to give the balance of advantages in favour of the more modern double-hung sash-window. Modern ingenuity has been devoted to rendering this form of window perfect, and the contrivance for raising the bottom sash so as to introduce an upward current of air between it and the upper sash, and yet without opening the window at the bottom, is surely an achievement. If this be done by means of a deep bottom rail to the lower sash, we may look for another of those many new features that are slowly accumulating towards the formation of a recognised style; and it may be added that there is more designing to be put into a sash window than is generally supposed.

The weak point in double-hung sashes consists in the danger of the sash-line giving way, and in the amount of "cradling" which has to be made for these weights to work in, to the detriment of real solidity and honesty of construction. Any one who could invent a vertical sash-hanging without pulleys, and applicable to large and heavy window-sashes as well as small ones, would do the world a service.

The Swedish windows, described and illustrated by the Librarian of the Institute in a former number of the *Builder*, could also be used where double-hung sashes are undesirable. Their water-tightness appears to be marvellous, and their construction far cheaper than the more complicated arrangements made in England.

Much ingenuity has been displayed by architects in combining stone transoms or mullions, or both, with wooden casements or sashes, and many of us will remember the regret expressed by one of our leading practitioners at the adoption of eighteenth-century windows, "just as we were getting Gothic work into practicable shape" (or words to that effect). Except, however, in a very lofty tower, there is really no need for stone transoms to strengthen the window-opening, and, while admitting the convenience of stone mullions for subdividing a fine large window, one cannot help being sensible of a certain grittiness in the presence of a stone surface in the midst of the joinery and upholstery of a truly modern house. In halls, passages, and other thoroughfares the discordance is not felt, as a rule, and the windows themselves, owing to their positions, often assume various odd shapes to the design of which stone mullions are welcome aids.

In all periods of architecture, before the imitative styles gained the predominance, windows, where seen in position, have formed unerring indications of the purpose of the buildings in which they occur, and, unless they have been inserted in older work, are an

equally sure indication of date. Doorways, arcades, buttresses, walling are blank pages as compared with the information conveyed by windows in their successive developments from the eleventh to the sixteenth century, and even then the Early Renaissance architects preserved a manly independence, selecting and adapting just what ideas they wanted from the revival of Classic art, and thus creating a recognised style.

We have a still wider field for selection and are taking a longer time in casting aside that which, to us, is archaeological dress; but when we have consented to a convenient, practical, and beautiful set of windows, appropriate to the respective buildings in which they occur, something very near to a recognised modern style will have been formed.

#### GREEK PLAYS IN LONDON.

**T**HOUGH the term "Renaissance" is generally applied to the historical period of the fourteenth and fifteenth centuries, when classical learning and taste were revived in Italy, the term might, in a new sense, be applied to our own immediate time. For, whereas classical, more especially Hellenic, culture, was, in the fifteenth century in Italy, restored through the channels of Roman history, art, and literature, the new feature of the revival lies in the directness with which we go back to Greek culture itself, as well in the study of art as in history and literature. This tendency has led not only to the modification of the ordinary university studies, and to the introduction of branches of study (such as classical archaeology) which were hitherto neglected, but it has extended its influence beyond the ordinary bounds of university work to a wide circle of lovers of Hellenic culture, who are endeavouring to reproduce what is best in the great past of Greece.

Of late, the efforts of these Hellenists have been chiefly directed toward the reproduction of the Greek drama. Oxford undergraduates led the way with the performance of the "Agamemnon"; Harvard University followed with the "Edipus"; smaller attempts were made at various places, especially at Bradfield College, while at Cambridge the performance of the "Ajax" was followed by the production of the "Birds" and the "Eumenides," and the Greek play has become a regular institution, if not officially academical, at least a part of Cambridge life.

Two similar attempts in London within the last few days show that the metropolis is also moved by this spirit of Hellenic revival, and all who recognise the good that dwells in things Greek will hail such signs of awakening and will be grateful to the promoters of such laudable enterprise. There is always some fear lest good movements may not evoke reaction when once they become "fashionable"; for this is often the price at which metropolitan publicity is bought. Yet the pure profit to be derived from such efforts will, we hope, remain, however numerous the imperfections in the work produced, and however strong the reaction which exaggeration and sham may call forth.

The first of these revivals in London was the performance of the *Story of Orestes* at Prince's Hall on Thursday, May 13th. Prof. Warr here endeavoured to condense the Oresteian trilogy of Æschylus (Agamemnon, Choephore, and Eumenides) into one drama. As the three Greek tragedies are continuous and strongly bound together, it was an experiment well worth making to produce the whole in one performance. But the copious cutting which this necessitated interferes so much with the continuity of action that we believe the experiment has proved such attempts to be futile. On the other hand, we must draw attention to Prof. Warr's translation, which is masterly in the proximity with which it follows the Greek, and the freedom and beauty of the English.

The performance itself was, chiefly owing to the very cramped space given to actors and chorus, not as impressive as previous performances of Greek plays have proved to be.

Considering these disadvantages the chorus (Argive and Athenian elders and maidens) performed its part very creditably. The drapery both of men and women was not always successful, sometimes even medieval, and not Greek in character. Two attempts at "archaising" accurately were not successful. The first was the attempt to give masks to the Furies. The masks in the Greek drama had chiefly a constructive origin. The conditions of space in the Greek theatre, both with regard to sight and sound, called for the Greek masks and the *colthurnus*, the mask acting as a speaking-tube. In reproducing masks we should have also to reproduce the other conditions of the Greek stage, and the whole "make-up" of the Furies themselves, as well as of all the other actors, and the character of the accessories in the play would have to correspond. Unless complete accuracy is aimed at and a strictly and primarily archaeological spirit pervades the whole performance, it is better to give up such attempts at archaising and to adapt the plays in the less essential features to the requirements of modern taste. The same holds good with regard to the music which was composed by Mr. Walter Parratt. We cannot reproduce Greek music, and even if we could the great development of that art in modern times has affected our very organs of hearing, and the consequent requirements of our taste. The effect which the more rudimentary music produced upon the ancient Greeks, and its importance as a feature in their dramatic performances, can only be adequately represented in a modern performance by a much more elaborate form of lyrical art. The chanting of the chorus in the *Story of Orestes* was not even effective by its simplicity. Greater simplicity might have been maintained in the acting, especially of Clytemnestra, who evidently admires some of the mannerisms of Sarah Bernhardt. On the other hand, Miss Dene's rendering of Cassandra was not only intelligent, but, in the weird and visionary pathos of her prophecy, caused many a student to realise, more fully than he could from the mere reading of the Greek, the solemn grandeur of Æschylus.

No doubt the most interesting and successful features of this performance were the tableaux. The first of these represented the "Sacrifice of Iphigeneia." It was designed by Mr. G. F. Watts, the background representing the coast of Aulis, painted by Mr. Arthur Severn. There was a famous picture in antiquity representing this scene, by Timanthes of Kythnos, of which Pliny, Cicero, and Quintilian give us an account. The picture is said to have been remarkable for the success with which the artist presented the rising scale of pathos; Kalchas was sad, Ulysses deeply grieved, Aias distressed, whilst the artist refrained from painting the face of the father, Menelaos, and thus represented him as covering his face with his cloak. In an extant mural painting from the Casa del Poeta Tragico at Pompei, as well as on a relief on a small drum in the Uffizi, at Florence, we no doubt have modified reproductions of the picture of Timanthes. Mr. Watts followed these to some extent in the general arrangement of figures, as well as in the action of Agamemnon, which Lessing praises as showing how well the Greek realised the limitations of his art: Iphigeneia, with head upraised, has sunk back before the altar, supported by the attendant of Kalchas, the priest, who raises the knife above the altar to deal the fatal blow. On the other side, Agamemnon covers his face with his cloak, and behind him a fury with a torch stands beside the altar as a presage of the fate which is to befall the house of the Atreidae, and which governs the whole of the trilogy. Greek warriors are grouped round these central figures.

The other tableaux, designed by Mr. Walter Crane, were Nemesis, or the Return of Agamemnon; the Dirge at the Tomb of Agamemnon; and Orestes before the Areopagus. Of these the Dirge before the Tomb of Agamemnon was the most successful. Electra, seated before the sepulchral stele of Agamemnon, with her attendants grouped about her and a background of cypress trees, was most im-



pressive. The smallness of the stage made the last tableau less impressive, especially to those who had seen the last act of the Eumenides at Cambridge.

The same painful feeling concerning the smallness of the stage and the imperfections of stage arrangements was certainly not experienced by those who witnessed the performance of Mr. Todhunter's play "Helena in Troas" at the Greek Theatre in Argyle-street on Monday last. It was certainly one of the most beautiful sights ever offered to the London public, and Mr. E. W. Godwin, who was responsible for the stage arrangements, may be heartily congratulated upon his successful accomplishment of a very arduous task. Upon entering the theatre, usually known as Hengler's Circus, it required no great stretch of the imagination to fancy oneself transported to ancient Greece, and this in spite of the modern audience and the galleries and boxes. For the eye was immediately attracted by the theatre proper, in which the bold attempt had been made to solve by demonstration the vexed question of the actual arrangement of the Greek stage. What was formerly the ring of the circus, was covered by boards and canvas representing the tessellated marble pavement of the orchestra, in the centre of which stood the thymele or altar of Dionysos. This orchestra or chorus was one of the earliest parts of the theatre, as the choric dances formed the earliest feature of the Dionysiac festival long before the drama itself had become properly developed. Thus we have the explanation of the introduction of the altar to Dionysos in combination with plays which make no reference to the "cult" of that deity. At one side a segment of the circle of the orchestra was cut away by the stage proper, the *scenyn* or *scenitron* with a background, and three entrances for the principal actors. We are told that Mr. Godwin chose as his model for the palace of Priam the so-called Temple of Empedocles of Selinus, in Sicily. Be this as it may, no fault can be found with his attempted restoration, though he mural decoration points to a later period than the age of Sophocles, which we were to accept as the supposed date of the performance. But he was right in not attempting at restoring the building in accordance with the very slight indications of early Greek art, the rather as in all probability no such archaeological realism would have been attempted on the Athenian stage. The distant view of the coast in the background, beyond the walls, was very effective, and not out of keeping with what we have reason to believe the scenic decorations in the period of the developed drama was like. No doubt in the earliest drama the arrangements as regards scene-painting were very rudimentary, but towards the close of the fifth century B.C. the important position of scene-painting in the development of pictorial art, beginning with the painter Apollodorus, and the minuter drawing of characters and action in Sophocles and Euripides, must have called for a far more elaborate system of scene-painting than antiquaries have hitherto admitted in connexion with the problematical *scenitron*. On a level with the orchestra, just where the extension of the stage beyond the orchestra (the *parascenium*) begins, the doors through which the chorus enters the orchestra, while marble steps lead up the centre to the stage proper. These steps in the Greek theatre were probably of wood, and movable. We were glad to find that Mr. Godwin introduced polychromatic decoration into his architecture, and also used curtains freely. Without these important adjuncts Greek architecture loses much of the life it undoubtedly possessed. He might even have been bolder and more decided in the application of colour. So also the colouring of the bas-reliefs added much to the effect. In the front of the stage slabs from the amazon-frieze of the Parthenon were let in, and these were given a dark red background, while the figures were left. Perhaps some bas-reliefs of Dionysiac import might have been more appropriate. Even the modernness of the galleries and boxes was alleviated by the introduction of casts from the Parthenon frieze, to which a blue background

was given, while the relief remained white, giving them a little too much of a Wedgwood appearance.

The dresses were very good and appropriate. The fifteen Greek maidens of the Chorus were draped in white, with the long *himation*, and a kind of *diplois* like the figures from the frieze of the Parthenon. As they entered in procession, and swayed rhythmically to their own singing, or while the action was proceeding on the stage, sat in graceful attitudes below the stage, one realised how the Greeks with the Chorus presented to the Greeks the living and moving sculpture which has been lost to us with the introduction of the gauzy petticoat and tip-toe rope-walking of the *corps de ballet*. The dresses of the actors were also very successful. The best, perhaps, was the Tirewoman to Hecuba (Mrs. Jopling), who also, it appears to us, was most graceful in attitude and most perfect in gesture. The dress of Paris, the archer, was effective and correct according to ancient representations. He wore the close-fitting garment which distinguished the Oriental archer, and the Phrygian cap. Perhaps he might have held his bow, or worn a quiver, instead of the sword, which became singularly obtrusive in the superfluous business of kissing it before he died. Throughout the acting was very good.

But in both these plays a deficiency, not only of the modern stage, but of modern life, became most manifest, namely, the universal awkwardness in walking and in standing. It is certainly due to our dress, but actors in Greek plays ought to study it carefully. Ancient reliefs and statues will show each phase in the act of walking. When the one foot is advanced the other foot turns outwards while rising on the ball and is then moved in an outward circle forward, whereas modern walkers keep the foot at one angle and raise it at once. This Greek walk must not be confused with the ordinary abrupt stage-walk. In standing, the modern Paris dress, especially in its treatment of the waist, has caused women to bend their back in too much. In Greek dress the outline of the figure, when the modern attitude is maintained, is decidedly ugly. One slim and fair lady in the Chorus was very graceful in her attitudes, and might easily have been taught to walk as the most graceful figure from a Greek frieze would have walked in life. Ignoring these slight defects, we must feel that we witnessed a sight never to be forgotten, and one which seemed to take us for the moment far away from London and modern life.

#### NOTES.

**T**HE principle of Mr. McLaren's Purchase of Land Compensation Bill, which was read a second time last week (May 12), is sound enough. Practically its object is to enable those bodies which take land compulsorily to set off any advantages to the property left, against the disadvantages arising from taking land compulsorily or from their undertaking. It is quite clear that if without doubt the undertaking will improve the value of the property it is not right that credit should not be given, so to speak, by the arbitrator for this advantage when he comes to assess the compensation which is payable. The difficulty in regard to the scheme is in carrying it into practical effect, because while the disadvantages to the property are clear, the advantages are very often problematical, or such that they will not be a benefit to a property in its existing state. Suppose a piece of land near a house and grounds were taken, cutting off access to a river or home farm, the loss to the owner of the property as a residential one may be clear, the gain in the proximity of a station may altogether depend on the future train service. Still, if the principle of a Bill is sound it should pass its second reading, but whether this particular one if it becomes law will be found to have much practical effect seems very doubtful. However, the chance of such small fry as this obtaining the royal assent during the present session is not very promising.

**T**HE statistics of deaths by fire, as recently set forth by Dr. Choquet, are of very considerable interest, and especially those cases which have happened in theatres and places of public resort. The latter, indeed, have been extremely prolific in this kind of calamity, no fewer than 7,000 persons having been burned between 1751 and 1885. The first ten years of this period showed only 179 victims, of which Paris supplied 21,—a proof that places of entertainment were relatively few and far between; and things went on pretty quietly until between 1790 and 1800, when it mounted up to 1,100, of whom 1,000 were burned to death all at once at a place in Istria, probably the largest human hecatomb on record. America took the lead in the next epoch from 1801 to 1830, although the total number of deaths was only 227. In the following decade, St. Petersburg had more than one large fire, by which 500 persons came to their end; but this number was greatly exceeded between 1841 and 1850, the total of deaths amounting to 2,144. Of these, 1,670 were carried off at one swoop in a Chinese theatre at Canton, and 200 more in a Canadian theatre at Quebec. The next twenty years showed a relaxation in the roll of deaths from this class of accident, there being only 345; but there was a great increase in the next fifteen, the total amounting to 1,845. It must be remembered, however, that there has been within that period a great development of theatrical entertainments in all the large cities of the world, though, on the other hand, the means for providing for the safety of visitors have been very much more attended to than formerly. Paris, with its numerous minor theatres and *café-chantants*, has been, on the whole, remarkably free from deaths by fire, not more than 71 in twenty-five years. This is not bad, considering that the theatres number 32 and the *café* concerts 56, which are visited yearly by at least eight million people. Considering, too, that the Porte Saint Martin has been burned twice in the present century, and the Ambigu-Comique, the Gaieté, the Italian, and the Vaudeville each once, it is surprising that the total deaths at these occurrences only amounted to five, the fires fortunately happening when the theatres were empty.

**W**E in England are generally credited with an undue degree of Philistinism as regards art matters. It may, perhaps, be some consolation to know that other countries are as bad as ourselves, and that even Italy, with her professedly artistic life, is not always free from blame. A proof of this is shown in the art history of Florence. In 1431 Lucca della Robbia built a beautiful singing-gallery for the Duomo, while two years afterwards, Donatello made another to match it, the bas-reliefs on these being objects of the deepest admiration. In 1688, when the wedding of Prince Ferdinand with a Princess of Bavaria was celebrated, these galleries were taken away to make more room, and placed in one of the rubbish chambers belonging to the cathedral works, and there they remained until 1845, when they were taken to pieces and put into one of the magazines of the fortress, whence they found their way into a cellar in the Chapel of the Medicis. Finally, Professor De Fabris found them in 1870 in another cellar, covered over with mud brought in by the Arno, which had overflowed into it. The bas-reliefs, however, had been taken off the galleries and were stored away in a dark room forming part of the building occupied by the employees of the Duomo, not only utterly unknown to the public, but as described in a current document "*Mala mente visibili*,"—scarcely to be seen, at all events, without the aid of a lantern. From this ignoble position they were eventually rescued, and placed where they are now in the national museum known as the Bargello. The ten bas-reliefs of Lucca della Robbia, the subjects of which are singing and dancing boys and girls, are probably some of the most exquisite groups, both in design and execution, that can be found all the world over. The whole story has a striking resemblance to that of the underground marbles in the British



Museum, though with the difference that there seems to be no immediate prospect of deliverance for the latter.

**A** GAIN the old, old story. Such may explain any one who takes note of the case of *Botterill v. The Ware Board of Guardians* just decided by the Court of Appeal. It is the old story of a contractor suing his employer, going into an expensive litigation, and being held not entitled to recover, because there was no final certificate from the architect or the engineer as the case may be. "It is common," said Lord Justice Bowen, "for contractors who put themselves in the power of the engineer, or surveyor of the employers, to bring actions under a sense of supposed wrong, in the wild hope of somehow or other getting a decision contrary to strict law." That law is, that without a certificate, a contractor is not entitled to be paid, unless the certificate is withheld by fraud and collusion. It is true that in the case of *Pawley v. Turnbull* (Roscoe's "Digest of Building Cases," p. 27), a builder was held to have a right of action, because the architect in regard to the certificate had acted "improperly and unfairly." But such impropriety and unfairness must be by the light of the last case in the Court of Appeal and other decisions of tribunals of less authority, clearly be such as in the eye of the law would be equal to fraud. The lengthy and expensive litigation, the cost of which will be borne by the plaintiff in this case, should be a warning to all contractors not to enter on these forlorn hopes. We have over and over again pointed out the sanguine recklessness with which contractors enter into contracts by which they are absolutely at the mercy of engineers and architects, and how futile it is at the eleventh hour to try and escape from the bonds they have made for themselves. The cost of an arbitration of twenty-two days, or of a trial before a judge, and an appeal to the Court of Appeal are the substantial items to set on the debit side against the sum of 670*l.*, which the defendants were willing to give the contractors, not as their legal right, but simply from good nature.

**T**he *Daily News* of Monday last admitted to its columns what can only be described as the despairing wail of a confirmed and unreasoning "Anti-Scraper," in the form of a letter from a correspondent "N. M." He writes:—

"There remains in London one ecclesiastical building of the twelfth century yet unrestored, and lovers of early Medieval art have been hoping that this one had been overlooked by the destroyer, yeelped restorer. It appears now, however, that the fiat has gone forth. To-morrow, perhaps, an army of irreverent scrapers will be turned loose in the venerable church of St. Bartholomew the Great, with instructions to obliterate every trace of antiquity from its walls. There is, perhaps, only one way of preventing this dreaded consummation, which is to withhold the supplies; and it is devoutly to be hoped that the subscriptions to the restoration fund will be only sufficient to meet the really necessary repairs, so that the restorers may be restrained by lack of means from undertaking any works tending to rob the church of its venerable appearance."

We wonder whether the writer of these rabid sentences saw the interior of the church as it was up to within a week or so ago? The idea that "lovers of Medieval art" could have indulged the hope that the church would be allowed to remain in its deplorable and despoiled condition is absurd to a degree only equalled by the audacity with which it is assumed that "an army (!) of irreverent scrapers" will be instructed "to obliterate every trace of antiquity" from the walls of the building! The writer either does not know what is proposed to be done, or he wilfully misrepresents the proposals of the Committee and their architect. His diatribe would not be worth notice in these columns except as a specimen of the length to which some of the neck-or-nothing "anti-restorers" can go in the direction of wild and baseless assertion.

**T**HE project for the erection of a St. Gothard monument, in commemoration of the piercing of the tunnel through that mountain

has now taken a definite form. It was originally intended to place the monument in some prominent position on the mountain, either at Göschenen, on the Swiss side, or at Airolo, at the Italian end of the tunnel, but this has been abandoned, and it has now been determined to erect the work at Lucerne. A model of the monument has already been executed by the well-known sculptor, M. Richard Kissling. According to the new plan an artificial island is to be constructed in the Lake of Lucerne, not far from the quay, and near the Schweizerhof, which is to serve as the pedestal. The sculptor's work represents a young man, mounted upon winged wheels, personifying the genius of the age of steam travelling. On two of the sides of the socle will be medallions, containing the busts in relief of the engineers of the tunnel, MM. Louis Favre and Alfred Escher.

**P**OLITICAL disturbances in Greece happily do not seem so far to have retarded archaeological work; the excavations of the French school have begun again at Delos, and the *Δελφὶν τῆς Ἑλλάδος* (No. 474) reports that the American school is just about to set to work at a systematic exploration of the ancient theatre at Thoricus. "Thoricus et Brauronia, olim urbes, jam tantum nomina," so wrote Pomponius Mela in the first century A.D., and it is noticeable that Pausanias makes no mention of the place: probably the ruins were inconspicuous. Since then the fortunes of Thoricus (now Port Mandri or Theriko) have looked up again. Important mining operations from the Laureum mines are carried on there. To some of us the place still owes its sanctity to Makronisi, the "Long Island" which shelters its harbour. There Helen rested when she fled with Paris. The theatre, which is to be the scene of the American excavations, is noted for its unusual form; it has also a pointed gate similar to the one at Tyrus. On the promontory of the town the ruins of the fortifications built by the Athenians in the Peloponnesian war still remain. There is also, on the west side of the theatre, a Doric building, the purpose of which is uncertain.

**S**OME "Proposals for Antiseptic Drainage" made in a pamphlet, sent to us by Dr. J. M. Lownds,\* indicate that he has not much practical acquaintance with the subject, although he writes of sewage, sewage-farms, reservoirs, and pumping-stations as if he had. The working of his proposed system would come to a deadlock in a hundred places at once, in a town even of the 20,000 population he mentions, to say nothing of London, of which he makes further mention. There is one saving proposal, and that is all. Where a cess-pool must be made for the reception of liquid sewage, Dr. Lownds proposes to cover the surface of the liquid with a film or layer of "oil containing about ten per cent. of an antiseptic such as terebinthine oil, crude creosote, carbolic acid, &c." He has for eighteen or nineteen months preserved urine in a glass vessel exposed to sunlight, air, and heat in a conservatory, "free from decomposition and smell, as at first, and the mucus is just as it appeared when it settled down." Where it may be proper to prevent this decomposition the method might be tried, as it seems to effect the purpose.

**T**HE drawings made for Mr. Ruskin for "St. George's Guild," and which are on a screen in the same room with Mr. Goodwin's drawings of the Fine Art Society's galleries, are exquisite specimens of what illustrative drawing of architecture should be, a large portion of them being of architectural subjects. The artists are Signor Alessandri, Mr. Frank Randal, Mr. Fairfax Murray, Mr. T. Rooke, and Mr. W. G. Collingwood. Mr. Rooke's drawing of one of the richly-coloured stained-glass windows from Chartres is a splendid piece of work, with almost the deep sombre glow of the glass itself. Mr. Randal's drawings of the porch and of the lion and dragon sculptures at the cathedral of

Bergamo, and the Tabernacle at Santa Maria Maggiore at the same place, are models of illustrative architectural water-colour drawing. The whole of the small collection shows the most conscientious work, with a desire to realise the effect of the original, at whatever cost of labour and patience. Architectural draughtsmen and students should not miss looking at them.

**A**T the International Art Exhibition to be opened in Berlin on Sunday, the 23rd, more than a hundred English artists will be represented. The total number of their works, to be shown in a separate compartment, will be about 130, of which sixty are oil-paintings, fifty water-colour drawings, and twenty sculptures. The Exhibition is expected to represent the best work of the leading German artists of the day.

**T**HE Burlington Fine Arts Club have had on view for the last fortnight in one room in their house a small but very interesting and valuable collection of illuminations from manuscripts, principally Italian and French. These include some very large, fine, and elaborate pictorial initials, letters enclosing paintings, &c.; there is very little of mere decorative borders or letterings, but there are one or two very beautiful Arabesque borders. The examples of the Venetian School include some cuttings from Ducal commissions ("Ducalcs") from the Venetian Senate to individual persons, officers, &c., in which the portrait of the Commissioner was usually introduced. These are very fine in execution, and, being as they are, mere ornaments to a State document, are worthy of the city of Titian.

**F**ROM the *Berliner Philologische Wochenschrift* (May 15) we learn that Dr. Schliemann intends to crown the romance of modern archaeological enterprise by the excavation of the oracle-cave of Trophonus. We were not aware that the exact site of this wondrous cave was known, but no doubt Dr. Schliemann holds the clue. The memory of Trophonus and his brother Agamedes is, no doubt, enshrined in the heart of every architect, so we need not recall the excellent stories that Pausanias tells of their buildings; they were at work before *Dædalus* himself, they were men "dear to the immortal gods," men "wonderful at building temples for the gods and palaces for mortals," and above all things they built "strong treasure-houses" for Minyas at Orchomenos, for Hyrieus at Hyria, for Angeias at Elis. It is at Lebadeia (Livadia), that Dr. Schliemann intends to set to work, where the oracle of Trophonus was consulted by Croesus, and again by Mardonius. It kept up its prestige long after the other oracles of Boeotia were dumb. It may be that the cave still holds strange treasures of curious idols and quaint votive offerings. Anyhow, the exploration is the fitting sequel to Dr. Schliemann's work on the semi-mythical sites of Troy, Mycenæ, and Orchomenos.

**A**T Messrs. Tooth's gallery in the Haymarket there is opened to-day a collection of paintings by M. Tissot, entitled "Pictures of Parisian Life." These consist of sixteen paintings all of the same size, and arranged round the room as a series. They are not on the small scale and in the highly-finished manner in which M. Tissot used to paint London Society when he lived in England; he paints on a larger scale now, and artistically in a far inferior manner; the flesh tones are in too many cases crude and untrue; the texture hard; the figures on all the planes of the picture painted up to the same degree of force and brightness, at least in some cases; as in "The Amateur Circus," where the amateur clown in the ring seems to be on the shoulder of the lady in the foreground. Artistically, this is a great declension from the artist's old style; but, in some other respects, the pictures are exceedingly clever and bitterly satirical. We are shown the "fashionable beauty"—a soulless doll walking calmly between two rows of admirers; the girl "without dowry," also a doll, and evidently waiting to

\* No publisher's name.



catch some one; the "political woman," who has married an old man she expects will become a Minister; the woman of fashion blocking herself in the hall for her next rendezvous; "painters and their wives" sitting down to lunch after "varnishing morning"; the "provincial women" with their father, who have come too early to the Prefect's reception, and are open-mouthed at the splendour of the empty rooms. The manner in which the various shades of society are discriminated is worth note; the banking society in "the fashionable beauty" who is only in a certain set) is quite distinguished from the style and manner of the personages in "The Woman of Fashion," who belongs to the best set. This is all very clever, but it is not pleasant, and the painter is no more in earnest than his personages. He has been producing a popular picture show; that is all. It is not a very high use of art; but the whole set of paintings is a curious commentary on Feuillet's recent novel, "La Mort."

#### ARCHITECTURE AT THE ROYAL ACADEMY.—IV.

No. 1,628, "New Offices, Legal and General Life Assurance Society, Fleet-street," is another building by Mr. Edis, an example of the application of terra-cotta to street architecture, though the fact of the employment of terra-cotta is not indicated in the uncoloured pen-drawing in which it is shown. The ground-story, with a Roman triglyph cornice, is very only treated; the porch of the principal entrance is carried on fluted columns with the lower portion of the shaft covered with sculptured or rather modelled ornament; a plain massive rusticated pier between the two windows gives further value to the decorated surfaces. The building serves to show how much decorative effect the employment of terra-cotta gives scope for, without extravagant cost, and (which is more important) in a material far less affected by London atmosphere than an ordinary building stone.

1,630, "Cheltenham Grammar School: accepted Design," Mr. Henry Hall. We published this drawing recently. The plan is not depended, as it should have been. The school, with large square mullioned windows, is set back from the road, a courtyard being left in front of it, flanked by residential blocks. It is a pleasing-looking building, suitable for its purpose.

1,631, "Almshouses at Charlton, Kent, built by Trustees of the Dutch Church, Austerlitz, &c.," Messrs. Tanson & Son. A plain brick building of Late English type, the centre apparently an administration block, higher than id projecting beyond the wings, which are plain in their neatness." No plan.

1,632, "Business Premises, Foregate-street, Chester," Messrs. Grayson & Ould. An attempt to do something in keeping with the old Chester architecture, but in a more massive style. The ground-floor has round arches with no impost, is bay an open loggia, after the Chester fashion; two bays forming shop-windows. The windows above are mullioned, and the gable finished with what would be corbie steps, only the angles are filled up with scrolls. Generally picturesque, but rather wanting refinement in detail, and a by no means good drawing, in this respect certainly not vindicating its favourable position on the walls.

1,636, "Premiated Design for the New Baths, Stockport," Mr. W. G. B. Lewis. A neat, domestic-looking building, with no show about it, but nothing in its character to indicate its object; it looks rather like a private house, with a one-story addition for billiard-room at the side. No plan.

1,639, "National Liberal Club: Whitehall-front," Mr. A. Waterhouse. A powerful but rather loaded water-colour drawing, giving an effective view of this part of the building, with the polygonal angle tower seen on the left. The effect of the balcony on heavy corbels running under the second-floor windows, and opposing against the sides of the projecting bay, tying the whole together, is well shown in this drawing, which generally conveys very well the massive character of the building.

1,641, "New Premises for the College of Receptors, 2 and 3, Bloomsbury-square," Mr. J. Finch. A building rather heterogeneous

in detail; panelled pilasters à la Renaissance with Gothic cusping in the middle as an ornament; square-headed windows with mouldings receding as in Gothic work, but, nevertheless, with (apparently) the outer moulding standing out beyond the wall-face, as in a Classic architrave; the whole suggests an effort after originality by combining details not generally combined. The combination is not unsuccessful in itself; at least, it is not owing to that peculiarity that the building is not very pleasing, but to a want of general refinement.

1,646, "Council House and Art Galleries, Birmingham," Mr. Yeoville Thomason. The sort of architecture that delights the heart of your Birmingham man *pur sang*: large, costly, and respectable, without a spark of artistic feeling or originality. A good water-colour drawing of the architectural draughtsman style, with a sufficient number of carriages and people.

1,648, "Harrow School: New Museum and Class-rooms," Mr. Basil Champneys. A brick Queen Anne building, with the usual illogical details, which the fashion for a particular epoch alone makes people admire, but with a good many pleasant points of treatment in spite of this. The corbelled balcony running along part of one side, with the picturesque bay windows at each end, is one of these; also the open arched staircase in the angle of the other front. No plan; so that we cannot tell the least how far these architectural features lend themselves to the arrangement of the plan, or express or emphasise it.

1,655, "The Guildhall School of Music, now being erected at Blackfriars for the Corporation of London," Mr. Horace Jones. We gave the elevation of this building some time ago. It is a square Italian building, with rusticated ground story, very plain, the only special feature being the insertion of carving in the spaces which would otherwise be the second-floor windows, excepting the end ones; this portion of the building being raised higher than the rest, and we presume marking the concert-hall. No plan. The building is, we very little doubt, practically suitable to its purpose, nor does the exterior sin against good taste in any way; but its purely architectural merits are certainly of too negative a description to have been worth all this paper and colour and wall-space.

1,656, "Design for the Mappin Art Gallery, Sheffield," Mr. J. B. Webster. This, we imagine, should have been labelled "competition design." It is not the selected one, but, as far as exterior architectural design, it is as superior to the selected one as light to darkness. No plan; and therefore we cannot form any judgment as to whether the arrangement and practical treatment of the building would or would not have justified its selection. The building has something the look of a Classic church in outline and composition. It has a very picturesque octagonal turret and a large semicircular annexe, the lower story of which forms an open porch. The remainder of the building is apparently in a three-aisled form, with clearstory windows, which would not be much seen from below and are plainly treated, with the practical object of giving as much light as possible. The outer side walls are solid and pilastered, with statues in niches between the pilasters. It is shown in an admirably-executed pen-drawing. It is a great pity the author did not add a small plan and section to indicate his practical treatment of the building. The exterior treatment is very pleasing and original.

1,662, "Chelsea Vestry-hall," Mr. J. W. Brydon. A large elevation of this Queen Anne vestry-hall, the centre portion of which seems to be modelled on details from St. Martin-in-the-Fields. We illustrated the design at the time of the competition.

1,665, "Cheltenham Grammar School: competitive design," Messrs. P. Thicknesse & W. E. Willink. A design showing the same general arrangement as the accepted one, the school thrown back, and accessory buildings flanking the space in front, so that, we presume, this general arrangement was part of the programme; but in this case the end of the school building is turned to the road, instead of the side. The building is a great deal more picturesque one than the accepted design, but as no plan is given with either, it is impossible to give any judgment as to their real practical merit for the purpose for which they were intended.

1667, "Salcombe College, Loughton," Mr. James Cubitt. We presume a girls' school, treated in a picturesque, homelike style; an attractive building to arrive at, as a girls' school should be. No plan.

1,669, "London and County Bank, Kensington: New Premises," Mr. Alfred Williams. A richly-treated elevation of Late Gothic detail, the bank duly marked by large mullioned windows on the ground story. Some of the details are of Early Renaissance type, but mixed with details more decidedly Gothic than are usually found in this combination. It is not refined architecture, but it is a creditable attempt to give something more of architectural effect and interest to a bank than bankers usually care for; this class of professional men being in general, for some reason, more utterly and stolidly opposed to architectural beauty or picturesque than any other class; the bad effect on the mind of continually handling money, we presume.

#### THE "SHIPPERIES" EXHIBITION, LIVERPOOL.

As the various sections of this Exhibition are got more into shape, its real scope and interest become more apparent. But there is still an immense amount of work to be done before the display can be said to be complete. The workman's hammer is heard in all parts of the building, and empty stalls are gradually filling. But the annex set apart for "machinery in motion" remains almost a chaos, and it must be some weeks before the whole of its contents can be in working order.

The most conspicuous, perfect, and not the least interesting section of the exhibits is that of the marine models, which are arranged on each side of the central main avenue; and from a scientific point of view, as illustrating the history of shipbuilding in Great Britain, and, indeed, also in Europe and America, during the last century, this collection is highly instructive, not only to the shipbuilder and engineer, but to all men of intelligence. The list of exhibits in this department occupies fifty-six pages of the printed catalogue. These models are for the most part of excellent workmanship, and are contributed by the Royal Naval College, Greenwich; the Bureau Veritas, Paris; Messrs. Laird Bros., Birkenhead; Sir W. G. Armstrong & Co., Newcastle-on-Tyne; the White Star Line, Liverpool; Messrs. Henderson Bros., Liverpool; D. J. W. Henderson & Co., Partick, Glasgow; the Cunard Steamship Company; Inman Steamship Company; National Steamship Company; Cayzer & Co., Glasgow; Gairton & Co., Liverpool; Denny Bros., Dumbarton; John Reid & Co., Port Glasgow; R. Napier & Sons, Glasgow; G. L. Watson, Glasgow; Messrs. Alexr. Richardson and St. Clair Byrne (both naval architects, of Liverpool); the Liverpool Model Yacht Club, &c.

The specimens of naval architecture thus brought together of course form one of the chief features of an exhibition whose very name implies that the illustration of the shipping of the civilised world and its appliances is its almost main object.

This series of models comprises nearly every known class of vessel. The iron-clad man-of-war (in many instances accompanied by drawings and sections explanatory of the construction), the ocean liner, the cargo-carrying sailing ship, the Channel passenger steamer, the steam yacht, the river-ferry and towing steamer, and the most modern type of cutter and schooner yachts. Along with these are many examples of our now-obsolete wooden sailing frigates and other wooden ships, down to the collier brig of a century ago. There are also excellent models of past and present light-ships, lifeboats, &c., showing all their arrangements and equipments. A more complete marine show has probably seldom been got together. As connected with steam navigation, Mr. John Dickinson, engineer, of Sunderland, exhibits a patent crank shaft, made of separate pieces and fitted together with screw bolts, and thus capable of repair at sea. It is essentially, he says, a "built shaft," being more easily taken to pieces and put together than any other shaft extant; and in the event of a flaw taking place in any part of the shaft, that part may be replaced at a fraction of the cost of the whole shaft. By carrying a spare web and pin and two shafts, should a breakdown occur at sea, the faulty part could easily be replaced by the



engineer and assistants without the expense and risk of taking the ship into port. A sound forging is ensured in the shafting owing to its being made in short, straight, easily-handled lengths. The shaft exhibited is a very fine piece of workmanship. The web and pins are cast-steel, and the forgings of iron or steel. We are informed that several steamers have been fitted with this shaft.

Messrs. Vicars & Co., of Sheffield, exhibit two screw-steamer blades of cast steel, duplicates of those supplied by them to the Cunard steamers *Umbria* and *Urania*, of 7,000 tons. Messrs. John Brown & Co., Atlas Works, Sheffield, have a Siemens steel furnace-front, flanged by hydraulic pressure in one heat, as made for the steamers building for service at Queenborough. The same firm also show an Ellis's patent steel-faced armour-plate, tested by a twelve-ton service gun with chilled cast-iron Palliser projectiles (256 lb. weight each), charged with 50 lb. of powder, at a range of ten yards. The result of three shots in different parts of the plate is an indentation in each instance about half way through, but scarcely any bulge or crack is visible at the back of the plate, which is a 10-in. one. Had the plate been of iron only, it is said it would have been pierced completely through; or if of steel only, it would have been broken up into pieces.

The "Mersey Forge Company," and Messrs. C. Cammell & Co., of Sheffield, show some massive iron forged-work for cranks and main shafts for large ocean-going steamers.

Messrs. Doulton's Trophy, which we mentioned in last week's notice, next attracts attention. This structure, which is in itself an exponent of the use to which Doulton ware may be applied in decorative art, is a pagoda-like design, square in plan, and entered by arched doorways from all four sides. There are also four detached stands, ornamented with porticos, &c., situated at each corner of the area formed by the dome of the Exhibition Building, under which the whole group stands. Their furnishing is not yet completed, but the centre trophy is intended to contain samples of Doulton ware in all its applications, besides some specimens of stained glass produced by a new process; while the corner stands are to exhibit stone-work, fire-proof flooring, chemical ware, sanitary appliances, &c. It will probably be a fortnight before these stands are really finished.

The New Ferry Brick Co. exhibit some good moulded brickwork, of a uniform brownish-red colour, the decorative devices being generally sharp and well formed. The "lock-jaw" roofing tiles patented and manufactured by Mr. Charles D. Phillips, of Newport, Mon., have been chosen by the Aylesbury Dairy Company for the roof of their extensive building.

Among the exhibits from Douglas are specimens of a fine-grained grey limestone from Castletown. It is stated that Castle Rushin was built with stone from the same quarry 900 years ago, and that it is in almost as perfect a state as when first erected. Messrs. Stone Brothers, of Bath, have on view specimens of a Bath stone which they claim to be specially durable. They quote a report of Mr. J. L. Pearson's upon work completed twenty years ago with it, and which had been exposed to the direct action of the sea. Mr. Pearson says:—"I found it had acquired a hardened surface on which the weather seemed to have had no influence, and I found it had deepened in colour to a rich yellow tint, toned down in places by a grey lichen which had grown on its surface, and which is a sure sign of a good weather stone."

Messrs. Fred. Jones & Co., of London, devote a stall to their patent silicate cotton, or "slag wool," for making walls, partitions, ceilings, and floors fire and sound proof,—the best material for the purpose which has been brought out; and Mr. T. I. Constantine shows specimens of his "Treasure Cooking Ranges." Messrs. Pendleton & Co. exhibit Wright's patent "As you Like it" grate, which we described and illustrated in our issue of Oct. 17, 1885. Mr. Muller, of Birmingham, has a gas apparatus for lighting places where coal-gas is not attainable. This gas being produced without fire or heat, he calls it "The Alpha patent Air-gas Apparatus." It is a compact and portable machine.

In the machinery department proper, the most striking objects at present on view are locomotive engines. One, called the "City of Liverpool," manufactured at the Crewe works of the London and North-Western Railway, is a remarkably fine piece of workmanship. It

is one of the three-cylinder compound passenger engines, on Webb's system, which we before noticed in the Inventions Exhibition, and has two high-pressure cylinders, 14 in. by 24 in.; one low-pressure ditto, 30 in. by 24 in.; and coupled driving-wheels 6 ft. 3 in. in diameter. Among other locomotives is the "Victoria," by Messrs. Sharp, Stewart, & Co., of Atlas Works, Manchester, made for the Lancashire and Yorkshire Railway; and one by Messrs. Black, Hawthorne, & Co., Gateshead-on-Tyne, made for the Brazil Great Southern Railway. This latter is fitted with elaborate iron "guards" back and front, for removing obstructions.

In strong contrast to these powerful modern machines is their neighbour, "Locomotive," said to be the first that ever drew a passenger train on any railway, and which is the type of engine which led up to the construction of Stephenson's "Rocket," which figured at the opening of the Liverpool and Manchester Railway a few years afterwards. Certainly in its small size and feeble and elementary appearance it sets off to advantage the modern work among which it stands, and illustrates the enormous strides which have been made in mechanical engineering during the last half-century.

Messrs. Schaffer & Budenberg, of Glasgow, exhibit their patent pressure and vacuum gauges, patent hydraulic gauges, automatic expansion regulator with governor for steam-engines, and other inventions.

Messrs. Moser & Sons, of Borough High-street, London, have their patent fan-forges and fan-blowers on view. Their improvement on others consisting in the construction of the fan, and the method of driving it, by which they are said to be the most powerful yet produced, the use of bands being avoided, and fly-wheel and multiplying-wheels substituted.

Messrs. Henry Pooley & Son, of Liverpool, exhibit a variety of their weighing-machines and weigh-bridges, but their most important exhibit is a set of their locomotive engine balancing tables, fixed in the main avenue. These tables are eight in number, arranged in pairs, and so adjusted as to give separately the weight distributed on each wheel of an eight-wheeled locomotive engine.

Messrs. Lockwood & Carlisle, of Eagle Foundry, Sheffield, have their "patent double-action metallic piston packing-rings and spring" on show. With these they claim to secure thorough steam-tightness with the least possible amount of friction; springs that are not liable to break or lose their action, and may be simply and easily adjusted when required; in conjunction with a system of packing-rings which are at once strong, elastic, and durable.

It is almost premature to enter into any detail as to the foreign contributions to the collection, for the galleries in which the Italian, French, and Belgian treasures are to be displayed are only just beginning to fill up their empty spaces. What is already to be seen gives great promise, however, that in productions of art, bric-a-brac, and articles of vertu generally, this portion will perhaps be the most attractive in the Exhibition.

In the Italian Court, for instance, A. Bancer, of Florence, has a beautiful selection of ebony inlaid with ivory, carved work in oak and walnut, &c.; and in both the French and Italian Galleries some apparently fine marble sculptures are in course of arrangement.

Among the miscellaneous exhibits, which it is impossible now to particularise, there are many of great interest and value. The Liverpool trophy of imports and exports is a commanding and interesting object. Messrs. Elkington & Co. have an extensive collection of silver and plated goods, including two large shields executed in repoussé work. The principal pianoforte and other musical instrument manufacturers are largely represented. Messrs. Gruisen & Son, Dreaper, Cramer & Co., Metzler & Co., and others have each exhibitions of pianos, chamber-organs, &c., showing the most recent improvements in their construction. Messrs. R. J. Ward & Son, of Liverpool, exhibit brass instruments and flutes in the actual course of making. Messrs. Charnot, of Wardour-street, London, have also a good show of stringed instruments.

In the grounds outside the Exhibition building an "Ashantee Village," an "Indian Pavilion," and a "Settlement of Laplanders" are in course of preparation.

The late bad weather has, however, greatly impeded the outdoor operations; but with the

return of sunshine and the result of a few days' labour, both the exterior and interior of this very extensive Exhibition will no doubt wear a greatly improved aspect.

## VINEGAR-YARD AND AN OLD PLAY-HOUSE.

A MEMORIAL OF DICKENS.

For shouts were heard mid fire and smoke,  
And twice ten hundred voices spoke,  
"The Playhouse is in flames!"  
And lo! where Catherine-street extends,  
A fiery tale its lustre lends  
To every window pane.

REFLECTED ADDRESSES.

The offices of the *Builder* in Catherine-street look out towards the back on to a little plot of ground, barely one roof in extent, which had apparently escaped the notice of London topographers. Whatever may be its previous history, this piece of land now belongs to the parish and church of St. Mary-le-Strand, whilst its elevation above the surrounding level indicates how fresh it was used for interments. A long-neglected and, until recently, noisome open space, it some time ago came to the notice of the Metropolitan Public Gardens Association, and a faculty having been obtained, the rector of St. Mary-le-Strand, the Rev. Canon Tugwell, gladly giving his consent, the space has, at a cost of 180*l.*, been made presentable by being covered with tar pavement, a small flower-bed being provided and a couple of trees planted, though the space is so hemmed in that any attempt at anything ambitious in the way of horticulture or arboriculture would be futile. A number of seats have been placed about the ground, and an appeal is made by Lord Brasenose for funds for the erection of "a handsome drinking-fountain in memory of Charles Dickens," for this burial-ground is by many people believed to be the one so graphically described in "Bleak House," where poor Jo's only friend "Nemo" was interred, and at the gate of which Lady Dedlock was found dead.\* Dickens describes the graveyard in question as,—

"A hemmed-in churchyard, pestiferous and obscene, whence malignant diseases are communicated to the bodies of our dear brothers and sisters who have not departed while our dear brothers and sisters who hang about office backstairs,—would to Heaven they had departed!—are very complacent and agreeable. Into a beastly scrap of ground which a Turk would reject as a savage abomination and a Caffre would shudder at, they bring our dear brother and sister to receive Christian burial. With houses looking on every side, save where a reeking little tunnel of a passage gives access to the iron gate, with every villany of life in action close on death, and every poisonous element of death in action close on life,—here they lower our dear brother down a foot or two; here sow him in corruption to be grained in corruption, an avenging ghost at many a sick bedside; a shameful testimony to future ages how civilisation and barbarism walked this boastful island together. Come night, come darkness, for you cannot come too soon or stay too long by such a place as this. Come struggling lights into the windows of the ugly houses; and you do the mischief therein do it at least with this dread scene set out. Come flames of gas burning so sullenly above the iron gate on which the poisoned air deposits its white-crimen almsy to the touch."

This is no very exaggerated picture of the condition of many town graveyards thirty-five years ago, and it is asserted that Dickens's graphic pen had much to do in hastening the closing of urban burial-grounds. While speaking of the alleged associations of the place with Dickens's "Bleak House," we may be permitted to point out that the Metropolitan Public Gardens Association, with the *Daily Telegraph* and the *Morning Post*, are incorrect in assuming that Dickens's appellation of "Tom-all-Alone's" was given by him either to the burial-ground or to the courts immediately surrounding it. At the end of chapter xv of "Bleak House," Jo, having had a piece of gold given him by Lady Dedlock at the gate of the burial-ground, is described as "setting off for 'Tom-all-Alone's,' stopping 'in the light of innumerable gas-lamps' to look at the coin." This passage alone justifies the inference that in Dickens's mind the burial-ground and "Tom-all-Alone's" were some little distance apart. We believe that it is the opinion of many students of the topography of Dickens's London that "Tom-all-Alone's" was situated in Great Wild-street, a street a little to the eastward of Drury-lane, and the description given of the locality in the chapter already mentioned seems to confirm that view. Th

\* But it is to be observed that Hawdon, the law-writer, and the "Nemo" of the tale, died at Krook's house in the court off Chancery-lane. This is not in the parish of St. Mary-le-Strand, and, therefore, his burial should not have been located in the ground under notice.

† Since these lines were written we notice that the *Daily News* has called attention to the mistake.



point is of interest because Dickens's descriptions of some of the scenes of his stories are realistic word-pictures capable of identification by those whose knowledge of London forty years ago was, like Sam Weller's, "extensive and peculiar."

This small, but, to the poor children of the neighbourhood, very acceptable playground, was formally opened on Wednesday afternoon by Lady George Hamilton, and amongst other noblemen and gentlemen present were Lord Rochester, Lord Fortescue, Col. Burges, the Rev. Canon Tugwell, Mr. J. T. Bedford, C.C., Mr. F. H. Fowler, Mr. Cross, Mr. Augustus Harris, Mr. A. M. Broadley, and a large number of ladies and gentlemen interested in the efficient work of the Association. The formal part of the proceedings being concluded, the children of the neighbouring courts and alleys were admitted to the ground, and large numbers of them remained there until the closing-hour (eight p.m. this time of the year), exercising their limbs and their lungs. Before passing from this part of our subject, we may mention that of the few remaining headstones which are legible, one marks the burial-place of "Mrs. Betty Hadrill, many years housekeeper to the Royal Academy," who died April 28, 1803. This is of interest as recalling the fact that at that time the Royal Academy was located in Somerset House.

Separated from this neglected and well-nigh forgotten burial-ground by Vinegar-yard and Cross-court formerly lay, to the north-east, Vinegar-yard Garden. Until the building to which we shall hereafter refer, the Garden was utterly represented by the space between Drury-lane Theatre and a curtain-wall, which, arising from what is known as Lady Burdett Coutts's door, abutted against Marquis-court. At the Drury-lane end of Marquis-court remains a pretty a name-tablet, of the date 1763, as may be found in the town. At one time Vinegar-yard was a title frequent enough in London; in a few cases,—as in the district under review,—and also in St. Giles-in-the-Fields, in Aldgate, and in Bermondsey, it is most likely a corruption of the earlier and here and there still extant Vinegar or Vinegar-den-yard,—marking the site of a conventual pleasure. Peter Cunningham says it was built circa 1621, and that from St. Martin's-in-the-Fields register an entry of the burial (probably in the adjacent Drury-lane ground) of "blind John out of Vinegar-yard," on 4 February, 1624.\* But he does not mention the one name which should rescue it from oblivion. For in our Vinegar-yard was born Fanny Barton,—daughter of, it said, a guardsman,—who, succeeding to Richeard's and Clive's comic muse, was such Miss Prue and a Lady Teazle as the world has never since seen, and whose face is familiar to us in the many portraits of Mrs. Abington by Reynolds.

In an essay of Elia, written circa 1825, Charles Lamb describes his first visit when a child "not past six years old" to Drury-lane theatre. "My First Play" begins thus:—"At the north end of Cross-court there yet stands a portal, of some architectural pretensions though doomed to humble use, serving at present for entrance to a printing-office." He goes on to say that this old doorway was the identical entrance to old Drury,—Garrick's Drury,—and that it was then left. Garrick's muse was the second to occupy this spot, having been erected from Wren's designs, and, as Cibber recounts, opened on the 26th of March, 1744, with a prologue and epilogue from Dryden's pen. The poet had joined with Killgrew, Mohan, and others in the venture for this "new play-house." Its predecessor, burned down in January, 1692, formed the "King's House" so often mentioned in Pope's theatrical gossip, which Killgrew opened on Thursday in Easter week, March 8, 1693, with Beaumont & Fletcher's Humorous Lieutenant,\* the play beginning three o'clock. Shortly after the Restoration, a bookseller, rebuilt for the third time a notoriously offending Cockpit or Phoenix, a "private" house on the farther side of Drury-lane, just southwards of the old Devil's Gap, a company, however, comprising Hart and other officers in the Civil War, Burt, and mistress Betty Marshall, joined Tom Killgrew's, dining their house to Davenant's troupe. These, after, with Kynaston and Betterton, removed in 1662 to the "Duke's Play-house," in

\* Singularly to say, in one or two maps of about 100 years ago this yard appears as Woburn-street.

Portugal-row, Lincoln's Inn-fields. Pitt-place, in Great Wild-street,\* long preserved a memory of the Cockpit, which had shared more than once at Puritanical hands the fate of certain other houses, the neighbourhood's *dustbin on wheels*, which it was deemed to resemble in repute. Pitt-place, Prince's-court,† and Stewart's-rents (*antique*, Holford-court), together with Orange-court and Wild-passage, marked its site. These pestiferous alleys were demolished in 1881 for the Artisans' Dwellings erected by the Trustees of the Peabody Fund. Thus is gone every trace of a house where, before Commonwealth men gained the upper hand, were brought out Marlowe's "Jew of Malta," Heywood's "Woman Killed with Kindness," and, above all, Massinger's "New Way to Pay Old Debts." Closely associated with the dramatic triumphs of Dryden, Lee, Wycherley, Congreve, and Farquhar, Wren's house was licensed in turn to Rich, Steele, Doggett, and Booth. Here Garrick first performed, under Fleetwood's management, in 1742, earning a salary of 500*l.* a year, and the nickname of the Whitefield of the stage. On September 15th, five years later, he opened the season, as Lacy's co-partner, with "The Merchant of Venice" and Dr. Johnson's incomparable prologue. Here he continued as actor, author, and manager, until, having sold his moiety for 35,000*l.* to Sheridan, Linley, and Ford, he finally took leave of the public on 10th June, 1776.

Together with Charles Lamb's delightful essay should be read, for the sake of contrast, that by Cumberland *à propos* of a same occasion, when taken under proper convoy to Drury-lane from Westminster School. His attention is riveted by Quin as Horatio, dressed in a green velvet coat, an enormous full-bottomed wig, rolled stockings, and high-heeled shoes, pouring forth his heroics, so diverse from his ordinary delivery, with dignified insolitude. Mrs. Cibber as Calista sings in sweet recitative Rowe's harmonious strains. Mrs. Pritchard, as Lavinia, is so different, yet so much more varied, for however "ungentle" in figure, she could pass with facile excellence from Doll Common to Lady Macbeth. Little Garrick, striving to reconcile his audience to naturalness on the stage, then young and alive in every feature and muscle, electrifies the house as he bounds on to the boards as Lothario. Heavens! what a transition! A noteworthy comment, too, on that day's fashions is afforded by Lamb's "Reminiscences,"† and a foot-note to the bill of June 10, 1776, being the very last play-bill in which Garrick's name is printed. It is the last night of the season; his final course of Shakespearean characters is concluded, and as Don Felix in "The Wonder" he is to bid farewell to the stage. The doors open at 6:30, the curtain rises at 6:30; "ladies are requested to send their servants a little after five to keep places to prevent confusion."

Referring to J. Gwynne's plan of 1766, we see that the theatre at that time was co-extensive with the auditorium of the existing structure. Four approaches severally opened through Vinegar-yard, Drury-lane, and the then Brydges and Little Russell streets. A passage ran from Little Russell (now Russell) street into Vinegar-yard. The front of Garrick's house had a handsome elevation, resembling somewhat Wren's Middle Temple gate in Fleet-street. A pediment, carrying at its two corners the royal supporters, encauchant, and at the apex a trophy of arms, was sustained by five fluted pilasters resting upon a Palladian basement story having five spacious doorways. Destroyed by fire, the theatre was rebuilt by Henry Holland on an enlarged scale as to accommodate 4,000 spectators. But this—the third—house met with a similar fate; for on the night of the 24th of February, 1809, after a brief life of but fifteen years, it was totally consumed. The existing house, designed by Benjamin Wyatt, was finished at a total cost of 150,000*l.* The Russell-street colonnade, of cast iron, and the portico in Catherine-street, surmounted by a leaden figure of Shakespeare, are more recent additions. The opening on the 10th of October, 1812, with a prologue by Lord Byron, is memorable for the publication in a thin 12mo.

\* So named after Humphrey Weld, who built (1661) over the Aldwych Field property that had belonged at divers times to the Holland, Drury, Stradling, and Digby families.

† Part of Drury-lane, temp. James I. was called Prince's-street, but that style really belonged to the now newly christened Kombe-street, a thoroughfare dating from the days of the Hollands and Drury's in Elizabeth's reign.

His first visit was made in 1781.

volume that year of the wittiest parodies, by the Brothers Smith, in the English language. Just within the semicircular wall, and facing Cross-court, stood the pit entrance spoken of by Charles Lamb. All traces of that relic have been removed for new "property" and store rooms, lately constructed under the superintendence of Mr. C. J. Phipps, F.S.A., architect.

#### SCULPTURE AT THE ROYAL ACADEMY.

To the works in sculpture by the President in this year's Academy we have already alluded, as also to the very remarkable and original work by Mr. Gilbert, "The Enchanted Chair." Among the other leading works in the exhibition, perhaps none will attract more attention than the figure of "The Sower" (1,924 in the lecture-room), by Mr. Hamo Thornycroft, of which we have the pleasure of giving in this number a sketch, made specially for our pages by the sculptor. As to the entire suitability of such subjects as this, and the well-remembered figure of "The Mower" by the same artist, to sculptural art, we have our reservations. We should scarcely like to see them executed in marble; the material seems too fine to bestow on such details as boots and gaiters. But, in plaster or terra-cotta, these life-size and life-like representations of figures in the garb of their every-day vocations have a very high interest; and "The Sower" is, perhaps, superior in artistic expression to its predecessor. The long, swinging stride with which the sower walks over the furrows is admirably given; there is no hurry in the action, which is sufficiently quiet and subdued to come within the proper domain of sculpture; the expression of the face is fine and dignified; the whole reminds us somewhat of the feeling of the figures in some of Walker's paintings of rustic life; like them, it seizes the best and most dignified phase of rustic character.

Taking the other sculpture exhibits in the order of numbering, we notice first Mr. Mullins's marble bust of "the late W. C. Worthington, F.R.C.S." (1,750), notable for the bold treatment of the marble, which is not polished up, but left with its crystalline surface and visible tool-marks. The bust of Dr. A. Carpenter (1,754), by the same sculptor, has the same characteristics. Whether the real object of a portrait bust in marble would not be better fulfilled by the old-fashioned treatment, showing the head and partly nude bust without any of the details of coat-collar and shirt-front, is a question to be asked. We have no particular fancy for the execution of crumpled shirt-fronts in marble. But in both cases the treatment of the countenance is in true sculptural feeling. Of Mr. Pomeroy's design, submitted in the students' competition for "Cain an Outcast" (1,751), we have already given an illustration (*Builder*, April 17) and commented on its high merits and promise as the deservedly successful design in the competition. Mr. Adams-Aiton has a good portrait-statue of "David F. Carmichael, Esq., of Madras" (1,753), a seated figure so full of life and character that the drawback of the modern dress, so unsuitable for sculpture, is half forgotten. This in its way is one of the most successful works of the year. Mr. Nelson Maclean's marble statuette of "Comedy" (1,755) we have before noticed in speaking of a special exhibition of his works. Mr. Gilbert has a plaster bust of "Mr. Cyril Flower, M.P." (1,757), another of the realistic busts, which has a great deal of "go" about it; it is what old-fashioned people used to call "a speaking likeness." Miss Lipscomb's terra-cotta bust, "Day-dreams" (1,759), should be looked at as a very expressive head, slightly angular in contour, not strictly beautiful in feature, but with a beauty of a higher order than mere physical form.

Mr. Carl Müller's "George Burnard, Esq." (1,761), is another of the terra-cotta portrait busts, in which there seems to be an attempt to idealise the costume with some effect. Miss Susan Canton is a rising sculptor; her work this year is much in advance of what she has previously attempted. Her group, "What hast thou done?" (1,764), which seems to represent the Cain and Abel legend, and shows the instant of remorse after a murder has been committed, is, perhaps, over-accentuated in the anatomy of the figures; but it is a fine and expressive group on a small scale. Mr. Mark Rogers, jun., exhibits a marble "Caryatide for Chimney-pieces to the Saloon at Ashridge"



(1,766), appropriately placed so as to flank the door into the picture-gallery behind; it is a male figure, with head bent on the right shoulder, the left shoulder sustaining the cornice; a stain on the marble has an unfortunate effect on the nose and left eye, and the position of the figure is rather painful, confirming, in our eyes, the doubt we always have had as to the advisability of employing figures in this semi-constructive office, respectable as is the precedent for it. The figure itself, however, and the manner in which the vertical weight is taken by the left leg, is fine and sculptural. Miss Chaplin's "Lioness and Cub" (1,767) is an animal study of a larger size than usual with her, but quite equal in natural action to any of her smaller animal groups with which we are so familiar. Mr. Albert Toft is a name we do not remember before; but his "Study of a Young Man" (1,769), a terra-cotta bust, showing head and neck only, without any realistic adjuncts, is a very spirited thing; and so is his portrait bust of "Nelson Dawson, Esq." (1,801—lecture-room). He is a sculptor of whom one is likely to hear more. Signor Fontana's "Il mio fedele" (1,770), a girl and dog, is one of the "pretty-pretty" order of things, which delight children.

Mr. Brook's statue of Sir Erasmus Wilson (1,772), to be executed in bronze, and erected in front of the Infirmary at Margate, is a fine and very dignified example of portrait sculpture. The great authority on skin diseases is represented standing with clasped hands, and holding a book, the official gown which he wears furnishing the sculptor with a means of giving a broad "drapery" effect to the figure. Mr. Pinker's statue of "John Hunter" (1,781), a bronzed plaster-cast of a statue presented by the Queen to Oxford University Museum, is, however, perhaps the most successful work in this class as regards energy and expression. The great physiologist is leaning with one elbow on something,—we cannot well make out what,—and looking forward with compressed lip and an eager face, something like that of the monk in the "Sentimental Journey," that "looked as if it looked at something beyond this world." Hunter's studies were prosaic enough certainly, yet he must have had the kind of persuasion of future fame which is so well expressed in this work.

Mr. Havard Thomas's "A Slave Girl" (1,774) is a realistic marble study of the figure, with little beauty, but not without pathos. The expression of the face is in keeping with the attitude of the hands, half extended, as if in deprecation of her position and treatment. Mr. H. Christie's "Spring" is a pretty plaster sketch of a girl playing with lambs, which may be instructively contrasted with the girl and dog group above referred to; the action in "Spring" is really natural and unaffected. Mr. Birch's colossal statue of "Major-General Earle" (1,786), which occupies a central place opposite the entrance, is only half successful. The figure is represented as advancing to or leading on an attack, sword in hand; but the action savours too much of stage warfare; there is not the energy of real combat in it.

The lecture-room contains a great many small things of merit which we have not space to mention in detail, and of course a certain proportion of commonplaces. The most important works in it next to those we have already mentioned are the bas-reliefs by Mr. Harry Bates. The first of these is "Homer" (1,811), who is represented by a figure not quite dignified enough for the ideal of the ancient bard, seated at one end of the panel, bent over a harp, while at the other end are two beautiful women, one seated, the other reclined, listening to him. "Socrates" (1,827), a marble relief, by the same sculptor, is the finer work. Socrates is seated on the right, in attitude and manner as if arguing and laying down a proposition; opposite to him a nearly nude young man sits in an attitude of deep thought, the hands clasped over one knee; two other figures are behind him; a young man also stands behind Socrates, leaning over him. The composition, from a decorative point of view, is beautifully balanced, the expression of the two principal figures, in countenance and attitude, very good. On the opposite wall is a cast of the first of the sculptured panels of St. George's Hall, Liverpool, which has been executed (1,872), and about which there has been some foolish depreciatory local criticism. It is by Mr. Stirling Lee, and represents "Justice as a Child of the Poor, led by Understanding

into the Way of Wisdom, Joy following, strewing her Path with Flowers." So much meaning may be said to be a "rather large order" for one panel, and the nude child figure put to represent Justice is rather too young to have come to any years of discretion or any beauty of person; but the main treatment of the panel, with its broad surfaces and flowing draperies, is very sculptural, and eminently fitted to contribute to the decorative effect of the great Modern-Greek building for which it was designed. We presume the sculptor's intention was to show in further panels the stages in the growth of Justice; and we hope some more of them will be commissioned before long.

Looking round the room we note the design for the sculpture portion of the Sir John Goss Memorial, by Mr. Hamo Thornycroft, a panel in very low relief representing kneeling choristers. Mr. C. Calderon's "Fiore di primavera" (1,794), a very pretty female bust, should be looked at; and Mr. Onslow Ford's "A Hop-picker" (1,814), a bronze model of an old, seamed, weather-beaten face, pathetic to look at in connexion with the title. Mr. Lawson's "Summer" (1,823) is a piece of real sculpture. Like his "Spartan Dancing Girl" of last year, it is an expression in sculpture of a moment of repose in a body of strong and healthy physique, only this time it is a young lad who is the subject, who has evidently been bathing and is lying on his back on the bank, with his feet hanging down, in a moment of blissful indolence and enjoyment of warmth and sunshine. The figure is very finely modelled, and the work is altogether original. Miss Ada M. Palmer has made a success with her "Paolo and Francesca" (1,916), an alto-relief of the two heads only, very fine and passionate in expression, appearing to emerge from a background of drapery and flying figures.

Among the figures in the centre of the room, Mr. Onslow Ford's "Folly" (1,925), a bronze nude statuette, a little light-headed creature balancing herself on a bit of rock, with foolish gestures of her hands, is a very clever and original bit of invention. Among other works which we can only just mention as not to be passed over are "Contemplation," a bust (1,818) by Mr. Maclean; bust in marble of Sir James Paget (1,825), by Mr. Boehm; "The Young St. Timothy" (1,831), a nude child poring over a book, by Mr. A. G. Atkinson; "F. Johm, Esq." (1,851), by Mr. A. Drury; a bust showing the head and neck only, with no artificial accessories, very spirited expression; "Portrait of a Lady," terra-cotta bust (1,865), by Mr. S. Fry; "Felicità" (1,871), a peasant girl from Cava di Tirreni, by Mr. Amendola; "A Study" (1,891), a bronze bust of a calm female head, by Mr. E. Onslow Ford, a very good likeness in marble (bust) of the late Mr. Macdonald, of Aberdeen (1894), by Mr. Lawson, a reminiscence of a familiar figure who will now no longer be seen in his wheelchair on private view days, welcoming the friends who clustered round him; a Dalecarlian peasant-woman (1897), by Miss Henrietta Montalba; "Diana after the Chase" (1,911), a new figure in an attitude of repose, by Mr. G. C. Cowell. There are some good little works among the smaller exhibits, which we have no space to particularise. There is certainly a high average in the sculpture work of this year.

#### ROYAL INSTITUTE OF BRITISH ARCHITECTS.

The ninth ordinary meeting of the present Session was held on Monday last, Mr. A. W. Blomfield, M.A., F.S.A. (Vice-President), in the chair.

#### Obituary.

Mr. William H. White (Secretary) announced the decease, on the 28th ult., of Mr. H. H. Richardson, of Brookline, Massachusetts, Hon. and Corresponding Member of the Institute. Mr. Richardson, who had only quite recently been elected an Hon. and Corresponding Member of the Institute, died very suddenly, having been at work twenty-four hours before his death. He was a native of New Orleans, but he went before the American War to Harvard University, where he graduated in 1859. At that time he was so good an American that he would not fight against the national flag. He, therefore, went to Paris, entering the Ecole des Beaux Arts, where he took some

honours, and was ultimately employed on the works of the Tuileries and the Louvre, when the two buildings were being joined together. Returning to the United States, he settled in New York for three or four years, and afterwards went to Boston, where his principal works were erected. Photographs of many of these were lately exhibited at the Institute. Mr. Richardson's reputation was not only great in the United States, but also in Europe. One of his chief friends was Mr. Hubert Harkness, for whom he designed a house.

On the suggestion of the Chairman it was agreed to send a message of condolence to Mrs. Richardson.

Mr. E. Phéné Spiers, as a personal friend of Mr. Richardson, said that his works had been described at the time of his election as a Corresponding Member of the Institute. He (Mr. Spiers) had placed in the library a design for a cathedral prepared by Mr. Richardson, which, although it had not been carried out, would show his great power of design, and careful study of French Mediaeval work. His acquaintance with Mr. Richardson commenced when that gentleman came to Europe in 1859 to attend the Ecole des Beaux Arts. Mr. Richardson came over to Paris, as most Americans did, with sufficient money to enable him to live at his ease, and take his studies as it suited him. On the breaking out of the American War, however, he was left without means, and was compelled to enter into some office to *faire la place*, as it was termed. This would have interfered with his studies, had he not devoted his evenings to continuing them in the atelier. Mr. Richardson had told him that the misfortune which came upon him in Paris was really in one sense the making of his fame, as he would probably never have taken a serious aspect of practical work unless he had been forced to obtain his living. The work he did in the Tuileries and Louvre also gave him a position when he went to New York, and helped him to a lucrative practice. Mr. Richardson was one of the few architects who were able to charge more than the ordinary 5 per cent., for so great was the demand on his artistic powers that he was obliged at last to confess that he could not do work properly unless he obtained the best possible assistance. He, therefore, would not undertake work for less than 8 per cent., and for many years he had worked at that remunerative price. Mr. Richardson's last work was a very important one, and he hoped at some later date to be able to give more information as to this and other works of so eminent an architect.

#### The Charterhouse.

Mr. John Hebb.—With respect to the Bill lately before Parliament with regard to the Charterhouse, it was announced at a public meeting held at the Society of Arts the other day that the scheme then before Parliament had been approved by the Institute. It was a Member of Parliament who made this statement, which is, I hope, so unlikely to be correct that I think the Institute would be glad of the opportunity to give it some sort of denial. It may possibly have arisen from the act of an individual member of the Institute, who, being also a member of the committee to which the question was referred, did not consider it incompatible with his duty as a member of that committee to further a plan for building on the site, for running a road right through it, and entirely mutilating the buildings. It is a question of individual taste, and I suppose the Institute cannot help the action of its members individually; but, I think, in its corporate capacity the Institute would be rather chary of expressing any opinion with regard to proposals of this kind, and perhaps you may be able to say whether there has been any action taken by the Institute with regard to the Bill.

The Chairman.—I think, in regard to a question of this kind, that it would be more convenient if notice were given beforehand, so that one might have all the facts of the case ready. I am rather new to the post I occupy this evening, and was not present at any meeting of the Council,—in fact, I was not on the Council, when this question was considered.

Mr. J. Macvicar Anderson (hon. sec.)—I may say that no definite action whatever was taken by the Institute in the matter. The subject was brought before the Council by a member of the Institute, who is also an old Carthusian, but inasmuch as they did not seem to be entirely at one amongst themselves as to what was the



best course to adopt, the Council deferred any action, and no advice was given or action taken in the matter by the Institute.

Mr. Hebb.—I am extremely glad to hear it.

*Roman Remains in North Africa.*

Mr. Alexander Graham then read an exceedingly interesting and copiously-illustrated paper, entitled "Remains of the Roman Occupation of North Africa, with special reference to Tunisia." The following is an abstract of the paper:—

The author referred to the vicissitudes the Agency of Tunis has undergone since the Phœnicians from the Syrian coast formed their first settlement on its shores, and to the myths that surround its earliest history. It is supposed that Carthaginian literature was very limited, Greek being the language of educated Carthaginians, and that the principal records of Punic times passed to the library at Alexandria, and were destroyed by fire in the sixth century. There is nothing to show that the style of architecture introduced by the Romans into North Africa was influenced by the style of the buildings they found at Carthage, and explorations have favoured the supposition that the fine arts never flourished among the Carthaginians. This is the opinion of Winkelmann. The architecture in Tunisia during the five centuries of Roman occupation is as Roman as that of Rome herself. There is dearth of inscriptions of the time of the first emperors, owing to the colony having been at first principally agricultural, but with the advent of Hadrian and Trajan and their immediate successors commenced a long era of wealth and prosperity. Roman Carthage no longer exists, but its treasures of marble and porphyry may be seen in the principal mosques and palaces in North Africa, and in Europe as far north as Pisa. The older Carthage of the Phœnicians is about 40 ft. under the surface, awaiting systematic exploration. The antiquity of Utica, one of the oldest known towns in the world, was then referred to, and a contrast was drawn between the present appearances of Bou-Chater (its modern name) and the city in pre-Roman times, with its massive walls and its strong position. The Punic and Roman methods of building, as exemplified by the remains of Utica, were then compared, especially with reference to the early use of pise and of rubble. The Roman roads from Carthage were then traced, and reference was made to the remarkable natural harbour at Bizerta. The town of Thabraca and the castle of Charles V., on an island off the coast, were then mentioned, and a brief account given of the beautiful country of the Khomair tribes. The Roman road along the banks of the Bagradas were traced, and the remains of Bulla Regia, the residence of Numidian kings long before the Roman occupation, and of Imitica, with its magnificent marbles, were then referred to. Further eastward, along the banks of the same river, where the great aqueduct of Carthage, having a total length of sixty-one miles, crosses the plain, a full description of this stupendous work was given in detail, as well as a history of the development of the science of water supply in North Africa, and of the construction of cisterns in that country from the earliest times. The Roman road south of Carthage was then traced, and mention made of the ruins of Aphrodisium, and of the great city of Uthina. Journeying southward, the mountain of Zagouan was reached, and a description given of the ruined temple, with its colonnades, which the Romans built over the spring that supplied water to Carthage. Reference was then made to the holy city of Kairouan or Kairwan, and to the Roman shafts and capitals that form the chief ornament of the Great Mosque. Thydrus, better known as El-Djem, was described, and detailed historical account given of the great amphitheatre there, its materials, its mode of construction, and its size compared with other well-known examples. Turning northward to Carthage, the remains of towns on the south bank of the Bagradas were described, and special reference to Thugge, remarkable for its numerous monuments as well as for the purity of its position. Continuing along the Roman track, the site of Agiba was reached, there are the remains of an immense Byzantine

fortress. Some account was then given of these strongholds in North Africa, and their development in the sixth century into Monasteria for soldier-monks. The walled enclosure at Tebessa in South Algeria was referred to as a striking example of this kind of building. Passing close to the fatal plain of Zama (where Hannibal was signally defeated), the great ruins of Assuras were described, as well as the remains of Sica-Veneria, now known as El-Kef, signifying "the rock," occupying a remarkable position at a considerable elevation. The ruins of Mactar were then reached, and following the Roman road by Sufes, a town that once covered an area of nearly three square miles, but is now a mass of stones,—the last town on the western frontier, named Ammedara by the Romans, but better known by the modern name of Hydra, was described. The remains of Scillium were then referred to, and a full description given of the mausoleum of M. Flavius Secundus, with its quaint inscriptions. East of Scillium are the remains of Sufetula, the most important as well as the most interesting in Tunisia. These were fully described, special reference being made to the remarkable enclosure, commonly called the Hieron, on account of the three temples within the walls. Passing allusion was made to the sites of other towns farther south on the borders of the Desert that have not yet been explored, but no mention is made by travellers through this region of any architectural monuments now standing. The monuments of a country, such as those in North Africa, where written records fail, may be considered as so many pages of history, and the architect and the historian may walk, hand in hand, rebuilding the ruins, re-editing the fragments, and giving them their proper place and value in the records of the country. The principles of law and order were exemplified in Roman architecture in a remarkable degree, resulting in a national style that can be recognised in any of the monuments of the Roman Empire.

In the discussion which followed, The Chairman expressed the pleasure with which he had listened to Mr. Graham's interesting, scholarly, and suggestive paper. It raised a great many subjects for discussion and question, and he hoped they would have some remarks from visitors present who were familiar with Tunisia.

Mr. H. S. Ashbee, F.S.A., said that perhaps there was no country in the world where we could better appreciate the power and grandeur of Rome than in North Africa, and especially in Tunisia,—not so much from the monuments that had been left, as from a comparison of the desolate and terrible state of the country at the present time with what it must have been in Roman times. That country, which then supported a vast population of its own, and which was, in addition, the granary of Europe, had now become a mere waste, scarcely affording food for its sparse population. In one of the vast plains, for instance, one travelled for miles without finding any population except a few nomads, and no agriculture or even a tree was to be seen, nor was there shelter of any kind. Yet they were told by the ancient Arab historians that when the site for a city was chosen there it was an impenetrable forest, infested with venomous serpents and wild beasts, and that the interposition of Allah was necessary to make those enemies of the human race retire. The vast cisterns or reservoirs to which Mr. Graham had referred were of undoubted Roman workmanship, as was shown by the niches to be found in the interior of some of them. Mahomet forbade the erection of statues, and those niches were doubtless intended for nymphs or other images, and had rounded arches, not the horse-shoe ones of Arab construction. In the great plain in which Thydrus stood there was the same absolute desolation; the ground was furrowed by neglected water-courses which had broken up the country in every direction, so that no one could pass for three miles in a straight line. The amphitheatre would never have been put up on the plain unless there had been a population there. Thydrus was, no doubt, a minor place, but doubtless the whole plain was at one time covered with homesteads and villages, the well-to-do cultivators of which would fill the amphitheatre at the time of the games. For over a thousand years the Arabs held this beautiful country, which had a climate little short of perfection. They found it numerously populated by a cultured and active people, and adorned with magnificent monuments, the

drawings of some of the remains of which were upon the screen. The Arabs drove out or slaughtered more people than the whole country now contained; they cut down the forests without replanting; and they neglected the rivers and water-courses, allowing the roads to disappear and the bridges to decay, and they let the land go out of cultivation. In short, they turned a fruitful country into a desert, a garden into a wilderness. When it was considered that they had left no literature worth speaking of, and no monuments of their own; that no development of science or of commerce was to be found, it was permitted to them to turn their thoughts from such a people back to those grand times when Rome was dominant in North Africa,—to the times when those magnificent monuments were erected, the drawings of which, thanks to the faithful and facile pencil of Mr. Graham, they were able to admire upon the walls.

Mr. F. W. Percival remarked that, having travelled over a large portion of the country described by Mr. Graham, he had listened with great interest to the paper. Tunis could be easily reached, and was an extremely interesting centre from many points of view. If the district were thoroughly examined, he believed that discoveries of great architectural interest would result.

Mr. R. W. Edis, F.S.A., Member of Council, proposed a vote of thanks to Mr. Graham for his exceedingly interesting paper. The subject was one in which they all took a very great amount of interest. He had no idea that there was so much Roman work in a part of the world which he had always believed consisted chiefly of sand.

Professor T. Roger Smith seconded the vote of thanks, and referred to the great excellence of the paper and its illustrations. It was only when one attempted to do anything of the sort that one understood how much pains and labour went to the creation of such illustrations. It was well that we should from time to time be reminded of the great debt we owed to the Romans, of whom we were architecturally the descendants. All the architecture of Europe, both Christian and Renaissance, traced back to a Roman origin, and when we found in a hitherto-unexplored country a fresh proof of the vigour and energy with which the Romans colonised, and the orderly manner in which they erected monuments and buildings of the highest importance, we could only feel that here was a great people whose mission it was to supply a kind of energetic stimulus, the results of which had remained to the present, and the influence of which would remain for many generations yet to come. Therefore, we were specially indebted to any one who showed us the works of those who were in a certain sense our forefathers, in the way Mr. Graham had done that evening.

The resolution was then put, and cordially received.

Mr. Graham, in replying, said it was a pleasing task to prepare a paper of this kind, which went a little out of the beaten track. It might be that some of them might think the information he had brought together could be found in that usual resort of the thirsty *littérateur*,—the encyclopædia. But in order to obtain reliable information on the subject he had not only traversed the country and seen many of the remains described, but had traced back all the statements he had made as far as he possibly could to the original Latin authors of the first, second, and third centuries. Under these circumstances they might fairly rely upon his statements,—not only those which he had read, but those which, for want of time, were left unread, but which he hoped many of them would peruse when the paper was published in its entirety in the Institute's "Transactions."

**Rodney Stoke.**—The parish church of Rodney Stoke, near Wells, Somerset, has just received some important and much-needed decorative additions to the chancel. An oak panelled and boarded ceiling, with richly-carved bosses and ornamental cornice has superseded a common lath-and-plaster ceiling. An entirely new east window, with handsome tracery, harmonising with the fifteenth-century architecture of the church has been added. It contains three lights, and is filled with painted glass, by Messrs. Lavers & Westlake. The architect is Mr. B. Edmund Ferrey, F.S.A. The window superseded was a very poor one, inserted about thirty years since.

\* Some particulars of this Mosque, by Mr. Herbert Carpenter will be found, in the *Builder* for Feb. 24, 1883, p. 237, and in the Institute "Transactions" for the same year.



## COMPETITIONS.

*The Fulham Vestry Hall.*—A special meeting of the Fulham Vestry was held on Tuesday evening, the Rev. F. H. Fisher, M.A., in the chair, to consider the report of a committee stating that several letters were read from competitors re the Vestry Hall plans, pointing out the hardship they would be subjected to in consequence of the resolution of the Vestry deciding to adjudicate themselves on the plans, and recommending the rescinding of so much of the resolution relating to the non-appointment of a professional adviser to assist the Vestry in the examination of the amended plans for a Vestry Hall.—The adoption of the report was proposed by Mr. Hamer, and seconded by Admiral Sullivan.—Mr. Walden maintained that they were practical men, and quite competent to decide upon the plans.—Mr. Easton expressed an opinion that Mr. Currey made a mistake in his award. The Vestry had acted in a manner which he thought was for the benefit of the parish. He felt sure that the vestrymen were capable of forming an opinion as to the plans.—Mr. Cardwell said a professional adviser should be called in for the benefit of those vestrymen who were unable to form an opinion as to the plans. He regretted that Mr. Currey's award was not accepted.—Mr. Hamer thought the proposition to ask their surveyor to act as adviser would prove impracticable and undesirable. What was their object in appointing a professional adviser in the first instance? In order to obtain the best design, and, further, that they should have an independent man. He also regretted that the award was not accepted. They had set aside Mr. Currey's award, and, if they adopted the report, they would be excluding the best men of the profession from joining in the competition. Not having a professional adviser, they practically excluded members of the Institute. The best thing they could do was to obtain the advice of a man of equal standing to Mr. Currey. He hoped they would rescind the resolution, so as to enable members of the Institute to participate in the competition. The motion that the report be adopted was put to the meeting, and lost. (A letter referring to this subject appears on another page.)

## Illustrations.

ST. JAMES'S (R.C.) CHURCH,  
SPANISH-PLACE.

**WE** publish this week two views of the design Mr. Leonard Stokes submitted in the recent competition for the above church. The drawing of the exterior is now in the Exhibition at the Royal Academy, and has been already noticed by us. The interior we criticised at the time of the competition. The plan is arranged so as to give as far as possible an uninterrupted view of the altar and pulpit, and a low triforium has been introduced in order to obtain as much accommodation as possible on a somewhat cramped site. The materials proposed were red brick and stone throughout both the interior and exterior.

THE NEW HOMOEOPATHIC HOSPITAL,  
LIVERPOOL.

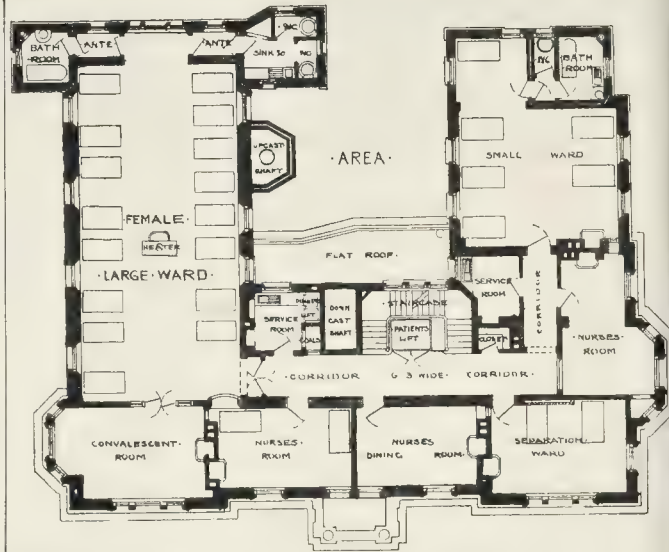
This building, of which we give an illustration this week, occupies a prominent site at the corner of Hope-street and Hope-place, Liverpool. The illustration shows the exterior from the north-east angle.

The building is designed to accommodate fifty beds at present, and is capable of being enlarged, on the south and west sides, so as to provide twenty or thirty more.

The basement is arranged as a dispensary, to take the place of the present one in Hardman-street.

The building is upon the red sandstone rock, and stands high in what is considered to be the healthiest part of the city.

The wards are arranged to have a southern aspect, and in the case of the three larger ones, cross lights, and large windows at the west ends. The large wards (male and female) on the first and second floors are 69 ft. by 24 ft., and have each a convalescent-room, with large bay window at the east end. A



Liverpool Homoeopathic Hospital.—First Floor Plan.

smaller ward is provided on the first floor, and two infectious wards, completely isolated from the rest of the building, on the second floor. Two separation wards are arranged on the first and second floor; and five private wards, with a convalescent-room on the third floor, all being lofty and well lighted. Service-rooms, with hot plates, sinks, dinner-lifts, &c., are placed next the wards, and nurses' rooms, with inspection-openings commanding all the beds. The latrines and bathrooms at the ends of the wards are completely cut off by an air-space and double doors from the wards adjoining; they have a separate system of warming and ventilation, and will be lined throughout with glazed tiles, and have polished cement floors.

Nurses' bedrooms, and dining-rooms, an operating-room with north and north light, servants' bedrooms, &c., occupy the remainder of the upper floors.

The main staircase is of granolithic stone; and the whole of the corridors are of fireproof materials.

On the ground-floor are the kitchens, sculleries, larders, stores, servants' hall, pantry, and service-room, in the south wing. The board-room, stores, office, porter's room, boys' room, and entrance-hall, are to the front. The House-Surgeon's sitting and bed room and spare room; the matron's sitting and bed room, bath-room, &c., and large store, with hoisting doors to yard, in north wing.

A hydraulic lift for patients will be provided from the ground to the third floor, in the well-hole of the stair; and a coal-lift from the basement to the top of the building.

With the exception of a large store-room, the wine and beer cellars, and the mortuary, the whole of the basement floor is devoted to the dispensary requirements. A large waiting-hall, with latrines at the west end, is provided, with porter's room overlooking it, and communicating with a spacious corridor, off which are seven well-lighted consulting-rooms, a waiting-room, with dispensing-room and exit door, completes the arrangement of this floor. Dados of glazed brick are provided in the hall and corridors.

The sub-basement is devoted to the heating-chamber, coal-places, air-shafts, and chambers of the heating and ventilating apparatus.

The exterior of the main front is faced with red Ruabon brick, the strings, cornices, window dressings, &c., of stone from Stourton quarries. The ridges, hips, and finials are of terra-cotta, and the roofs are covered with Welsh slates. The drainage of the building has received special attention, and the soil drain-pipes will be flushed out by means of a large self-flushing tank (Bowes Scott & Reid's patent) placed at a point where the soil-pipes from the closets join the drain. The ventila-

tion and warming are arranged on the "aspirating suction power" principle, as successfully applied by Drs. Drysdale and Hayward, Liverpool, to several dwelling-houses in the neighbourhood, and may be briefly described as follows:—The foul air is extracted from the wards and rooms by flues situated near the ceilings, carried up through the walls to a horizontal foul-air chamber in the roof. This chamber is intended to cause all the foul-air flues joining it to be drawn on equally by the central downcast shaft, with which it is connected, and which conveys the foul air to the bottom of the great upcast-shaft, which actuates the whole system, and is then carried up the same, rising some distance above the ridge of the roof, and finished with an iron hood, having side openings for the escape of foul air. The centre of this shaft is occupied by an iron flue from the kitchen fireplace and heating apparatus boiler, and also connected with a large Cockle stove for use when the boiler is not required.

By this means a powerful current will be induced in the upcast and consequently in the downcast shaft and its connecting system of foul-air chambers and flues. Regulating valves will be fixed at both the upper and lower ends of the foul-air flues to admit of them being accurately adjusted. Central fireplaces are provided in the large wards, if iron or earthenware, with separate air supplies, water trays, marble tops, &c.

The fresh air is introduced into the various rooms and wards, &c., by means of flues in the walls, connected at their lower ends with a chamber heated by rows of hot-water pipes and running round the whole of the building under basement floor. A perforated wall allows the fresh air from an adjoining air-chamber to pass over the hot-water pipes, and as to enter the various rooms at a temperature of 60 deg. in the coldest weather.

Fresh air is supplied to the air-chamber by means of seven "Eolus Water-spray Inlet Ventilators," which suck the air from some height above the ground.

By means of these appliances and the regulating valves at the upper ends of the fresh-air flues, the supply of heated or cooled fresh air can be regulated with the greatest nicety, or shut off from wards not in use.

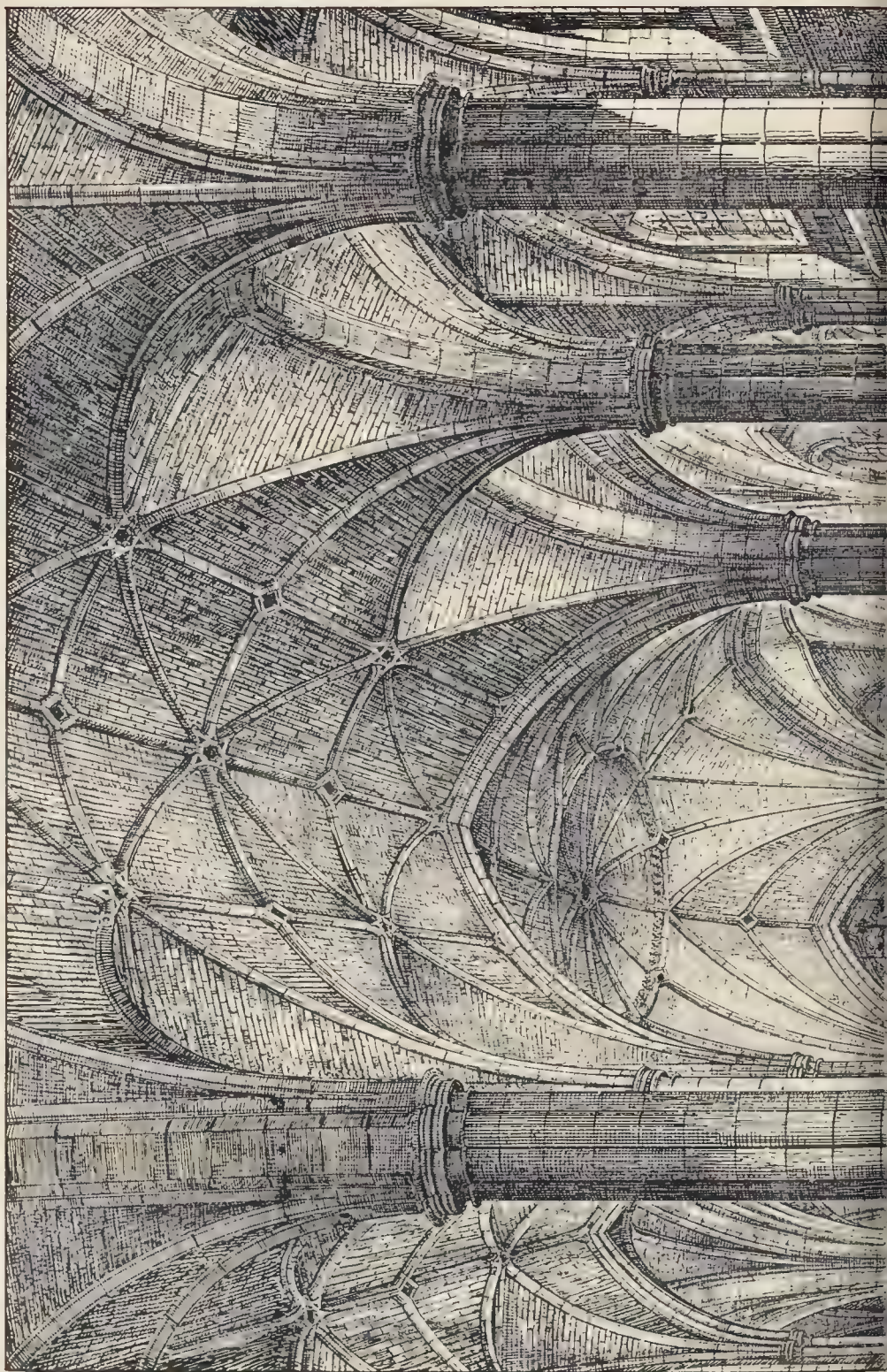
The hospital, the first contract for which amounts to over 13,000l., is being erected at the sole cost of Mr. Henry Tate, of Park Hill, Streatham, and Liverpool, on the freehold site recently purchased by him from the Liverpool Corporation.

The contractors are Messrs. Holme & Green, and the architects Messrs. J. & C. Holme, of Liverpool. Mr. W. Bell is clerk of works.

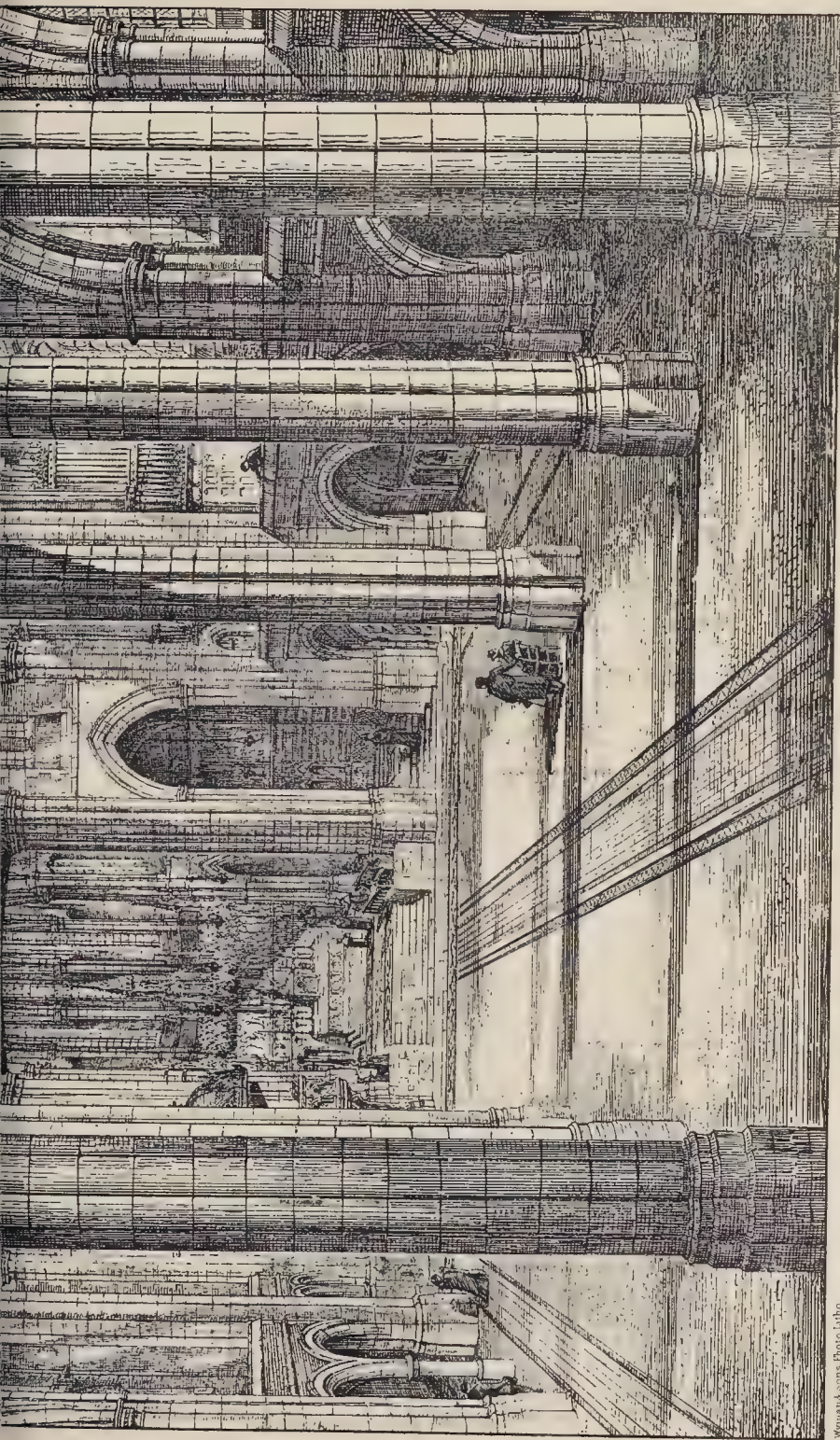




THE BUILDER, MAY 22, 1886.







WYMAN & SON'S PHOTO-LITHO

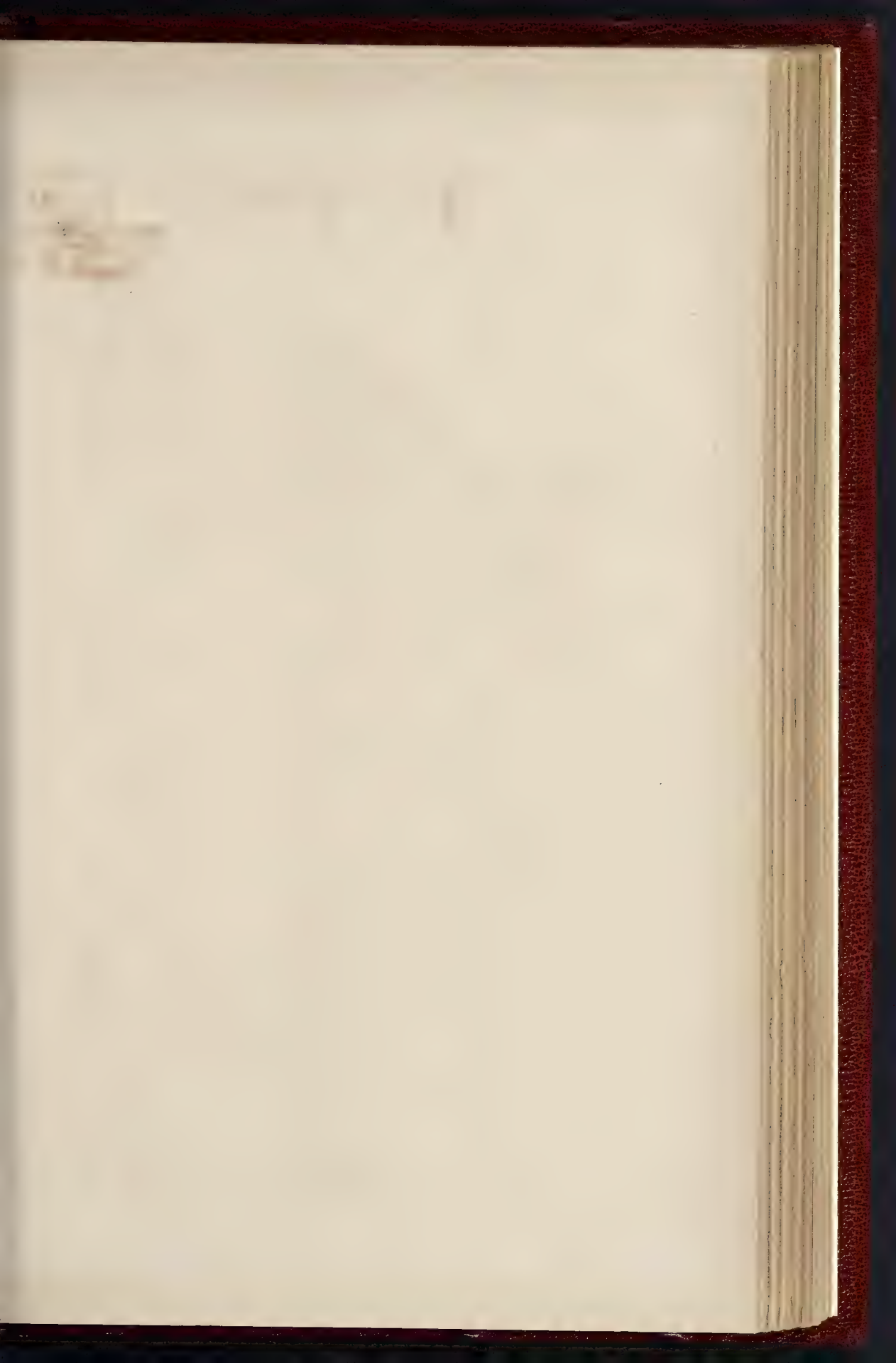
19, Green St. London W.C.

COMPETITION DESIGN FOR THE NEW CHURCH OF ST. JAMES, SPANISH PLACE: INTERIOR, LOOKING EAST.

MR. LEONARD A. S. STORES, A.R.I.B.A., ARCHITECT.









THE BUILDEN MAY 22 1886











THE SOWER—MR. HAMO THORNYCROFT, A.R.A., SCULPTOR.

(From a Sketch by the Artist.)







ST. BRIDE'S VICARAGE.—MR. BASIL CHAMPNEYS, ARCHITECT.

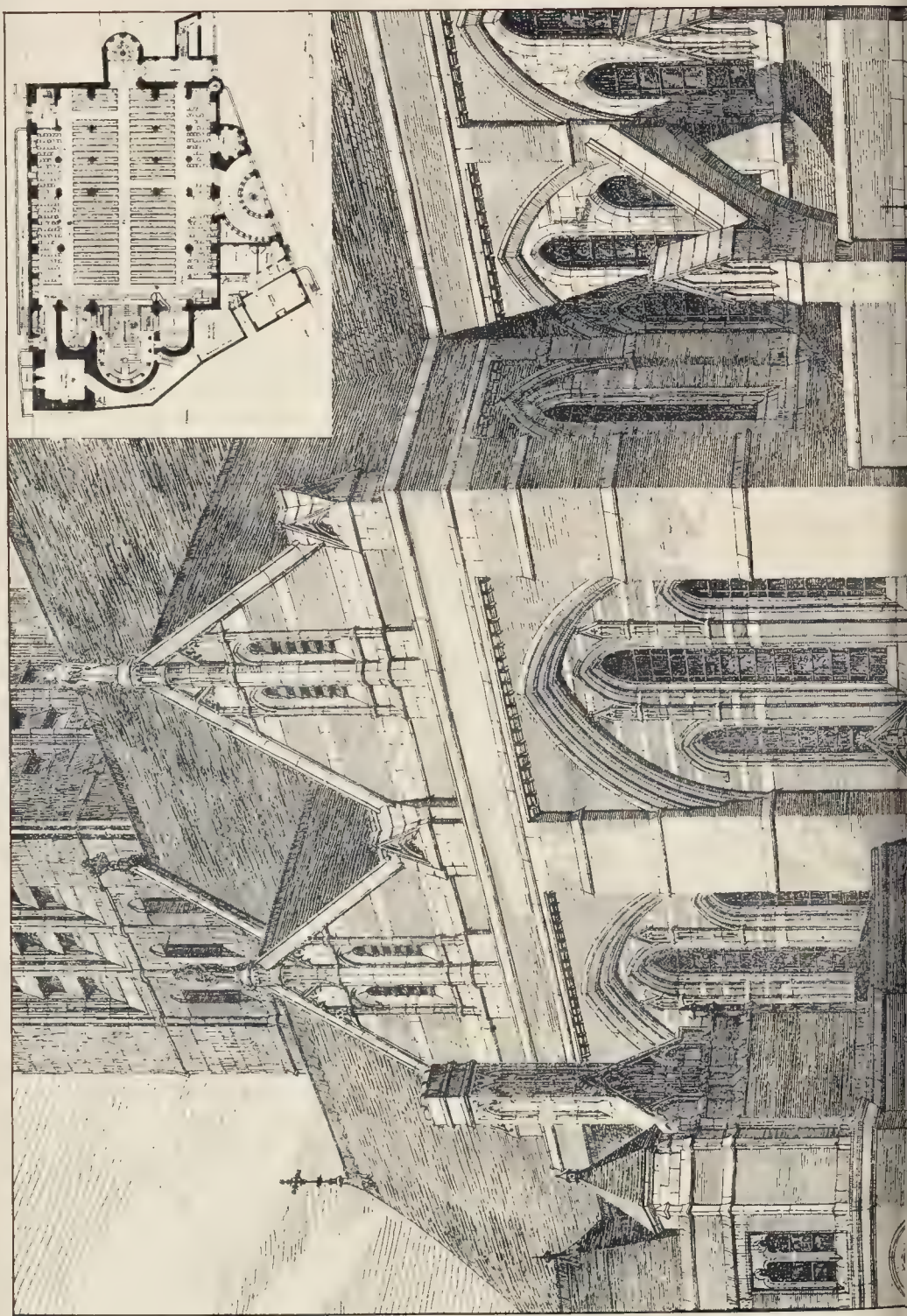




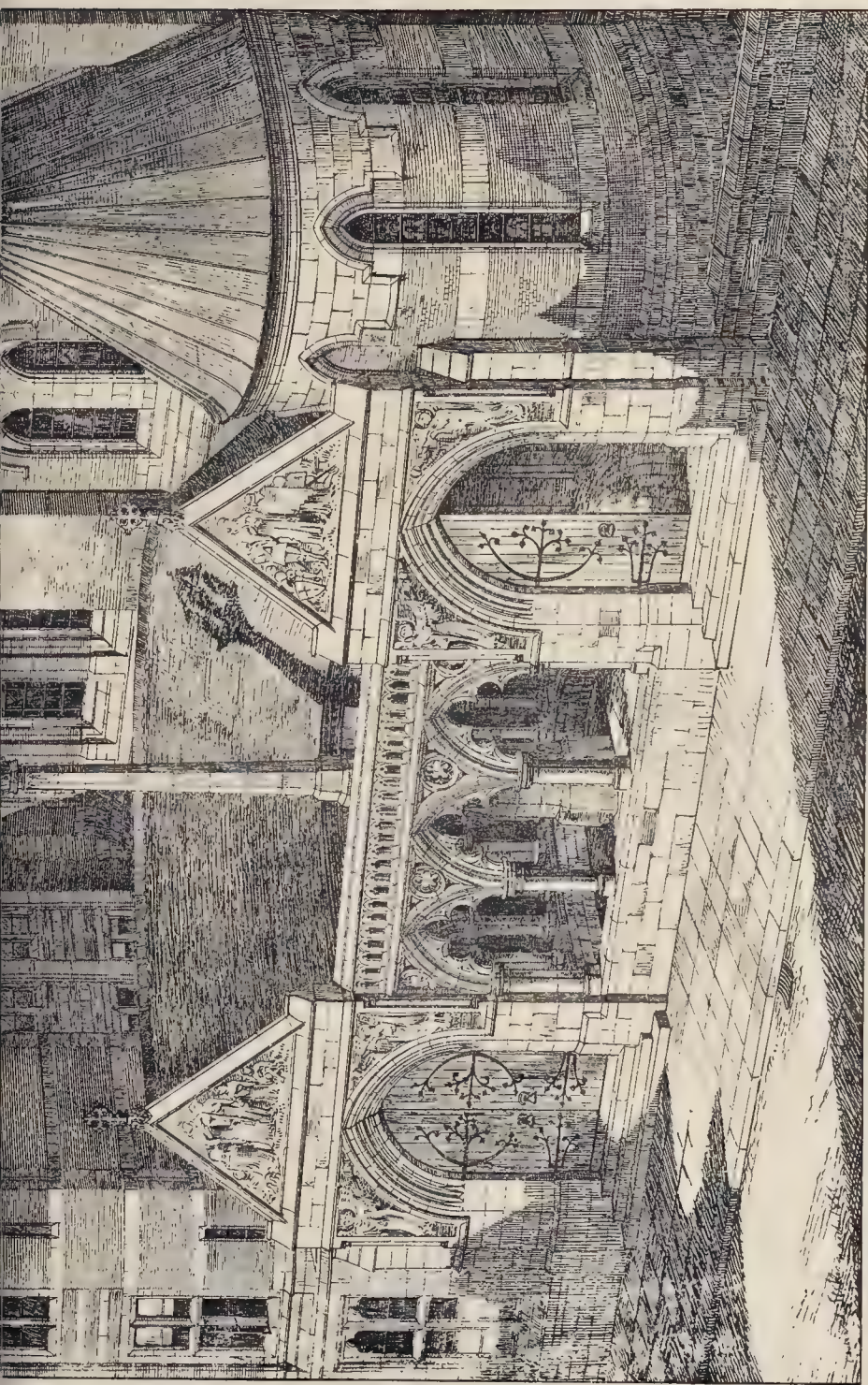




THE BUILDER, MAY 22, 1886







W. J. L. & Co. London W.

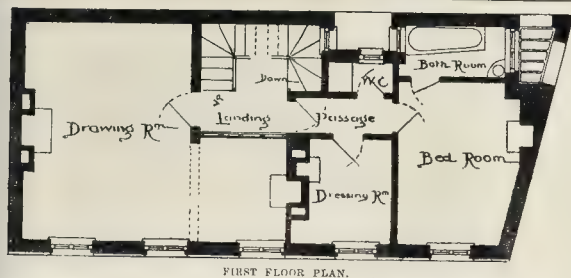
COMPETITION DESIGN FOR THE NEW CHURCH OF ST. JAMES, SPANISH PLACE: SOUTH TRANSEPT AND PORCH.

MR. LEONARD A. S. STOKES, A.R.C.E.A., ARCHITECT.

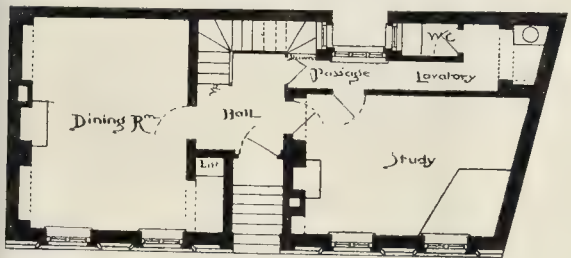
See Plate 1.



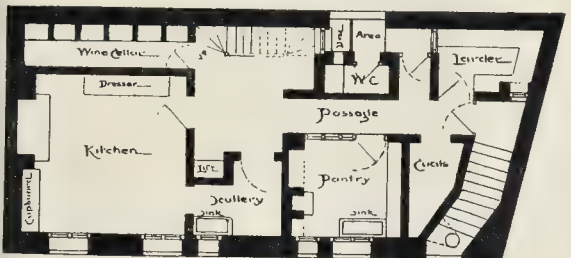




FIRST FLOOR PLAN.



GROUND PLAN.



BASEMENT PLAN.

St. Bride's Vicarage.

## ST. BRIDE'S VICARAGE.

publish to-day a view of this new London Vicarage, of which Mr. Basil Champneys is the architect, and a drawing of which is in the possession of the Academy. The house is built on ground granted to the Ecclesiastical Commissioners, and occupies a site of 1,000 ft. super. The Vicarage is of Bridewell, who were the owners of the house which commanded light and air, and that the house should occupy the frontage at the northern end of Bride's Place. Hence the considerable extent of frontage compared to the depth of the house. The material is red brick throughout. The contractor was Mr. Nightingale; the architect, Mr. Goodchild; the drawing, by Mr. Richard Crittall.

## OLD WOODWORK AT THE CHARTERHOUSE.

give some measured drawings of the woodwork in Howard House, part of the Charterhouse property, about the possible fate of which there has been so much discussion lately. The portion of the building in which the woodwork is, was not, we are assured, ever to be touched or removed; but it may be interesting to those who do not know the Charterhouse interior to have this example of old woodwork to be found there.

## SCULPTURE AT THE ROYAL ACADEMY.

give this week a sketch by the artist, Mr. Thornycroft, of his principal work at the Academy this year, "The Sower." We commented on it in another column, and remarks on the Academy sculpture of this year.

## THE RECENT MUNICIPAL WORKS IN ROME.

## SURVEYORS' INSTITUTION.

At the ordinary general meeting of the Surveyors' Institution, held on Monday evening last, Mr. F. Vigors (Vice-President) in the chair, the President (Mr. E. P. Anson) read an interesting paper on "The Recent Municipal Works in Rome." We are permitted to extract some portions of it:—

Of all the cities of Europe,—may I not say of the world?—there is none which excites more interest than the City of Rome, the Eternal City.

For the last three winters I have had the opportunity of seeing the extensive works which are in progress; it is these municipal works and their initiation which I now propose to describe.

When the seat of the Government in 1870 was transferred to Rome, the city was found insufficient to fulfil the requirements of its new destination. The considerable increase of its fixed population and probable increase had to be provided for.

The necessity that the modern city should have well-planned and well-drained streets, the example of what Florence, which for five years was the seat of Government, had already accomplished, immediately engaged attention, and whilst it was felt desirable to initiate works of urgent necessity without delay, it was equally felt that some general plan should be settled to regulate the development of the city, with a view to which, within ten days after the formation of a provisional government on the 30th of September, 1870, a Commission was appointed.

It is worth remark that Mr. P. Anson at present enjoys the dual and unique honours attaching to his position as at once President of the Royal Institute of British Architects and President of the Institution of Surveyors,—the two leading professional societies connected with architecture and surveying.

of which Signor Pietro Campanesi was President, the veteran archaeologist, Signor Rosa, was vice-president, with nine other members, architects or engineers, all Romans, and well acquainted with the topography, the local difficulties, and the many questions which had to be considered in designing a plan for the development of the city.

This Commission, although the members were soon agreed on the general principles of a plan, did not so easily agree as to the details of the extensive and complete scheme they were appointed to carry out.

When the Commission commenced its labour the members had before them plans which had already been prepared, namely, a *piano regolatore di Massima*; a second plan, proceeding from a section of the appointed Commission; a third plan, presented by the Roman Communes, prepared by the engineer Merrote; and a fourth plan, by an architect named Farnicini.

A Council of the Roman Commune was called on to deliberate on these plans on the 3rd of June, 1871; they appointed four engineers to examine and report on the merits of the plans produced, who reported in favour of the plan of the Government Commission, but suggested various alterations, whereupon an amended *piano regolatore* was prepared.

At this stage of the inquiry another engineer, Alessandro Viviani, was called in, when, after the lapse of several months, the *piano di Massima* was recommended for adoption, and provisionally approved by the Council on the 28th of November, 1871, when, pursuant to a law passed in 1865, the plan was publicly exhibited, so that it might be fully known and criticised; and on fifteen consecutive days this plan was examined by a daily average of 120 persons, in all about 1,800. The objections made were neither serious nor numerous, but all objections made, either by individuals or by the public press, were carefully recorded, so that any amelioration to the plan which might appear necessary as the result of the objections offered could be made.

This plan seems to have been divided into sections, for on the 14th of September, 1871, the Council approved of the plan for the Esquiline Quarter.

The Commune, on the 13th of November, approved of the plan for alterations in the Piazza Sta. Maria Maggiore and adjacent streets; on the 20th of February, 1872, of the plans of the Pretorian Camp and of the Viminale Quarter; on the 20th of March, of the Industrial Quarter of Testaccio; and on the 6th of April, of the Quarter of the Celio.

Finally, at the sitting of the 19th of August, 1872, the project was approved of continuing the Via Nazionale direct to the Fountain of Trevi and to the Piazza Sciarra, and for which the necessary powers of expropriation were obtained.

The Commission had proceeded thus far in the summer of 1873, by which time the *Massima* plan, which was then partially approved, contained all the fundamental requirements of a first design, and it was again presented for the sanction of the Council, who, before having a definitive consultation, on the 9th of July, 1873, appointed a third Commission composed of four engineers, with instructions to re-examine the plan and also ten other plans, which by that time private engineers had laid before the Municipal Administration.

Two months afterwards this Commission published their Report, dated the 3rd of September, 1873, which determined that neither of the ten new plans was better than the official *piano regolatore*, or capable of being combined with it.

The Commission classed the proposed works under three categories:—1. Those they thought indispensable. 2. Those they thought relatively useful. 3. Those they considered ornamental and not absolutely necessary.

On this report further discussion took place, the opinion of the public was invited, and several meetings took place to consider the objections and criticisms on the plans, which were read to the Council on the 6th of October, 1873, Francesco Nobili Villettasche, President; and on the 18th of the same month the *piano regolatore* appears to have been accepted, and a further commission was then named, who published it in April, 1882, and this seems to have been the final Report. It was signed by Villettasche, President; Marco Ottoboni Duca de Tiano, Giovanni Ballista de Rosa (the veteran archaeologist), Salvatore Bianchi, Emidio



Renzazi, Andrea Brachi, Gastano Pompiano, and Antonio del Vecchio, Secretary.

The *piano regolatore*, after passing through the various Commissions which had succeeded each other, received the approval of the Parliament, when a law was passed to enable the State to contribute to the rebuilding and extension of what had become the capital town of the country.

So early as 1873 it had become apparent that without the assistance of Government the city had not the power to meet the exigencies of the new position, and that it was not reasonable that the Commune of Rome should without assistance be required to provide for the expense of the proposed works, which were for the advantage of the whole nation. Nevertheless it was even then decided to continue the works in the new Esquiline Quarter with the Via Nazionale, delaying other works for the time, and until Government assistance could be procured.

The Committee found, by reference to the statistics of the decennial period anterior to 1871, that the annual increment of the population had been 3,000; from 1871 to 1881 the increment had been 80,000, perhaps one-half of which was occasioned by transporting the seat of Government to Rome. In 1879 the increase was 7,100; in 1880, 9,000; in 1881, 6,500; and it was considered that, during the next twenty-five years, the annual augmentation might be reckoned at 5,000, or in all 125,000, which, added to the 300,000, the population at the time of the last census, would amount to a population of 425,000. Then, taking it as a basis that a well-arranged city contains 500 inhabitants to the square acre, including buildings and streets, the extension of the plan should be such as to provide for 850 square acres; and, as the inhabited part of the city in 1871 covered an area of 500 acres, it followed that the additional area required in the new quarter was 350 acres.

Additional spaces, conveniently placed, were also considered necessary for dock, markets, slaughter-houses, and above all for studios, workshops, and other buildings in connexion with the fine arts, one of the staple industries of Rome. The principal streets, it was determined, should be 25 metres wide, and the others should vary from 20 to 12 metres. It was more difficult to decide about the enlargement of the old streets on account of the difficulty of removing various old buildings of archaeological interest and artistic value which it was desirable to preserve. It was considered that the bridges should not be more than 300 to 400 metres apart, and that they should coincide with important streets already formed or contemplated, and the retention of gardens and public promenades, the committee considered, should not be neglected.

After making these general observations the Commission refers in considerable detail to various parts of the plan.

What may be gathered from this relation is, that vigorous efforts were made as soon as Rome became the seat of Government in 1870 to devise a plan for forming new streets and altering old ones, so as to effectually provide for the anticipated increase of population and the public buildings necessary for State and municipal purposes. The relation states that in 1865 a law had been passed to enable the compulsory acquisition of land and houses for purposes of public utility. It sets forth the various steps which were taken, the apparently thorough and conscientious study and publicity which was given to the subject, and concludes with recommendations as to the order of time in which the various works contemplated should be carried out.

The conception of the plan appears to me truly magnificent and of great public utility, because it is a *piano regolatore*,—that is, a plan which, after the largest opportunity for inquiry has been given, is the plan adopted by the governing body, the strict adherence to which will ensure the development of a great and well-arranged city.

As I understand it, the Government takes the initiative, and requires the Commune to execute such works as the Government thinks necessary, leaving, however, as I gather from the relation, great latitude to the Commune as to the details; that thereupon the Commune studies the subject, and prepares its scheme and plan, and the approval of this plan is considered equivalent to a declaration of public utility, on which may follow the expropriation or acquisition of such property as may be

required for carrying on the work. It also appears that after the plan for the intended improvements, or probably after the order of the Government is given to take the matter into consideration, that a period of twenty-five years is allowed for the execution of the work, and the Commune has power to levy taxes so as to provide for the expenses of carrying them out.

The development of the new city commenced in close proximity to the terminus of the railway, which, after skirting the east side of the city, enters it on the north-east, near the Porta Maggiore. Close to the railway station are the ruins of the Baths of Diocletian. Opposite these ruins a fine crescent has been formed, and from the centre of this crescent the important Via Nazionale has now been constructed, running in a south-westerly direction for nearly 1,000 yards towards the Piazza Venetia, which is at the southern end of the Corso, the great street of old Rome. This is a noble street; it falls pretty gradually towards the Piazza Venetia until at the lower end, where the street has an inconveniently steep gradient, and an awkward bend. At the present time the work of the demolition of the buildings which it is necessary to remove in order to extend the Via Nazionale towards the Castle of St. Angelo is actively going on.

From the Baths of Diocletian to the Piazza Venetia the Via Nazionale is now completely formed, lined on both sides with either new buildings (entirely so in the upper part) or with old buildings in the lower part of the street, the façades or enclosures to which have been altered so as to adapt them to the line of the new street. Some gardens also about on the street, causing open spaces to be left; but the aspect of the street is on the whole highly satisfactory, and in parts even picturesque.

In the upper part is one of the large modern hotels of Rome, the Quirinale, not far off from which, in a parallel street, is another modern hotel, the Costanza. On the upper part of the Via Nazionale stands a charmingly-designed church, built for the Americans,—who frequent Rome in large numbers,—by the late Mr. Street, in the Mediæval style, with such modifications as the locality and the climate suggested to the mind of that most able architect. In the lower part of the street is a somewhat imposing building, called the Palazzo degli Belle Arti; the other buildings are private houses or shops. The street is of ample width, and planted as a boulevard, with trees on either side.

Not the least interesting work now in course of execution is the embankment of the Tiber, which is being carried on on the Trastevere side, in the prosecution of which scheme the embankment has been or will be advanced, and in one part the land at the back of the Palazzo Farnesina, which projected into the stream, and narrowed it very inconveniently, has been removed. This work appears to be going on with considerable rapidity, and when completed will be a most important work.

#### THE SUPERINTENDING ARCHITECT: METROPOLITAN BOARD OF WORKS.

At the meeting of the Metropolitan Board of Works on the 14th inst., the Clerk, Mr. J. E. Wakefield, read the following letter:—

"Metropolitan Board of Works,  
Spring-gardens,  
May 19, 1886.

To the Chairman and Members of the Metropolitan Board of Works.

GENTLEMEN,—I beg to inform you that I find myself compelled by failing health to tender my resignation of the position of Superintending Architect to the Board, which I have held for more than twenty-five years.

It is with great reluctance and deep feelings of regret that I have resolved to withdraw from this high and honourable position, and from the performance of professional duties in which I have taken a very lively interest for nearly half a century (having entered my profession in July, 1836).

In closing my long connexion with the Board, I trust I may be allowed to express my grateful sense of the kindness and consideration which has always been extended to me by all the Members of the Board, the Chairman, and officers, the recollection of which will ever be a great comfort and consolation to me in my declining years.

In tendering my resignation I desire at the same time to say that I shall be prepared to continue the conduct of the business of the Department until the Board shall have made such arrangements as they may think necessary in consequence of my retirement, and shall also be willing and ready to place my services at the disposal of the Board on all occasions when the Board may think fit to honour me with their confidence.—I have the honour to be, Gentlemen, yours very faithfully,

JOSEPH VULLIAMY."

Mr. F. H. Fowler said he was sure that he expressed the unanimous feeling of the Board,

which was one of regret that in consequence of declining health Mr. Vulliamy had felt himself bound to send in his resignation as Superintending Architect to the Board. No one knew more than those who were connected with him the high character of Mr. Vulliamy. He had served the Board for twenty-five years. A pupil of Sir Charles Barry, and for some sixteen years engaged in the practice of his profession on his own account, he was elected from among twenty-two competitors as Superintending Architect in the place of Mr. Marrable on the resignation of that gentleman in 1861, and since then had been actively concerned, under the direction of the Board, in carrying out some of the most important street improvements which the metropolis had witnessed, and in his retirement he would carry with him the respect and esteem of every member of the Board with whom he had been associated. Moved, in the first instance, that Mr. Vulliamy's letter of resignation be referred to the Works and General Purposes Committee.

Mr. Freeman said that, as the oldest member of the Board, he was able to endorse to the full all that had been said by Mr. Fowler as to the regret which the Board would feel at Mr. Vulliamy's retirement. He seconded the motion, which was unanimously agreed to.

Mr. Vulliamy some time afterwards entered the Board-room, and presented his usual weekly report on applications under the Building Act.

At the meeting of the Board to be held this Friday, the 21st, the Works and General Purposes Committee will present a report recommending that Mr. Vulliamy's resignation be accepted as from the 29th of September next.

It may be mentioned that Mr. Frederick Marrable, the first Superintending Architect to the Board, was elected on Feb. 4, 1856, when there were fifteen other candidates, viz., Messrs. W. Hosking, E. W. Lower, J. Blore, J. H. Taylor, G. L. Taylor, G. Legg, H. Harrison, J. T. Wood, C. W. Pined, Thomas Taylor, John Barnett, E. C. Hakewill, William Young, F. W. Stent, and S. C. Gant. At the last moment, however, Mr. G. L. Taylor wrote withdrawing his candidature, as he considered the salary offered for the duties too small. A member of the Board moved that the appointment should be deferred, and the question of salary reconsidered, but this proposition was negatived, and the election was proceeded with. Four of the candidates (viz., Professor Hosking, Mr. Marrable, Mr. Hakewill, and Mr. Barnett) were first selected by show of hands to go to the final vote, and ultimately Mr. Marrable was elected.\*

Mr. Marrable resigned in 1861 under the following circumstances:—The Covent Garden Approach and Streets Committee presented a report to the meeting of the Board held on Feb. 9 of that year, recommending that the salary of the Superintending Architect be increased from 800*l.* to 1,200*l.* per annum, but to this recommendation an amendment was moved, and carried by twenty-seven to nine, that Mr. Marrable's salary be increased to 1,000*l.*† At the following meeting of the Board Mr. Marrable sent in his resignation, on the ground that when, in 1856, candidates were invited for the office at a salary of 800*l.* per annum, nothing was said to induce a belief that he would be expected to perform such onerous and responsible services of a professional character as had been demanded of him, relative to the survey, valuation, and purchase of property for the new streets undertaken by the Board, and he regarded the increase of salary now offered as inadequate. The resignation was accepted, and it was referred to a committee to consider the duties and salary of the office.‡

At the meeting of the Board on March 1, 1861, Mr. Vulliamy was elected by thirty-five votes as against twenty-nine given for the late Mr. Sancton Wood, twenty-seven for Mr. J. Kerr, twenty-six for Mr. Isaacs, twenty-six for Mr. J. Billing, and twenty-three for Mr. Fowler. There were seventeen other candidates, viz., Messrs. Saunders, J. Young, E. Wilson, Hart, C. Eales, Salter, H. B. Richardson, Liddiard, T. Goodchild, T. Morris, Blore, Dizo, T. D. Barry, Cooper, J. Hansom, Kirkland, and Salmon.§

In February, 1877, the Board determined to elect an Assistant Architect and Surveyor,

\* Vide *Builder*, 1856, p. 78.

† *Builder*, 1861, p. 106. ‡ *Ibid.*, p. 130. § *Ibid.*, p. 1.



salary of 500*l.* per annum, and it was remitted to the Works and General Purposes Committee to select six candidates from among those who applied for the appointment. There were only eight applications. The committee submitted the following names:—Messrs. D. R. Dale, W. Ogerty, John Hebb, George McDonnell, W. Ilkley Nash, and Jasper Wager. Mr. Hebb was elected, and continues to hold the office.

#### ARCHITECTURAL SOCIETIES.

**Edinburgh Architectural Association.**—The annual general meeting of this Association was held on the 18th inst. Mr. Geo. Washington Rowne, President, in the chair. Mr. J. Fairbairn, Hon. Secretary, read the report of the twenty-eighth session, which the Council stated at they regarded as one of substantial progress in all departments. The gentlemen admitted as members during the session numbered eighty-seven; twenty-seven names had been withdrawn, owing to various circumstances, and there were now 503 on the roll. The report having been adopted, the office-bearers for the ensuing session were elected, viz., Mr. Hippolyte Blanc, president; Professor Baldwin Brown and Mr. John Kinross, vice-presidents; Mr. T. Fairbairn, hon. secretary; and Mr. John White, hon. treasurer. On the motion of Professor Baldwin Brown votes of thanks were given to all office-bearers. The Chairman then read continuation of a paper on Monastic Architecture in Scotland.

**Glasgow Architectural Association.**—On Tuesday afternoon last a party of the members visited the Cathedral, and were conducted over the building by Mr. John Honeyman, R.I.B.A. Under his guidance the various portions, from crypt to tower, were seen, and in dates of erection learned, a running commentary on the purposes of the different parts, and the intention of the builders where these appear to be departed from or unfulfilled, rendering the inspection a most interesting and instructive one.

**Liverpool Architectural Society.**—The annual report of this Society, read at the meeting on the 23rd inst., shows a slight diminution in the number of members, the number now being 121, as compared with 121 at the close of last session. This number is made up of 42 Fellows, 27 Associates, 23 Associates, 23 Associates, and 2 Corresponding Members. There had been two resignations, viz., two Associates and six Students. Among the members deceased, mention is made of the late Mr. Samuel Huggins, many years a member of the Society, which is indebted to him for many contributions to the proceedings. Seven members had been elected, viz., one Fellow, five Professional Associates, and one Student. In the early part of the session the Council received, with great interest, the resignation of the Hon. Sec., F. W. Hornblower, whose devotion to, and interest in, the welfare of the Society for past eight years had contributed in no small measure to its continued existence. Mr. C. W. Hornblower had undertaken the duties of the office, subject of the federation of architectural societies had frequently engaged the attention of the Council, who had given their support to a committee formed by the Royal Institute of British Architects, upon which Mr. C. W. Hornblower was placed, and Mr. Parslow has been appointed as the representative of the Society.

#### OBITUARY.

**Sancton Wood.**—Mr. E. C. Robinson Wood, whose office I entered in 1846, I was requested by his representatives to attend a few words about him. He died on the 24th of April last, within a week of his seventy-year, and was buried on the 24th at Putney. He had resided in a house of his design on Putney-hill for the last thirty years, and was formerly District Surveyor of Putney and Roehampton, but for the last twenty years he was District Surveyor of St. George's, Chelsea. He was a Fellow of the Royal Society of British Architects, and was a member of the Examining Board for District Surveys. He was also a Fellow of the Institute of Civil Engineers, and an Associate of the Institution of Civil Engineers. He was

articled to Sir Robert Smirke, but was turned over to Sydney Smirke, and remained Classical in his architectural taste and practice. He was engaged by Mr. John Braithwaite to design the station buildings on the Eastern Counties Railway, and was the architect of the old terminus at Shoreditch. He was the successful competitor for the Great Southern and Western Railway buildings in Ireland, and erected the Kingsbridge Terminus and the stations from Dublin to Cork. He was also architect to the Limerick Junction line, and, living at a time when architects were not quite elbowd out by engineers, he became architect of the Rugby and Stamford Railway, and the Syston and Peterborough Railway buildings in England. He was subsequently architect to several building estates, and built many private houses and London offices, notably those at the southwest corner of King-street and Gresham-street. In his later years he was much employed in arbitrations, and was an able administrator. He was married and had two sons, who preceded him to the grave.

We are asked to add to the above that in 1846 Mr. Wood received a premium of 100*l.* for his designs for the Blackburn Railway Station, offered by the Blackburn and Preston Railway Company.

#### BUILDERS' BENEVOLENT INSTITUTION.

An election of pensioners on the funds of this Institution took place on Thursday afternoon, at 11 o'clock, at the residence of Mr. Arthur C. Lucas, J.P. (President), in the chair. There were three vacancies,—two for men, and one for a woman,—for which there were six candidates, five of whom were men. The following is the list of the candidates, with the number of votes polled for each, according to the report of the scrutineers (Mr. Thomas Stirling and Mr. Keeble), viz., John E. Rowe, Croxson, aged sixty-three, builder, 1,091 votes; Samuel Walton, Holloway (formerly a subscriber to the Institution), aged sixty-eight, builder, 1,283 votes (including 140 allowed for subscriptions); Ebenezer Robinson, Camberwell, aged seventy-two, builder, 653 votes; James Pickering, Clapham, aged sixty, builder, 74 votes; and Thomas Norton, Brookgreen, aged forty-six, 330 votes.

John E. Rowe and Samuel Walton were therefore declared to be the successful male candidates, and Mrs. Caroline Cleary, of Highbury Quadrant, widow of Joseph Cleary, builder, being the only female candidate, was elected as a matter of course.

Votes of thanks to the Chairman, proposed by Mr. Foxley, and to the scrutineers and other gentlemen who had taken part in the proceedings brought the meeting to a close.

#### CASES UNDER THE METROPOLITAN BUILDING ACT.

##### NEGLECT TO SUBMIT PLANS TO DISTRICT SURVEYOR.

At the Hammermith Police Court on Saturday, Mr. Harris (Harris & Wardrop), contractor, was summoned for omitting to produce to Mr. Knightley, the District Surveyor, plans and sections showing the constructions of proposed stabling for Messrs. Carter, Paterson, & Co., in Glenthorne-road, Hammermith.

Mr. Knightley said he sent formal notice to the builders for plans, but without effect.

The defendant said his foreman called one day at Mr. Knightley's office. He only saw a junior clerk, and refused to leave the drawings. He (the defendant) added that Mr. Knightley could have seen the drawings at the building at any time.

Mr. Knightley contended that the production of the drawings meant in such manner that he should have time and a fair opportunity to examine them.

The Magistrate, Mr. Bennett, expressed a similar opinion, and imposed a penalty of 3*l.*, with costs.

##### WHAT IS A PARTY-WALL?

At the Worship-street Police-court, on Wednesday, Mr. James Stone, a builder, of Walthamstow, was summoned under the Building Act, for so irregularly building a certain party wall that it did not rise 15 in. above the roof.—Mr. Jutsum, solicitor, appeared on behalf of the prosecuting surveyor, Mr. Meeson, of the District of East Hackney North; and Mr. Adam Burn, barrister, defended.

The defendant, it appeared (we quote from the report in the *Daily Telegraph*), was the contractor for certain buildings being erected in Theydon-road, Hackney; and the point of the case was whether the wall in question was or was not a "party" wall within the meaning of the Act. If a "party" wall it was necessary that it should be carried up above the roof at least 15 in., whereas the evidence of Mr. Meeson showed that the wall was covered by the roof. There was no contention as to the facts, and it was shown that the buildings in question

were intended for "model dwellings," and are being erected in eight "blocks."

The defence was that the total area of the "block" in question was only 1,200 ft. super., whereas 3,600 ft. was the allowance under the Act for areas without party walls.

Mr. Meeson's contention was that the wall, being the boundary of the "separate dwelling," as model dwellings "are let, was a "party" wall, and a long discussion as to the bearing of the Act took place on the point; the Act, it was submitted by Mr. Jutsum, being sufficiently clear in its definition of a "party wall" by stating that it should "apply"—a word which Mr. Hannay remarked was very oddly used in that connexion,—"to any wall separating a building from another building occupied by different persons."

Mr. Hannay said that if that view of the matter was to be held good, a set of chambers would require a "party" wall.

The solicitor submitted that they did, and that the "flats" of "model dwellings" were "separate dwellings" was clear from the Representation of the People Act, which treated them as dwelling-houses.

Mr. Hannay said that it was well known that separate occupation was a "separate dwelling" for voting purposes; but if a separate occupation was a "separate dwelling" within the meaning of the Building Act no person could let a portion of a house to a lodger without putting up a party wall from roof to basement.

Mr. Burn cross-examined to show that for every "separate" dwelling, District Surveyors under the Act were entitled to a fee about six times greater than that allowed for a mere survey of so many floors, &c. Therefore, if Mr. Meeson were to succeed in his contention, it would be greatly to his benefit.

Mr. Hannay thought that point need not be pursued.

Mr. Burn having addressed the Magistrate for the defence.

Mr. Hannay said that he could not go with the contention for the prosecution, that a set of chambers or "rooms" was a separate building; and he was helped to that opinion on reading the 27th section of the Act, which said that every building should have its "external or party wall." In his opinion the wall in question was not necessarily a party-wall; therefore the defendant was not bound to carry it above the roof, and the contention for the Surveyor must fail. He dismissed the summons, and ordered the Surveyor to pay the defendant two guineas costs.

#### TALL CHIMNEY CONSTRUCTION.

SIR,—Your correspondent "J. H. G." (page 694, ante) having put six queries to the readers of your paper, and especially asked me to reply, with your permission I will endeavour to do so, taking them *seriatim*, embodying in the answers the opinion and experience of men who have practically superintended the erection of this class of work, both in England and America, for many years.

**Cement Rings.**—The whole of the chimney should be built with good lime-mortar, and not with cement rings every yard in height. Some shafts have been built with cement rings; probably it is thought this prevents cracking, but I know chimney-designers and builders in the counties of Lancashire, Nottinghamshire, and Kent who use good lime-mortar throughout, because they are convinced it is better to preserve the homogeneous character of the structure.

**Concrete Chimney.**—I only know of one shaft being built in concrete,—that is at the Chain Cable and Anchor Testing Works, Sunderland, and is described and illustrated in our book. If any of your readers know of other examples I hope they will communicate the same to the Builder.

**Exhaust Steam.**—The discharge of exhaust steam into the chimney cannot always be avoided, but it is very rarely done. I know a case in the City of London where the exhaust steam is conveyed into the chimney-shaft, but this was arranged to avoid causing a nuisance to the opposite premises. The responsible person in charge considers it detrimental to the brickwork. Some chimney-builders say that exhaust steam injures the draught when discharged up the shaft, as the steam forms itself into a column and takes up the centre of the chimney, and saturates the smoke. The vapour clings to the chimney sides and causes a wet lining of soot on the brickwork, and so affects the mortar that it falls from the joints every time the fires are stopped. The face of the brickwork will peel off when touched, similar to plaster on a damp wall. The who's length of the flue from where the steam enters is wet and slimy on all sides, and there is a constant downpour of soot and grit accumulating at the



base, which causes 25 per cent. more dirt than if no steam entered, and the damp and dirt in the flue make the chimney more unhealthy and laborious to the men employed.

**Portland Cement.**—The Liverpool Corporation specify their cement as follows:—It must be of uniform quality and capable of bearing the following tests to the satisfaction of the engineer:

1st. Samples of the cement being sifted through a No. 60 gauge wire sieve, must not leave a residue of more than 10 per cent.

2nd. Samples of pure cement will be gauged with water and placed in brass moulds used by the corporation. Within twenty-four hours the casts thus made will be immersed in still water, in which they will remain until the expiration of seven days from the date of moulding, when they will be taken out of the water and tested to ascertain their tensile strength, which must not be less than 1,000 lb. on the sectional area of  $2\frac{1}{2}$  square inches.

3rd. In ordering the cement it will be distinguished as quick-setting or slow-setting. In order to ascertain the time of setting a modification of Vicat's needle will be used, having an area of 1-400th part of a square inch and a total weight of  $2\frac{1}{2}$  lb. The slow-setting cement must take an impression from the needle when standing vertically upon it at any time within three hours after moulding. The quick-setting cement must take the impression only during the first half-hour.

"J. H. G." should not overlook the important provision as to the amount of water to be used in moulding briquettes for testing. An excess of water will adversely affect the result; the right proportion is 9 oz. to 40 oz. of cement, as given in Grant on the "Strength of Cement."

**Shafts out of Perpendicular.**—There is a chimney in Lincoln upwards of 140 ft. high from the ground-line, which stands considerably out of plumb, and has been so many years. Inspections have been made two or three times during the last twelve years, and it shows no alteration. Some years ago I saw several moderate-sized engine-house shafts in the Staffordshire mining district, a little out from the vertical, owing, I suppose, to the subsidence of the ground from removing the minerals.

**Mortar or Cement, when exposed to great Heat.**—I presume that "J. H. G." asks this quite apart from the question of fire-brick lining, which, of course, is always set in fireclay. I have found that practical chimney builders consider that brickwork in mortar will stand greater heat than brickwork in cement. Your correspondent will also find the following authorities agree with this:—

Hurst's "Surveyor's Pocket-book," twelfth edition:—"Mortar is generally preferred to Portland cement in the erection of chimneys, as the latter does not stand the heat well."

T. Box on "Heat," fourth edition:—"Mortar should be used for the most part, because cement is destroyed by a strong heat; the 4½ in. work at the top, however, should be in good cement. With so thin a wall the heat is rapidly carried off by the external air, and the cement will not be injured."

R. Wilson, on Boiler Chimneys, says:—"Cement, owing to its crumbling when exposed to a high temperature, cannot be recommended except for the top of the chimney, where it may be usefully employed."

R. M. BANCROFT.

#### ARCHITECTURAL ASSOCIATION.

SIR,—For the benefit of those who were unable to attend the supplementary lecture on the History of Architecture last Saturday, and who have written to me for information, I would say that, after looking at Assyrian, Persian, Egyptian, Greek and Roman work at the British Museum, we visited the following buildings:—St. Bartholomew, Smithfield, for Norman; the Temple Round Church for Transitional; the Temple (eastern portion) and St. Bartholomew's western doorway for Early English; St. Etheldreda's, Ely-place, for Geometrical; Austin Friars church for Curvilinear; Great St. Helen's for Rectilinear; Lincoln's Inn gateway for Tudor; Middle Temple Hall for Elizabethan; Whitehall for Inigo Jones; Bow Church for Wren; the Adelphi for Adams; and Somerset House for Sir W. Chambers.

It would have been easy to begin with the Confessor's work at Westminster and to have filled up many gaps in the list, as London is still capable of showing a connected series of styles from Anglo-Saxon to the beginning of this century, but the above had to be seen in the course of an afternoon.

EDWARD J. TARVER, Lecturer.

#### ARCHITECTURAL ASSOCIATION EXCURSION TO ROME.

SIR,—Those of your readers who have taken an interest in the scheme which I brought forward several months since for short excursions to Rome will have gathered from the notices you have printed during the last few weeks that the first of these excursions has been successfully carried out. It happened that I was at Rome at the time of the visit, and saw the party at other places, and I feel extremely gratified with the result. The labour of getting up this excursion and of conducting it was undertaken by Mr. H. D. Appleton, one of the Hon. Secretaries of the Architectural Association, and while I shall be very glad to promote any further excursions made with the view of seeing the best examples of the architecture of Italy, Mr. Appleton will be happy to place the experience he has gained at the service of any students who may apply to him.

The party that has recently returned will combine to put on record in some suitable way the impressions they have received during their short visit to Italy.

THOS. BLASHILL.

#### FULHAM VESTRY HALL COMPETITION.

SIR,—We have received the following letter from the Vestry in reply to our inquiry as to whether they would appoint a professional assessor for the so-called second competition, for which, with our reply, we shall be glad if you can spare space in your next issue.

NEWMAN & NEWMAN.

19a, Tooley-street, London Bridge,  
May 20, 1886.

[COPY.]

"Vestry Offices, Walham-green,  
May 19th, 1886

DEAR SIRS,—I beg to inform you that at the meeting of the Fulham Vestry held last evening, it was resolved to adhere to their resolutions of the 8th of April last not to appoint a professional adviser to examine the amended plans, and to make no alterations in the date for depositing the amended plans.—I am, dear Sirs, yours faithfully,

CHARLES J. FOAKES,  
Clerk to the Vestry."

"DEAR SIR,—We are in receipt of your letter of yesterday, and are not at all surprised at the course your Vestry have taken, as it fully confirms our views as to the 'straightforward' way in which this competition has been conducted, and also confirms the report we have heard upon good authority that the work was from the first intended for a local architect."

In answer to your Vestry's advertisement, about seventy-five architects have expended their time and money uselessly, and as neither the design under the motto 'Clavus' or 'Truth' (the authors of which are known to us) were considered by Mr. Curry worthy of notice, the Vestry has now given them an opportunity of altering and amending their designs at the expense of the other competitors, and has reserved to itself the rights of final selection. After this we will say no more in the matter, but will leave those interested to form their own opinions.—We are, dear Sir, yours truly,

C. J. FOAKES, Esq. NEWMAN & NEWMAN.

#### BELPER UNION INFIRMARY COMPETITION.

SIR,—Accompanying the "Instructions" for this competition is a drawing comprising plan of site, levels, and an elevation of the infirmary building. This drawing bears the name of a Belper architect, and it would be well for intending competitors to ascertain (if they can) how this gentleman stands with reference to themselves.

Many of your readers will remember that a few months ago the Birmingham Guardians advertised for designs for an infirmary to cost 60,000. There were only six competitors. And why? Simply because it oozed out that a local man had already prepared designs, and inspected other infirmaries in company with the guardians. Moreover, it was stated that it was only by the casting vote of the chairman that a competition was decided on. May not the Belper case be a parallel one?

Competitors are asked to give "an accurate estimate" of the cost of carrying out their designs, but the Guardians give no indication whatever of the amount they intend to spend. Doubtless this is one point, among others, in which outsiders will be heavily handicapped.

The Guardians deserve credit, however, for being quite clear on one matter. The last clause of the "Instructions" reads:—"The Guardians do not intend to appoint an assessor."

NOT A COMPETITOR.

**The Statue to Mr. Samuel Morley at Bristol.**—We are informed that Mr. Havard Thomas has secured the commission for the Samuel Morley memorial statue, which is to be erected at Bristol. The figure is proposed to be of heroic size, and will be placed upon a pedestal of granite. Mr. Thomas's commission is the result of a competition in which his model was successful.

#### PROVINCIAL NEWS.

**Abingdon.**—The Corn Exchange here was formally opened on the 5th of May. It occupies a prominent site in the Market-place, and is built of red pressed bricks, with white bands, &c. The interior is 80 ft. by 45 ft. The interior walls are of white bricks from Bridge-water, relieved by red brick dressings. There is also some effective ornamental brickwork introduced, by Poulton, of Reading. The roof is open, with wood principals and iron trusses of special design. There are four openings on one side and out of the hall, forming shops. The platform is specially designed for concerts and other performances, and has two retiring-rooms below, with separate entrances. The main entrance is in the front, with an extra one at the side. Over the entrance is a gallery for ladies. The roof lighting is by Rendle's patent glazing on the north side. The front gable is surmounted by a stone figure of Ceres, by Mr. W. Frith, of London, the gift of Mr. J. Heber Clarke, who was mayor of Abingdon when the building was commenced. The architect is Mr. Charles Bell, of London, whose design was selected in a limited competition on the award of Professor Hayter Lewis. Mr. Williams, of Abingdon, was the builder. The contract sum being 1,840l.

**Aylesbury.**—A new wing has been built at Messrs. Hazell, Watson, & Viney's extensive printing works at Aylesbury. The working-space now afforded is nearly an acre in extent, and consists of eight floors, each measuring 100 ft. by 40 ft., and some additional ground-floor space. Access to both buildings is obtained from a stone staircase, built in a tower between the two buildings. There is scarcely a partition in any of the floors, so that each floor forms a light and cheery space for each department of the business. Would that this could be said of all printing-offices! The architect was Mr. P. H. Watson. The building work was done by the firm without contract, Mr. Jesse W. Landon being the building foreman; and the whole of the details were carried out under the immediate superintendence of Mr. Jowett.

**Brooklands (Cheshire).**—On the 13th inst. the Bishop of Chester opened the parish room recently erected at Brooklands from the designs of Mr. Charles Heathcote, architect, Manchester. The room is in connexion with the church of St. John the Divine, is cruciform in plan, and will accommodate 325. The two arms of the cross can be separated from the remainder of the building by folding-screens. A vestry, a room for the preparation of refreshments, and two retiring-rooms complete the plan. The porch, containing two sets of folding-doors, is warmed, like the remainder of the building, with high-pressure pipes. The heating-apparatus chamber and a large store-room are in the basement. The building is lined above the wooden dado with bands of red and buff Ruscomb bricks. The roof is open-timbered and wood-lined, and the internal fittings and floor are of pitch pine. The extract-ventilator, with current induced by gas-jets, is in a turret at the west end. The floors of the porch and tea-room are laid in mosaics. The builders were Messrs. Wilson, Toft, & Huntley, of City-road, Manchester.

**Glamorganshire.**—At Gower-road, in the county of Glamorganshire, a Conservative club has just been erected. The main structure except the joiner's work, has been built by the workmen of the Elba Steel Works, under the direction of their foreman, Mr. George Beynon. The walls are built of slag from the works, and on the first story half timber-work is introduced. The slag, which is simply burned cinders from the furnaces, is put together with Aberthaw lime, the outside of which, between the timber, is covered with rough-cast. The building contains reading-room, billiard-room, and a bag-telle recess, card-room, and bar-parlour; and these rooms are a large assembly-hall with open timber roof, and approached by a distinct entrance. Two class-rooms are provided. Adjoining the club is a cottage for the caretaker. Messrs. Brown, Thomas, & Johns, carpenters of Llanelly, executed the woodwork, and the building was designed and carried out under the supervision of Mr. J. Buckley Wilson, architect, Swansea.

**Newport (Salop).**—At a recent meeting of the Newport Town Council, the General Purposes Committee recommended for approval plans of four streets submitted to them by the architect to the Newport Cottage Company, Limited.



and of two other new streets, one of which was in Caerw Park, for Mr. J. A. Herbert. The Deputy-Mayor congratulated the town upon its prosperity, as indicated in the spread of building operations. The four new streets for the Cottage Company would provide 330 dwellings suitable for the poorer classes, and at rents within their reach. The recommendation was adopted.

**Stoke-upon-Trent.**—At the last monthly meeting of the Town Council, the Cemetery Committee reported that, having considered Mr. J. Forsyth's account for laying out the cemetery, and the report of Messrs. Milner thereon, they found that a deduction of 789*l.* 7*s.* 10*d.* out of its claim of 1,194*l.* 3*s.* balance of his contract and for extra work had been made by Messrs. Milner, who had certified a sum of 424*l.* 15*s.* 2*d.* as being due to Mr. Forsyth. The committee having considered the statement of accounts and Messrs. Milner's report, and the unforeseen difficulties Mr. Forsyth had had to contend with, owing to the anticipated rocky nature of the ground, recommended that he be paid the sum of 500*l.* in total discharge of all claim. It was explained that besides the 424*l.* 15*s.* 2*d.*, there was 30*l.* due for shrubs, so that the proposal was to pay only 46*l.* beyond the certified sum; and Mr. Milner had informed the committee that Mr. Forsyth had had unexpectedly to contend with difficulties by reason of stone strata in many places not having been revealed by the borings. The Council, however, decided to adhere to the certificate of Mr. Milner, and to pay so much as 500*l.*

#### ROMAN CATHOLIC CHURCH BUILDING NEWS.

**Ford (near Liverpool).**—On the 9th inst. the foundation stones of a new church for the convent of the Good Shepherd, Ford, near Liverpool, were laid and blessed. The new church, which will be dedicated to the Sacred Heart, is designed to accommodate three separate congregations, who will be present at Mass in the building at the same time, all of whom must see the altar, but without any of them seeing either of the others. To carry out this idea there are two naves, which will be separated by an arcade filled with piers, one to be occupied by the nuns, and the other by the penitents, while the third, the "externa," will be provided with commodation in the transept running at right angles to the chancel. Near the chancel will be two arches, which will be connected by five piers with the chancel, supporting an octagonal lantern 30 ft. in diameter, and rising to a height of 54 ft. The total length is 88 ft., the internal width 52 ft., and the height will be 40 ft. Red brick, with dressings and boole stone, is being used in the construction of the building, for which Messrs. Pugin & Pugin are the architects, and Messrs. Roberts & Robinson, of Liverpool, the contractors. The cost of the building will be between 6,000*l.* and 7,000*l.*

**Grays (Essex).**—The first stone of a new school-chapel, &c., at Grays, was laid on the 11th ult., by Cardinal Manning. The new buildings are being erected from designs by J. F. H. Pownall, architect, Montagu-square, London, and comprise, on the ground-floor, a school capable of holding over 400 children, and a church above, to seat from 500 to 600 persons. The buildings are Early Gothic in character, and faced externally with stock bricks, of local manufacture, relieved with red bricks.

**Greenhill (Swansea).**—A new Roman Catholic church at Greenhill, Swansea, in the diocese of Newport and Menevia, for the Very Rev. Canon Harbours, O.S.B., has just been commenced. It is a most picturesque site, and will be seen in all parts of the town. The architects are Messrs. Pugin & Pugin.

**The Last of the Old "Cock" Tavern, Fleet-street.**—The historical Cock Tavern in Fleet-street will shortly be replaced by the buildings about to be erected by the Bank of England, and on Tuesday last the materials for the ancient hostelry were sold by Messrs. W. S. & Sons, & Everfield. The new structure on the Bank authorities intend to erect on the site will have a frontage to Fleet-street of 90 ft.

#### STAINED GLASS.

**Bexley.**—The five chancel windows in the new church of St. John the Evangelist, Bexley, Kent, have recently been filled with stained glass by Mrs. Layton, of Bexley, in memory of her late husband, Edward John Layton, through whose instrumentality the building was erected and to which he was a munificent donor. The centre window represents the Crucifixion, and in those on each side, the subjects of the Good Samaritan and Our Lord blessing little children, have been respectively illustrated. The extreme north window contains the figures of St. Peter and King Edward in niches under rich canopies, and on the extreme south St. John the Evangelist and St. Paul similarly arranged. In the quatrefoils of the centre window is the *Agnus Dei*, and in the four others the emblems of the four evangelists. The windows are all two-lights, and have been executed by Messrs. Barlison & Grylls under the supervision of Mr. George Low, the architect of the church.

**Penn (Bucks).**—The parish church of Tyler's Green, Penn, Bucks, has just received two Munich windows, one representing St. David, in memory of Mr. James Plaistowe, of Land-water, and the other containing a figure of St. Margaret, in memory of Margaret Amelia Rose. The work has been designed and carried out by Messrs. Mayer & Co.

**Westwood (Coventry).**—Westwood Church has been enriched by a stained glass memorial window to the Vicar's wife, who died last year: the window was unveiled on Easter-day. The subject represented is Our Lord meeting Martha and Mary. In the tracery is an emblem of the Trinity. The window was designed and executed by Messrs. F. Holt & Co., Warwick.

**Winchester.**—A memorial window to Lord Chief Justice Erle, who was a devoted Wykehamist, has been placed in a window of the south aisle of the cathedral nave, directly before the south face of the chantry of Wykeham. It is by Messrs. Clayton & Bell, and has been provided by Lady Erle. It is of six lights, with trefoil heads, in which are the college arms, the Erle arms, and an angel with an open book. The six lights are filled with figure subjects. In the upper tier are Wykeham, in full pontificals, and Bishop Ken, vested in the robes of the Protestant bishops. Between these two is the Virgin, to whom the two colleges are dedicated, holding the Divine Child. The second row includes figures of Faith, Charity, and Justice, with their conventional symbols and attributes.—*Hampshire Independent.*

#### The Student's Column.

##### OUR BUILDING STONES.—XI.

##### ON THE ORIGIN AND STRUCTURE OF SANDSTONE.

THE rocks included under this heading constitute a large class of building materials. They are composed mostly of grains of quartz cemented together by various kinds of mineral matter.

Sandstones are essentially aqueous rocks,—that is, they were formed in water, and the great majority of those used in building were laid down in the sea not far from land; for the quartz grains of which they are composed were derived from the denudation of the land. In the first instance, the grains were no doubt obtained from the wearing away of crystalline rocks containing quartz, but the majority of the sandstones formed at later periods were largely made from the destruction of pre-existing arenaceous rocks. Many sandy deposits now in process of formation, for instance, have obtained the materials of which they are made from the denudation of the sand-cliffs along our sea-coasts.

Suppose we follow out the formation of a sandstone the quartz in which has been derived directly from a crystalline rock, such as granite. The felspar, as previously stated, would decay, and, being borne out to sea in the form of mud, would form clay. Part of the mica would also be removed, thus leaving the remainder of the mica and the quartz loose. These the sea would eventually seize hold of, the mica being carried away some distance from the beach at an early stage in the process, but the quartz crystals would be rolled to and fro on the beach, knocked together and broken, their rough, jagged edges

being worn off whilst being made into pebbles. The pieces resulting from this fracturing would be of various sizes, and the smaller pieces or grains of quartz, being small enough for the water to hold in suspension, would then be carried away from the shore. If we still follow these little grains up we shall find that as the velocity or drifting action of the water became insufficient to suspend them, they would fall to the bottom, being quietly deposited there. It often happens that flakes of mica are deposited with the quartz, and are so arranged in thin layers that, when the sand becomes hard, it assumes a fissile character, which renders it capable of being split up into flagstones (see ante, p. 694).

Little pebbles would be frequently deposited in the coarser sand.

As molluscs and other organisms living in the sea died, their remains would be covered up by the deposit of sand, and unless subsequently removed, would be handed down to us as fossils. The accumulation of sand in time might become very great when the upper part of it, exerting considerable pressure on the lower, would cause it to become compact.

Although it has been shown that pressure alone is sufficient to make particles of sand cohere into a hard mass, yet by far the greater quantity of sandstone quarried for building purposes has a matrix or cementing material. This in most cases has been introduced into the stone after the sand has been laid down, for water in percolating it has left behind some of the chemicals which were held in solution, and these, forming round the grains of sand and filling up little spaces, made the mass hard,—in other words, made the sand into a sandstone.

A microscopic examination of sandstone imparts a considerable amount of useful information. Then it is seen that a specimen, which from outward appearance was not suspected to contain any grains but those of quartz, is made up also of minute particles and fragments of other minerals. This is a feature of much interest. If the specimen contained a more than usual quantity of silicate of alumina with potash, lime and soda, there is just the possibility that minute particles of felspar are present, but as the analysis would only give the aggregate chemical composition, we could not be quite sure in what form those chemicals occurred. An examination of a thin section of the rock would go far to settle points like these.

Little opaque grains of some form of iron are frequently seen under the microscope. These are waiting to be attacked by the atmosphere, and by their decay cause unsightly ferruginous lines to run down the surface of the stone when built up. The microscope is also useful in pointing out the state of cohesion of the quartz grains, and to some extent the nature of the matrix. If, for instance, the grains are rather far apart, and the mineral calcite appears between them, the stone would not be very durable, but more so than when the carbonate of lime existed, as it very often does, in an earthy form. If, on the contrary, the small quartz grains are close together, and the little matrix present looks firm, that is, does not present a decomposed, woolly appearance, the stone would be durable and easy to work. It would be still more durable if little veins, presenting the granular structure peculiar to chalcedony, or secondary quartz, were seen running here and there between the grains of quartz, although we should remember that the more siliceous the matrix is, the more difficult the stone becomes to work up.

If the sandstone under examination contains many shells, the mineral composition of those shells should be ascertained. Their original composition is often replaced by silica, but occasionally they are made of some form of carbonate of lime, and might then be submitted to the method of microscopic analysis for the determination of the particular form as described on p. 695.

#### LIMESTONE.

This class of stone is raised extensively for building purposes in many parts of the country, but often occurring in the midland and northern counties close to sandstones of better quality, limestones are not so generally used as they might otherwise be.

We will first consider the origin of limestone. Although sometimes deposited chemically, the greater quantity of carbonate of lime derived from the denudation of rocks, which is



rought to the sea by rivers, is eliminated by the agency of molluscs and other organic life. These organisms having died, and their shells being covered up by other shells, after a lapse of time such an accumulation takes place, and the deposit becomes so thick by the augmentation of shell sand, that the underlying portions are subjected to such a pressure as to make them tolerably compact. The deposition of different minerals from percolating water, subsequently aids the whole in becoming a limestone. The shell-sand is formed of broken up and pulverised shells. It is not difficult therefore to see why limestones contain so much shelly matter. One of the best known limestones is chalk, which is often used locally as a building material. On examination with the microscope this rock will be found to be almost wholly made up of the broken, and more or less perfect shells of marine organisms.

Several limestones found in this country and elsewhere, were evidently at one time coral reefs, as they are composed of the skeletons of those animals built up one upon another. In some instances, the character of these reefs has been gradually obliterated by the passage of percolating water through them, which has dissolved and re-deposited the carbonate of lime, of which the corals were made. In this way a crystalline structure, formed of organic remains, has been set up, without the agency of subterranean heat.\* Other limestones appear to have been similarly affected.

The microscopic structure of the little spherules which, together, help to form oolitic freestones, was described on p. 695. These little egg-shaped bodies were probably formed in water charged with a considerable proportion of carbonate of lime, and under the influence of gentle currents which drifted along the grains of quartz or fragments of shells now forming their nuclei. The carbonate of lime would be deposited on any surface suitable for its reception, such as that presented by these grains and fragments, and continual motion being kept up during deposition, it would form in layers round all sides of them. Such an action is proceeding in some parts of the globe at the present day.

The fact that grains of sand often form the centres of these oolitic spherules, and that sand frequently also occurs distributed throughout the rock, accounts no doubt in some measure for the silica which a chemical analysis shows is present in some limestones. We may remark that where this is the case the silica has no preservative action whatever, as, directly the oolitic grains forming the rock decompose, and the carbonate of lime is removed, the grains of sand, being loosened, simply fall out, having nothing to support them.

The microscope, however, often shows us that all the silica present is not confined to the grains of sand, but that some of it is distributed in a vein-like manner between the spherulitic bodies. When this is the case, the stone would show rather a high "crushing weight," and although, perhaps, it might not be a very good freestone, it would be much more durable than the ordinary limestones used in building.

Those rocks which are largely composed of carbonate of lime and carbonate of magnesia are called dolomites or magnesian limestones. They are often crystalline in character. In some instances, dolomites appear to have been formed by an original chemical precipitate from the saline water of inland seas.† In others, the rock has been altered to a great extent by heat and pressure, and a crystalline structure thus set up. Thirdly, they have been formed by the abstraction of carbonate of lime from those which contained but little carbonate of magnesia, and they may then have had their proportion of magnesium carbonate increased by the action of percolating water. It has been shown that shells and other organic remains originally made of calcite or aragonite have been converted into dolomite in this manner.

Limestones of fresh-water origin have been used in some districts for ecclesiastical ornamentations. Purbeck marble, for instance, was much employed in this manner, in many of our cathedrals and churches for slender shaftings, tombs, &c. This stone is sometimes also known as "pallidina" marble, from the fact that it is largely made up of the fresh-water shell of that name.

Although a large number of limestones are comparatively free from foreign matter, it is

evident from their origin that such must to some extent occasionally be present. Unless formed under very favourable circumstances, clay, iron, and bituminous matter, in addition to the sand, before referred to, will be more or less prevalent in them. The methods of detecting these impurities have been described on p. 491.

## FLINT.

This material is largely used for churches, &c., in districts where it is abundant. Most of it comes from the upper part of the chalk, the lower chalk containing but very little. As it hardens on exposure to the atmosphere, it is more easily dressed when fresh from the chalk-pit than when it has been lying about for some time. It is composed of silica, but frequently contains impurities such as iron.

Flint has been formed in various ways. It is often found enveloping sponges and other organic remains in such a manner as to leave but little doubt that much of it accompanied the deposition of the chalk, though why it should have a tendency to form in lines as it does is not very clear. It is certain that some flint at least was not formed until the chalk was made compact, because it is found filling cracks which were not in existence before the chalky deposit was considerably dried, the cracks being formed during the contraction consequent on drying. Water holding silica in solution appears to have permeated the chalk, leaving that oxide behind in the cracks and joints.

Unless flint is very impure it will last for ages when built up. The principal thing to look to in constructing a building of flint is the cementing material or mortar.

## RECENT PATENTS.

## ABSTRACTS OF SPECIFICATIONS.

609, Ventilating Buildings. E. Tomlinson.

A series of outlets are made from the rooms, &c., into the various chimneys, the smoke being collected by suitable cowls fixed on the ordinary chimney-stack. In the case of a single building the cowl may be continued over the roof or down the side in such a manner as to cause the condensation of the smoke. An artificial exhaust is employed, and after treatment of the smoke the gases are discharged by an up-take-pipe, into the atmosphere above the roof.

531, Measure. W. R. Lako.

Along the side or upon the back of the tape measure or scale is printed a corresponding logarithmic scale, so that calculations of cubical contents, &c., may be readily made.

843, Disinfecting Apparatus. J. Robertshaw and J. T. Turner.

Consists of a vessel, round the rim of which is a channel or gutter, and inside of which is suspended, from suitable supports, a metal plate, wire, or disc, or other suitable flat surface, on which sulphur may be burned or volatilised.

884, Hardening Stone, Cements, &c. B. J. B. Mills.

This invention consists in economising cements, &c., in the formation of agglomerates not of a marly or earthy nature, permitting the employment therein of vegetable matters, such as hay, algae, sawdust, &c., and hardening, without baking or compression, by the addition of rock alum and a suitable sulphate. The materials are mixed and shaped, dried, and immersed for twenty-four hours in a solution of any suitable sulphate, preferably zinc sulphate, with the addition of rock alum. The compound may be dried and again immersed in a bath of greater density than the first, or the immersions may be replaced by three or four waterings at intervals with the same liquid. Vegetable materials thus bound together may be made into partitions, hollow vessels, boats, &c. The mixture of rock alum and a sulphate may be applied for the preservation of public monuments, &c., for hardening soft stones, plasters, &c., for incombustible coatings for woodwork, &c., for coating ships' hulls, conduits, &c., and for other purposes.

896, Strengthening Wooden Mallets. A. J. Boulton.

The working surfaces of mallets, the wooden handles of tools, &c., where the surface of the wood is at right angles to the grain, are strengthened by strips of tough wood, raw hide, indiarubber, &c. (but not metal), which are bevelled at the ends, bent round to a circular form, so that the ends overlap, or to a spiral form, and, lastly, glued and pressed into circular recesses in the article to be strengthened.

897, Manufacture of Tiles. A. J. Boulton.

An hexagonal receptacle or basket is mounted on a vertical shaft by which it may be rotated at a

high speed. Moulds having glass backs for the purpose of producing a smooth surface are arranged on the interior of each of the sides. The sides are hinged so that they may be opened outwards for removing the moulds. The material which is to form the surface of the tiles is fed in first while the shaft is rotating, and the material to form the body is fed in afterwards. When the tiles are of sufficient thickness the basket is removed and a fresh one substituted. The apparatus may be modified to render it applicable to other articles than tiles.

## NEW APPLICATIONS FOR PATENTS.

May 7.—6,176, J. Dealey, Flushing Cisterns.—6,182, R. Little, Sash Windows.—6,196, J. Fryer, Chimney Cows.—6,207, W. Baker, Ornamentation of Mouldings.—6,212, E. Edwards, Compressed Blocks for Building.—6,221, C. Williams, Fireproof Floors.

May 8.—6,238, W. Pringle, Mitreing.—6,268, H. Lake, Rock-drilling Machines.

May 10.—6,292, G. Sharp, Oscillating Chimney Top.—6,309, J. Reid, Lavatory Basins, Baths, Water-closets, &c.

May 11.—6,312, J. Mason, Windows.—6,336, W. Chambers, Screw Driving.—6,337, W. Hulse, Spiral Levels.—6,352, J. Wilson, Securing Lock or Door Handles or Knobs to Spindles.—6,370, R. Lavender, Oxide of Iron Pigment Colour.

May 12.—6,379, D. Frow, Hinges and Fastening Devices.—6,389, J. Kershaw, Wood-planing Machines.—6,402, G. Innes, Hob Grates.

May 13.—6,426, W. Farry, Construction of Floors, Roofs, and Arches, of Bricks, Terra-cotta, Stones, &c.—6,437, G. Copeill, Spindle for Door Locks.

May 13.—6,441, N. Rosekilly, Centre-boring Bits.—6,452, H. Haddon, Tonguing Wood or Stone.

## PROVISIONAL SPECIFICATIONS ACCEPTED.

3,388, H. Dimpewulf, Smoke-consuming Fire places.—4,521, A. Boulton, Earth Closets.—4,733, G. Body, Fastening for Casket Sashes, Doors, and Fastenings.—4,943, T. Teyford, Closet Basins, &c.—4,953, M. Cleary, Flushing Water-closets.—5,131, C. Gordon, Domestic Grates.—5,167, J. Smalley, Preventing Down-draughts in Chimneys.—5,661, W. Williams, Portable Scaffold.—4,860, A. Gross, Window-sash Fastener.—4,886, S. Worsnop, Fixing Iron Laths and Slates to Iron Roofs.—5,007, C. Heaget and J. Shale, Window-sash Fasteners.—5,038, C. Ewing, Fasteners for Window Sashes.—5,175, S. Bott, Cupboard Turns, &c.—5,137, W. Walker, Ornamenting Glass for Covering Walls, Ceilings, &c.—5,238, F. Milan, Hot-water Apparatus for Warming Rooms.—5,286, E. Staples, Attaching Door-knobs to Spindles.—5,317, J. Westley and J. Peers, Ventilators.—5,371, J. Macmillan, Inlet Ventilators.—5,553, J. Dixon, Chimney Cows or Tops.—5,844, C. Howe, Manufacture of Cement or Plaster.

## COMPLETE SPECIFICATIONS ACCEPTED.

## Open to opposition for two months.

6,085, H. Lake, Protecting Wood from Moisture.—8,026, J. Coulter, Machinery for Dressing or Planing Stone, Marble, &c.—8,139, G. Redfern, Rendering Wood Incombustible.—8,437, S. Ingham, and Others, Woodworking Machinery.—8,533, B. Harrison, Attaching Door-knobs to Spindles and Doors.—8,552, S. Ingham and Others, Woodworking Machinery.—8,515, H. Doulton and J. Slater, Embossing and Decorating Window and other Glass.—15,512, W. McGowan, Screw Drivers, Gimlets, &c.—4,285, R. Shaw and W. Wenham, Cements.—7,409, J. Brooke, Oval or Elliptical Soldering Machine.—12,762, J. Belfield, Furnace for Burning Bricks, Tiles, Pipes, &c.—5,127, R. Cardwell, Stench Traps and Street Gullies.

## RECENT SALES OF PROPERTY.

## ESTATE EXCHANGE REPORT.

MAY 8.  
By G. B. SMALLFITCH.  
Guildford—17 and 18, Quarry-street, freehold ..... £74  
MAY 10.  
By R. A. NOTLEY.  
Aldersgate-street—Glasshouse-yard, freehold building site, area 5,600 ft. .... 2,63  
By CROFTON & SON.  
Kensington—43, 44, and 45, Church-street, freehold ..... 3,39  
6, Horton-street, 18 years, ground-rent 8l. 6s. .... 42  
42, Argyle-road, 68 years, ground-rent 12l. .... 1,77  
By WEATHERALL & GREEN.  
Islington—2, 3, and 7 to 9, Upper Winchester-street, 27 years, ground-rent 24l. .... 1,40  
MAY 11.  
By WALKER & RUNY.  
Camberwell—45, Wells-street, known as Sykes' Wharf, 27 years, ground-rent 20l. .... 20  
By WALTON & LEE.  
Portman Estate—71, George-street, 42 years, ground-rent 3 l. .... 2,11  
By C. & H. WHITE.  
Walworth—68, 69, and 70, Boyson-road, 65 years, ground-rent 18l. 18s. .... 1,21  
Westminster Bridge-road—4, Caroline-street, freehold ..... 60  
Forest Gate—7, 9, 11, and 13, Parliament-place, freehold ..... 71  
Harrow—1 and 2, Rokeby-villas, freehold ..... 34

\* See Dana's "Coral and Coral Islands," p. 354.  
† See Sterry Hunt, "Geology of Canada" (1863), p. 675.



garden-road, 74 years, ground-rent 7*l.* .....  
 feedington-road, 73 years, ground-rent 6*l.* 8*s.*  
 lead-road — 3 and 4, Exmouth-street, 24  
 years, ground-rent 23*l.* 10*s.* .....  
 bury—2, Stonefield-street, 18 years, ground-  
 rent 6*l.*

346 informed, in reply to their letter urging the  
316 legislation is needed to control the brick-making  
280 industry in the metropolis, that the Board  
420 having given careful consideration to the

gradually brought back to its proper position as the sinking progressed. The bridge is expected to be open for traffic in about two years. The entire cost, including the approaches,

### The Proposed New Bridge at Battersea.

**The Planning of Cow-houses.** Mr. P. McConnell, in his "Dairy Lectures," now appearing in the *Agricultural Gazette*, writes, with reference to the planning of cow-houses:—"The arrangement of the buildings is a point of the most vital importance, seeing that on this depends much of the success of the dairy management. It is advisable to have the cow-houses ranging north and south, with the barns, mixing-houses, food-stores, &c., across the northern end, while the dairy should be separate from the cow-house and as far away from the sun as possible, a system of "concentration" is the best, whereby the buildings are all contiguous and open into one another. This saves space, cost of erection, and labour of attending to stock. On the dimensions and arrangement of the stalls depend much of the comfort and cleanliness of the animals. The manger should be on the level of the ground, so that the animal could lie down without requiring to back into the gutter behind. The bed should be of the exact length to suit the cow, so that she may stand and lie in the same place. The gutter or channel behind for the droppings should be at least 2 ft. wide, and 8 in. deep at the side next the cow. The passages may be lower than the beds, so that the gutter need not be so deep at this side, but the bottom should have an incline away from the cows. Cows standing in a stall fitted up in this style, and with this wide and deep gutter behind, will not be so clean, a state of matters we seldom see in a dairy where the stalls are constructed in any other way. A wide draining-passage may be provided, but it is a matter of taste whether the feeding-passage in front or not. If there is no stall-fronts must be so arranged as to prevent the cows from sticking their heads through "

**The Jumna Viaduct.**—In connection with the Cawnpore and Kalpi line, a new branch of the Indian Midland Railway, of which we spoke in the columns of the *Builder* of the 8th inst., there is a very important bridge now in course of construction over the Jumna River. According to the designs, the bridge will consist of girders covering ten spans of 250 ft. each. The piers are 76 ft. high from the level of the water to the lower flange of the main girders, and are to be constructed on well foundations, each pier having two wells, 27 ft. external diameter, and sunk to a depth of 50 ft. below the bed of the river. Up to the present time the work has been almost solely confined to sinking the wells. Some difficulty was experienced in the sinking of one of the pier foundations on account of a well having got 8 ft. out of plumb in going down 20 ft. A steady pull of two to three hundred tons, however, was brought to bear on the upper section of the well, and under the continued strain thus applied the cylinder has been gradually brought back to its proper position in the sinking progress. The bridge is expected to be open for traffic in about two years. The entire cost, including the approaches, is estimated at thirty-four lakhs of rupees, or £40,000. sterling.

ETINGS.

SATURDAY, MAY 32.  
*Architectural Association.*—Visit to the National Agricultural Hall, Kensington. 3 p.m.  
*Society of Arts (Special Lecture).*—Professor George Forbes, M.A., on "Electricity."—VI. 3 p.m.  
 TUESDAY, MAY 25.  
*The Institution of Civil Engineers.*—Annual General Meeting to consider the Report, and to elect a President and Council. 8 p.m.

WEDNESDAY, MAY 26.  
British Museum (Archaic Room).—Miss J. E. Harrison  
on "The Topography and Monuments of Modern Athens."  
—III. 11.45 a.m.

THURSDAY, MAY 27.  
*Society of Antiquaries.*—Ballot for Election of Fellows.  
 8 30 p.m.  
*Society of Telegraph-Engineers and Electricians.*—Papers  
 by Captain P. Cardew, R.E., and Captain H. B. Sankey,  
 R.E. 8 p.m.

FRIDAY, MAY 28.  
*University College.*—Professor C. T. Newton, C.B., on  
 "Greek Myths illustrated by Pictile Vases and other  
 Monuments."—I. 4 p.m.  
*British Museum (Archaio Room).*—Miss J. E. Harrison  
 on "The Technique of Greek Vases."—III. 11.45 a.m.

**The Brick-making Industry of the Metropolis.**—The Works and General Purposes Committee of the Metropolitan Board of Works have recommended to the Board that the Society of Medical Officers of Health be informed, in reply to their letter urging that legislation is needed to control the brick-making industry in the metropolis, that the Board, having given careful consideration to the question, are not prepared to take any action in the direction indicated.



**Sales of Building Land at Fulham and Surbiton.**—Last week Messrs. Baker & Son submitted to competition, at the Red Lion Hotel, Walham-green, thirty freehold plots on the Bishop's-road and Salisbury estates, fronting on Bishop's-road and Munster-road, Fulham. The sites were described as well adapted for shops and medium-sized houses. The several plots offered have frontages of 17 ft., with a depth of from 60 ft. to 70 ft. Of the entire number of plots submitted, twelve were sold at prices ranging from 75l. to 80l. each, a corner shop front having a frontage of 23 ft. to Munster-road, with a return frontage of 58 ft. to Bishop's-road, realising 100l. Messrs. Baker & Sons also offered for sale seven plots on another portion of the estate, adjoining Messrs. Gibbs & Flew's steam joinery works, six of the plots having frontages of 20 ft. to Bishop's-road by a depth of from 55 ft. to 70 ft. to Rostrevor-road; and an angular plot, having a frontage of 78 ft. to Bishop's-road by an average depth of about 50 ft. The whole of these plots were sold at prices ranging from 46l. to 65l. each. The total proceeds of the two sales amounted to 1,307l. On Tuesday, Messrs. Debenham, Tewson, & Co. offered for sale, at the Auction Mart, fifty-four plots of freehold building land, on the Southborough Park Estate, situate at Surbiton Hill, Surrey, described as being in a first-class residential neighbourhood, and well adapted for the erection of detached or semi-detached residences, and also including sites for shops. The several sites have frontages of from 60 ft. to 70 ft. each, with depths ranging from 200 ft. to 320 ft., and contain areas varying from about half an acre to an acre each. The first four plots offered, having frontages of 70 ft. to Ditton-road, and a depth of 320 ft., were all sold to one purchaser for 290l. each, being at the rate of about 600l. an acre. For several of the plots next offered from 240l. to 260l. were offered, at which they were withdrawn. A plot having a frontage of 60 ft. to Lovelace-road and a depth of 210 ft., and containing an area of about a quarter of an acre, was sold for 230l., and another plot having a frontage to the same road of 65 ft. was sold for 245l. A corner plot with a long return frontage to Lovelace-road, and containing an area of nearly half an acre, realised 335l., and two plots having frontages of 51 ft. to Lovelace-road, were sold for 245l. each. The total proceeds of the sale amounted to 2,460l.

**Tidal Works on the Seine.**—At the meeting on the 5th inst. of the Liverpool Engineering Society Mr. Coard S. Pain, Assoc. Inst. C.E., President, in the chair, a paper by Mr. J. N. Shoolbred, B.A., M.Inst. C.E., entitled "Tidal Works on the Seine, and on other Rivers," was read by the author, who showed that the river Seine is affected by the flow of the tide for about ninety-three miles above Havre, of which the upper fifty-two call for no remark; for the next twenty-five miles down the channel has been confined, where required, within a narrow width, and its navigable bed considerably improved by means of H.W. training walls of rubble stone. The result has been to reclaim 20,000 acres of slob lands behind these walls, which formerly formed part of the bed of the river. These works were begun in 1845 and ended in 1867. The estuary, sixteen miles long, forms the lowest portion of the tidal compartment. Soon after the completion of the river-walls accumulations of sea-borne sand from the coast of Calvados began to be felt in the north-eastern part of the estuary in consequence of the river being no longer available. These accumulations have been gradually extending seawards till their area amounts to about 40,000 acres. The tidal capacity of the estuary has been diminished by one-third. The entrance of the port of Havre is now very seriously threatened, the yearly accretions in its vicinity having amounted for some time past to about eight millions of cubic yards. So that the earlier improvement in the navigation of the river Seine threatens to be more than counterbalanced by the deterioration of its estuary.

**Polstead, Suffolk.**—At a vestry meeting recently held here, it was decided to commence works of restoration to the parish church of St. Mary, Polstead. The church, which is a large one, is one of the oldest Norman churches in the county, and was one of those damaged by the earthquake some two or three years back. The work, which has been placed in the hands of Mr. J. Treadway Hanson, will be commenced at once.

**Colonial and Indian Exhibition.**—The Reception Committee, recently formed by direction of His Royal Highness the Prince of Wales, Executive President of the Royal Commission, is desirous of offering a fitting and cordial reception to Colonial and Indian visitors of distinction during their visit to England, by facilitating, so far as may be possible, their arrangements for visiting places of special interest in the United Kingdom. To enable the Committee to do this, funds are required; and those who may be desirous of co-operating are invited to subscribe to the object in view. Subscriptions can be sent to the London and Westminster Bank, West End Branch, St. James's-square, S.W.; or to Mr. Arthur Hodgson, C.M.G., General Secretary, at the office of the Reception Committee, "Old London," Exhibition Buildings, South Kensington; or to Mr. H. Trueman Wood, the treasurer, Society of Arts, John-street, Adelphi. Cheques should be crossed "London and Westminster Bank," West End Branch.

**Baling Public Baths.**—On Saturday the opening of the new swimming-baths at Ealing took place, Mr. E. M. Nelson, J.P., the chairman of the Board, presiding on the occasion. The baths, which are three in number, are situate on the main Uxbridge-road, and nearly in the centre of the district. They consist of a first-class bath, 90 ft. by 30 ft.; third-class, 75 ft. by 25 ft.; and a ladies' bath, 60 ft. by 24 ft., the latter with a waiting-room overlooking the bath. There is also a club-room, where members of the various clubs in the neighbourhood may hold their meetings. The interior walls of the baths are in plain brickwork relieved with red brick arches. The baths themselves are lined with "Ingham's" white-glazed bricks, a special-made brick 1½ in. thick, being used for the bottom. The woodwork of the interior is stained and varnished; the doors of the boxes are only 3 ft. 6 in. high, the upper part being fitted with curtains. The first-class bath has a gallery capable of holding 500 persons. The heating is by steam injected from two 20-h.p. boilers, and the laundry (for baths only) is contiguous to the boiler-house, the whole of the machinery being worked by a small engine connected with the boilers. The whole of the works have been carried out from the designs and under the superintendence of Mr. Charles Jones, C.E., the engineer to the Board, the contractor being Mr. W. H. Waters, of Ealing; and the machinery, which is of the latest description, was all fitted up by Messrs. Bradford. The contract for the baths, including the machinery, was 8,000l.

**Artists' General Benevolent Institution.**—The seventy-first anniversary dinner of this Institution was held on Saturday last at the Freemasons' Tavern, Great Queen-street, under the presidency of Lord Esber, supported by Sir Frederick Leighton, P.R.A.; Sir J. Gilbert, R.A.; Sir J. D. Linton; Mr. Alma Tadema, R.A.; Mr. W. P. Frith, R.A.; Mr. H. Armistead, R.A.; Mr. H. S. Marks, R.A.; Mr. J. Pettie, R.A.; Mr. A. Waterhouse, R.A.; Mr. J. O. Barlow, R.A.; Mr. E. Burne Jones, A.R.A.; Mr. J. E. Burgess, A.R.A.; Mr. Phil. Morris, A.R.A.; Sir J. E. Milais, R.A. (hon. sec.); Mr. P. C. Hardwick (treasurer), and Mr. D. H. Gordon (secretary). During the evening subscriptions and donations amounting to 2,538l. were announced.

**An Old Altar-piece in Selborne Church.** The Field, in an interesting article entitled "A Pilgrimage to White's Selborne," says:—

"Our first visit, as becomes good pilgrims, is to the grave of Gilbert White. . . . Being Easter-eve, the church was dressed with spring flowers, again simple enough, and in good taste. The good taste, however, fell short in the condition in which we found our next attraction, which was in a little cupboard-like vestry, the really good picture given to this church nearly a century ago by Gilbert's brother Benjamin, for an altar-piece. Painted in three panels, it represents the offerings of the wise men to the infant Christ, and is said to have been painted by Albert Dürer. This was a 'selected' taste left standing on a newly-washed floor, its only support being the whitewashed wall behind. In front was the one vestry-chair, requiring but a touch to have been already too numerous chairs and pedestals off the picture, which, as may be seen through the spaces so caused, is painted on panels of oak. In these days of art enlightenment, it seems a line is drawn by ecclesiastical authorities between 'artistic altar-dishes,' which may be 'selected' in the neighbourhood of Covey, a bygone school, to the exclusion of the latter from the adornment of our village churches. Surely this picture deserves the loving care bestowed on it by its long passed-away owners, and to be placed in security from further destruction by insidious damp or more careless injury, through the hurried preparations of those who may have used the same six-foot square vestry. If no better place can be found, the picture might be thought good enough for the very pretty and well-arranged little museum at Alton."

**A New Park for Sheffield.**—The Corporation of Sheffield has just acquired the beautiful piece of woodland lying on the south of the town known as the Endcliffe Wood. It is intended to lay this place out for the use of the public and as it is within a mile of the centre of the town, and easily accessible, it will be a boon to the townsfolk, Sheffield not being too well off in the matter of public parks and gardens. The Endcliffe Wood occupies the slope and valley near the Botanical Gardens, and is nearly a mile in length. The slope is covered with large trees, chiefly oaks, and the river Porter runs along the valley, and in its course works through old water-wheels used for grinding, one of which will be retained as a picturesque object; in fact it is intended to preserve the rusticity of the place as much as possible. Broad walks will traverse the wood, and rustic bridges will span the stream at various points, while along the boundary will be a carriage and footway, 75 ft. wide, planted with trees on each side. The dams which have worked the wheels will be converted into lakes for bathing, skating, and waterfowl; and the outfalls and races will be transformed into waterfalls, there being a fall of some 80 ft. or 90 ft. in the course of the stream between one end and the other. The natural beauty of the woodlands is such that when embellished a little, few towns will be able to boast of such a delightful public park as Sheffield. The work of laying out the place has been entrusted to Mr. William Goldring, London.—Gardeners' Chronicle.

**Cowley St. John, Oxford.**—The church of St. Mary and St. John has been further enriched by the opening of a new organ which has been given by Mr. G. Herbert Morrell, of Headington Hill Hall, the cost being defrayed out of a second 1,000l. he has generously given towards the completion of the church. The oak case with its elaborate tracery work was designed by the architect of the church, Mr. Mordaunt Mowbray, F.R.I.B.A., of Oxford and Eastbourne, and executed by Mr. Thompson, of Peterborough, at the cost of over 200l., while the organ itself was built by Mr. Martin, of Oxford, for 450l. provision being made for the addition of choir-organ later on.

#### PRICES CURRENT OF MATERIALS.

TIMBER.		£	s.	d.
Greenheart, B.G.	ton	8	5	0
Teak, B.I.	do	13	10	0
Sequoia, U.S.	foot cube	0	2	4
Ash, Canada	load	3	0	0
Elm	do	3	0	0
Fir, Dantsic, &c.	do	1	10	0
Oak	do	3	0	0
Canada	do	5	10	0
Pine, Canada red	do	3	0	0
do yellow	do	3	0	0
Lath, Dantsic	fathom	3	10	0
St. Petersburg	do	4	0	0
Wainscot, Baltic	do	2	15	0
Odessa, crown	do	3	12	8
Deals, Finland, 2nd and 1st, std.	100	7	10	0
Riga	do	6	0	0
4th and 3rd	do	6	0	0
St. Petersburg, 1st yellow	do	9	0	0
2nd	do	7	0	0
3rd	do	7	0	0
Sweden	do	8	0	0
White Sea	do	7	0	0
Canada, Pine 1st	do	17	0	0
2nd	do	12	0	0
3rd, &c.	do	6	0	0
Spruce 1st	do	8	0	0
2nd and 3rd	do	6	0	0
New Brunswick, &c.	do	5	0	0
Battens, all kinds	do	4	0	0
Flooring Boards, sq. 1 in.—				
pared, first	do	0	9	0
Second	do	0	7	0
Other qualities	do	0	5	0
Cedar, Cuba	foot	0	0	0
Honduras, &c.	do	0	24	0
Australian	do	0	3	0
Mahogany, Cuba	do	0	5	0
St. Domingo, cargo average	do	0	5	0
Mexican	do	0	31	0
Tobacco	do	0	4	0
Honduras	do	0	41	0
Maple, Bird's-eye	do	0	6	0
Kino, Rio	ton	7	0	0
Bahia	do	0	10	0
Box, Turkey	do	6	0	0
Satin, St. Domingo	foot	0	7	0
Porto Rico	do	0	8	0
Walnut, Italian	do	0	4	0
METALS.				
Iron—Pig in Scotland	ton	40	0	0
Bar, Welsh, in London	do	4	10	0
do in Wales	do	4	0	0
Staffordshire, London	do	5	0	0
Sheets, single, in London	do	6	15	0
Hoops	do	6	0	0
Nail-roads	do	5	10	0
Copper	do	43	0	0
British, cake and ingot	ton	45	0	0
Best selected	do	45	0	0
Sheets, strong	do	47	0	0
India	do	47	0	0
Australian	do	47	0	0
Chili, bars	do	40	0	0



Weston, Westgate-on-Sea .....	£10,384	0	0
Paramor & Sons, Margate .....	10,159	0	0
Port, St. Lawrence .....	10,010	0	0
Brown & Son, Margate .....	9,760	0	0
Home, Ramsgate .....	9,650	0	0
Velater, Folkestone .....	9,500	0	0
Brubroole, Faversham .....	9,348	0	0
Denne, Deal .....	9,295	0	0
W. & D. Denne, Walmer .....	9,250	0	0
Viae, Deal .....	8,994	0	0
Prostlick * Westgate-on-Sea .....	8,703	0	0
Martin, Ramsgate .....	8,555	0	0

## COMPETITIONS.

## CONTRACTS

## PUBLIC APPOINTMENTS

## TENDERS.

<b>HESTER</b> —For the erection of new stables, &c., <b>A. Prior, Mr. James F. Goodey, architects</b> .....		<b>Harris &amp; Wardrop, London</b> .....		<b>2318</b>	<b>£10</b>
<b>Dant</b> .....		<b>Nightingale, London</b> .....		<b>300</b>	<b>10</b>
<b>Dobson</b> .....		<b>Elkins &amp; Son, Hartford</b> .....		<b>3000</b>	<b>25</b>
<b>Ende</b> .....		<b>Falmer, London (accepted)</b> .....		<b>275</b>	<b>30</b>
<b>Evans &amp; Sons</b> .....		<b>HENDON</b> —For the erection of a pair of semi-detached villas, residents of.....		<b>300</b>	<b>10</b>
<b>Hubert</b> .....		<b>Mr. G. G. Hinchey-lane, Hendon, for Mr. G.</b> .....		<b>300</b>	<b>10</b>
<b>Madge</b> .....		<b>Quantities supplied by Messrs. Theobald &amp; Lushford of</b> .....		<b>300</b>	<b>10</b>
<b>Marshall</b> .....		<b>Mr. J. Roberts</b> .....		<b>2,100</b>	<b>0 0</b>
<b>McDonald</b> .....		<b>of Colchester</b> .....		<b>364</b>	<b>0 0</b>
<b>Dis (accepted)</b> .....		<b>£11 of Colchester</b> .....		<b>364</b>	<b>0 0</b>
<b>£11 of Colchester</b> .....		<b>£300 0</b> .....		<b>364</b>	<b>0 0</b>

HENDON.—For the erection of a pair of semi-detached villa residences at Finchley-lane, Hendon, for Mr. C. Cooper. Mr. G. H. Lutchford, architect, Hendon, quantities supplied by Messrs. Theobald & Lutchford, surveyors, Finsbury-pavement:—

J. Roberts	£1,100	0	0
C. Groves	1,085	0	0



**MITCHAM.**—For gasworks (exclusive of builder's work) at Mitcham, Surrey, for the Guardians of the Poor of the Hibernia Union. Messrs. H. Saxon Snell & Son, architects, London:—

	11 Gas-holder Tanks are of	
R. Dempster & Sons .....	£3,679	Iron
Renshaw, King, & Co. ....	3,679	3,923
Ashmore, Benson, Pease, & Co. ....	3,550	4,871
R. & J. Dempster .....	3,146	4,046
Cutler & Sons .....	3,117	3,798
Berry & Sons .....	3,010	3,867
May Bros. ....	2,875	3,693
Porter & Co. ....	2,625	3,615
Holmes & Co. (accepted) ...	2,490	3,635

**NEWCASTLE-ON-TYNE.**—For gates, gateways, retaining-wall, and for additional boundary walling at the Newcastle City Asylum Extensions, for the Visiting Justices. Mr. Arthur Plummer, architect:—

	Amended Tenders.	
W. Scott, Newcastle .....	£1,760	0 0
Middlemas Bros., Newcastle ..	1,627	0 0
	* Accepted.	

**PEMBROKE.**—For the restoration of St. Michael's Church. Mr. E. H. Lindsay Barker, architect:—

Stephens & Bastow, Bristol .....	£1,981	0 0
Davies & Morgan, Pembroke Dock ..	1,938	0 0
Davies, Tenby .....	1,769	0 0
Llewellyn, Pembroke Dock .....	1,440	0 0
Barrett & Phillips, Pembroke .....	1,450	0 0
Canton, Pembroke .....	1,450	0 0
Edwards, Milford Haven .....	1,335	0 0
Giles, Whitland .....	1,286	0 0
	* Exclusive of tower.	

**PONDER'S END.**—For alterations at the Railway Hotel, Ponder's End, for Mr. Holmby. Mr. George Richards, architect:—

Mower .....	£499	0 0
Smith .....	455	0 0
Sills .....	358	0 0
Hawkins .....	349	0 0

**POPLAR.**—For the erection of new lecture-hall and class-rooms, &c., at the Poplar Wesleyan Chapel, East India-road, E., for the Trustees. Mr. James F. Wesley, architect, Forest-gate:—

J. Currow .....	£1,193	0 0
M. A. Palmer & Co. ....	1,149	0 0
J. H. Johnson .....	1,148	0 0
Harris & Wardrop (accepted) ...	1,063	0 0

**ROMFORD.**—For sewerage works for the Rural Sanitary Authority. Contract No. 2, for low or high level sewers to parks in Iford, Chadwell, and Dagenham, with outfall works, subsiding tanks, filter beds, and other works in connexion therewith. Messrs. Brundell, Simmonds, & Brundell, engineers:—

B. Cooke & Co., Church-road, Battersea (accepted) .....	£9,696	0 0
---	--------	-----

**SHEPHERD'S-BUSH.**—For rebuilding the Seven Stars Tavern and house and shop adjoining, Goldhawk-road, Shepherd's-bush, for Messrs. Thorne. Messrs. Lee Bros. & Paine, architects, 8, Adelphi-terrace, W.C.:—

Chamberlain Bros. ....	£2,355	0 0
A. Newcombe .....	2,230	0 0
Simpson & Son .....	2,602	0 0
Holloway Bros. ....	2,524	0 0
L. H. & R. Roberts .....	2,186	0 0
G. H. & A. Bywaters .....	2,082	0 0
Lathey Bros. ....	7,937	0 0

**SOUTH SHIELDS.**—For the erection of two houses and shops in Ocean-road. Messrs. Southron & Hallam, architects:—

W. Scott, South Shields .....	£1,933	4 2½
T. Mackay, South Shields .....	1,298	0 0
T. Elliott, North Shields .....	1,298	0 0
W. Laz. Crook .....	1,275	0 0
Reay & Leighton, North Shields ..	1,252	0 0
T. Fortune, Jarrow .....	1,249	0 0
J. Little & Son, Hebburn .....	1,246	0 0
H. Prior, South Shields .....	1,170	0 0
D. Lawes & Co., South Shields ..	1,169	7 ½
G. Green, South Shields .....	1,176	2 0
E. Anderson, South Shields .....	1,091	4 2
T. Holliday, South Shields .....	1,074	8 8
W. Tindle, South Shields .....	1,064	8 6
J. Nichol & Son, South Shields ..	1,043	0 0
W. M. Ormsby, South Shields .....	1,038	0 0
N. Napier, South Shields .....	1,025	14 0
	* Accepted.	

**SOUTHWARK.**—For warehouse, No. 26, Southwark-street, Borough. Mr. Geo. Lethbridge, architect. Quantities supplied by Mr. Charles H. Gould:—

Clarke & Bracey .....	£4,956	0 0
Colls & Son .....	4,269	0 0
Higgs & Hill .....	4,194	0 0
Palman & Fotheringham .....	4,035	0 0
Lorrie .....	3,958	0 0
Scott .....	3,883	0 0
Harris & Wardrop (accepted) .....	3,797	0 0

**TIVERTON.**—For 2,376 yards of 24-inch stoneware outfall sewer and laying out 11 acres of filtering ground, in connexion with the Tiverton Drainage Works. Messrs. Goff & Beasley, engineers, Westminster. Quantities supplied:—

Oxendon .....	£5,069	0 0
J. Dickson .....	4,910	0 0
Bell .....	4,898	0 0
Beutley & Son .....	4,832	0 0
Ambrose & Son .....	4,785	0 0
Hilton .....	4,730	0 0
Sharp .....	4,615	0 0
Williams .....	4,251	0 0
Hill & Co. ....	4,219	0 0
W. Gibson .....	4,195	0 0
Small & Son .....	3,963	0 0
Gould & Co. ....	3,897	0 0
Hawkins .....	3,879	0 0
Cunliffe .....	3,770	0 0
Pitchall .....	3,691	0 0
J. Edmondson (accepted) .....	3,656	0 0

**WEM (Salop).**—For alterations to Wem Church, Salop. Mr. George H. Birch, F.S.A., architect, Devereux-chambers, Temple:—

R. George, Shrewsbury .....	£2,870	0 0
R. Yates, Shifnal .....	2,669	0 0
O. Jones, Shrewsbury .....	2,650	0 0
G. Phillips, Wem .....	2,085	0 0
T. & H. Davis, Wem .....	1,980	0 0
H. Tommy, Wem (accepted) .....	1,915	0 0

**WIMBLEDON.**—For proposed alterations and additions to St. John's Lodge, Raynes Park, Wimbledon, for Messrs. Blount, Lynch, & Petre. Mr. G. H. Luetichford, architect, Hendon. Quantities supplied by Messrs. Theobald & Luetichford, Finchley-pavement:—

G. Stephenson .....	£493	0 0
F. Mark .....	479	0 0
T. Taylor .....	432	10 0
Russell & Ball .....	424	18 0

**SPECIAL NOTICE.**—Lists of Tenders frequently reach us too late for insertion. They should be delivered at our office, 46, Catherine-street, W.C., not later than Four p.m. on THURSDAYS.

## PUBLISHER'S NOTICES.

Registered Telegraphic Address, "THE BUILDER, LONDON."

### CHARGES FOR ADVERTISEMENTS.

SITUATIONS VACANT, PARTNERSHIPS, APPRENTICESHIPS, TRADE, AND GENERAL ADVERTISEMENTS. Six lines (about fifty words) or under ..... 4s. 6d. Each additional line (about ten words) ..... 6d. Terms for Series of Trade Advertisements, also for Special Advertisements on front page, Competitions, Contracts, Sales by Auction, &c. may be obtained on application to the Publisher.

### SITUATIONS WANTED.

FOUR Lines (about thirty words) or under ..... 3s. 6d. Each additional line (about ten words) ..... 6d. PREPAYMENT IS ABSOLUTELY NECESSARY. \* Stamps must not be sent, but all small sums should be remitted by Cash in Registered Letter or by Money Order, payable at the Post Office, General-garden, W.

DOUGLAS FOUNDRIER, Publisher.

Advertisements for the current week's issue must reach the Office before THREE o'clock p.m. on THURSDAY. The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c. left at the Office in reply to Advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

**SPECIAL—ALTERATIONS IN STANDING ADVERTISEMENTS OR ORDERS TO DISCONTINUE same, must reach the Office before TEN o'clock on WEDNESDAY morning.**

PERSONS Advertising in "The Builder," may have Replies addressed to the Office, 46, Catherine-street, Covent-garden, W.C. free of charge. Letters will be forwarded if addressed envelopes are sent, together with sufficient stamps to cover the postage.

### TERMS OF SUBSCRIPTION.

"THE BUILDER" is supplied gratis from the Office to residents in any part of the United Kingdom at the rate of 12s. per annum. Outside, To all parts of Europe, Australia, and New Zealand, 36s. per annum. To India, China, Ceylon, &c. 50s. per annum. Remittances payable to DOUGLAS FOUNDRIER, Publisher, No. 46, Catherine-street, W.C.

## TO CORRESPONDENTS.

Registered Telegraphic Address, "THE BUILDER, LONDON."

G. F. H.—Y. R.—A. T. W.—J. S. & Co.—J. E. & Sons.—W. R. Son.—C. J.—A. S. E. (shall have attention).—T. J. H. All statements of facts, lists of tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication. We are compelled to decline pointing out books and giving addresses.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors. We cannot undertake to return rejected communications. Letters or communications (beyond mere news-items) which have been deposited for other journals, are NOT DESIRED. All communications relating to literary and artistic matters should be addressed to THE EDITOR; all communications relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

## Best Bath Stone.

WESTWOOD GROUND,

Box Ground, Combe Down,

Corsham Down,

And Farleigh Down,

RANDELL, SAUNDERS, & CO., Limited,

Corsham, Wilts. [Adv.]

## Bath Stone.

BEST QUALITY OF ALL KINDS.

PICTOR & SONS,

Box, WILTS. [Adv.]

## Doubling Freestone.

THE CHELYNCH STONE. The stone from these quarries is known as the "Weather Bed," and is of a very crystalline nature, and undoubtedly one of the most durable stones in England.

THE BRAMBLEDITCH STONE. Is of the same crystalline nature as the Chelynch Stone, but finer in texture, and more suitable for firebricks.

## HAM HILL STONE.

Greater facilities have been provided for working these quarries, and the stone can be supplied in large quantities at short notice.

Prices, and every information given, on application to CHARLES TRASK & SONS, Norton-sub-Hamdon, near Ilminster, Somerset.

London Agent—Mr. E. WILLIAMS, & Co., 16, Craven-street, Strand, W.C. [Adv.]

**Doubling Free Stone.** For prices, &c., address S. & J. STAPLE.

**HAM HILL STONE.** Quarry Owners, Stone and Lime Merchants.

**BLUE LIAS LIME.** Stoke - under - Ham.

(Ground or Lump), Ilminster. [Adv.]

**Ham Hill Stone! Ham Hill Stone!**

For Ham Hill Stone of best quality and workmanship, apply to JOHN HANN & SON, Quarry Owners, Montacute, Ilminster. Established 1837. Agents, MATTHEWS & GEARD, Albion Wharf, Regent's Park Basin, N.W. [Adv.]

**Asphalts.**—The Seyssel and Metallic Lava.

Asphalte Company (Mr. H. Glenn), Office, 84, Poultry, E.C.—The best and cheapest material for damp courses, railway arches, warehouses, floors, flat roofs, stables, cow-sheds, and milk-rooms, granaries, tanneries, and terraces.

**Asphalts.** Seyssel, Patent Metallic Lava, and White Asphalts.

**M. STODART & CO.**

Office: No. 90, Cannon-street, E.C. [Adv.]

# BANNER VENTILATORS.

The Strongest Exhaust Ventilators for all Buildings, Public Halls, Churches, Billiard-Rooms, &c.

HIGHEST PRIZES at all the most important Exhibitions.

BANNER SYSTEM OF SANITATION AND SANITARY APPLIANCES

WERE AWARDED AT THE

International Health Exhibition, 1884, One Gold Medal, Three Silver Medals, and One Bronze.

For further Particulars and Prices apply to

BANNER SANITATION COMPANY

Wessex House, Northumberland Avenue, Charing Cross, London, W.C.



## ILLUSTRATIONS.

Competitive Design for the New Admiralty and War Offices.—Mr. P. J. Marvin, Architect	780-781
Sculpture at the Royal Academy: "Summer," Mr. G. A. Lawson, Sculptor; "The Late Sir Erasmus Wilson," Mr. T. Brock, A.R.A., Sculptor; "D. F. Carmichael, Esq.," Mr. J. Adams-Aston, Sculptor.	784, 785
External Pulpit, Notre Dame, St. Lo.—Sketch by Mr. F. D. Bedford.	788
S.E. Porch, St. Gilles, Caen.—Sketch by Mr. F. D. Bedford.	789
Legal and General Life Assurance Society's Offices, Fleet-street.—Mr. Robert W. Edis, F.S.A., Architect	792
A Small Studio: Exterior and Interior Views.—Mr. T. E. Pryce, Architect	793

## CONTENTS.

Competition Designs for Sunderland Municipal Buildings.	769	Legal and General Life Assurance Offices	778	South News	796
the Paris Salon	770	Sketches in Normandy	778	Church Building News	797
Architecture at the Royal Academy.—V.	771	A Small Studio	778	The Student's Column: Our Building Stones.—XII.	797
the Folkstone Exhibition	772	Competition	778	Booker: Domesday Book in Relation to the County of Sussex	798
Bridge-span from Roofs; A Comparison (Illustrated)	773	The "Injector-Hydrant" for Fire Extinction	778	(H. Wolff); Morris's Registration of Titles (Shaw & Sons);	798
a National Agricultural Hall, Kensington	776	Cases under the Metropolitan Building Acts: Non-deposit of Plans	778	Bennett's Compensation for Personal Injuries on Rail, Road, and River ("Commercial Gazette" Office)	798
Architectural Association	778	"Windows"	782	Recent Patents	799
a Bazaar Town Goods Station of the Midland Railway	778	The Late Mr. Sancton Wood	795	Recent Sales of Property	799
Students Clerks Benevolent Institution	778	Consent	796	Meetings	799
Competitive Design for War and Admiralty Offices	778	The Church of St. Bartholomew the Great	796	Miscellaneous	800
Sculpture at the Royal Academy	778	Mr. R. B. Preston on St. Andrews	796	Prices Current of Building Materials	801

### Competition Designs for Sunderland Municipal Buildings.

**I**N response to the invitation of the Corporation of Sunderland, issued in February last, and with an endeavour to be in accordance with the numerous conditions in connexion therewith, 4 sheets of drawings were sent in by twenty-three architects. These have been for some days on exhibition in the Art Gallery in the town, well arranged and well lighted for inspection.

The site chosen is an imposing one. It is at the junction of Fawcett-street (the Regent-street of Sunderland, 70 ft. wide) and Athenium-street, a minor thoroughfare leading to the Central Railway Station of the North-eastern Railway, which latter is immediately the rear of the proposed buildings. The frontage in Fawcett-street is 151 ft., and that in Athenium-street about 100 ft. The available area to be covered is 40,720 superficial ft., and the cost not to exceed 27,000l. If the amount were exceeded, the premium was to be forfeited. The abstract showing the accommodation which is to be secured on the site is very clear and concise.

In the first-floor there are to be an art-gallery or reception-room, an ante-room, council-chamber, mayor's chamber, three committee-rooms, a waiting-room, and the Mayor's Town Clerk's department is to be here also, consisting of four offices. On the second floor provision is to be made for the departments of the accountant, medical officer, engineer and surveyors. On the basement, containing numerous offices and rooms for disinfectants, &c., provision is made, oddly, for an art-gallery and ballot room, and polling booths. The second floor there are to be rooms for a caretaker, school of art, and a sanitary building.

Most of the competitors seem to have very nearly conformed to the conditions. It varies from the other only in the way they have placed the principal rooms.

Externally they have all been led to adopt, what servilely, a style of Palladian architecture of a bad, heavy type, that is exemplified in a range of new buildings, shops, and that stand contiguous and in a line with the site in Fawcett-street. None of the competitors have ventured upon any design in the style. They are all more or less commonplace and impure in style, and none any novelty whatever in them.

One rather unusual feature in this competition is the total absence of any perspective view,—the conditions prohibited it. But granting that the employment of a perspective view to illustrate a design is sometimes much abused, surely the total prohibition of it in a competition is wrong. No architect can tell the possible effect of his design until he has produced it in a perspective view. The result is quite unsatisfactory in this case, and it has led to the employment of a large amount of "pretence work" in preparing the plans, elevations, and sections exhibited in these 155 sheets. There is really not one fine drawing in the whole set.

Two striking points present themselves in connexion with the site for these buildings at starting in preparing a design. One is, where should the council-chamber be best placed to be away from the screeching of the engines and the roar of the steam against the metal roof of the contiguous railway station? The other is where could it be placed to be clear of the noise of the street? (It must be admitted that the pavement of the streets is wooden and the noise of traffic is thus modified.) None of the competitors seem to have taken these facts into consideration, for the position of the council-chamber should be the key of the whole design. At the quasi "Town Hall" at Newcastle-upon-Tyne the council-chamber is so badly placed that the noises of the street and the railways have to be deadened by double windows, and not a breath of fresh air seems ever to enter it.

How have the competitors managed this and the other points? Let us see.

"Nil Desperandum auspice Deo" places the council-chamber in the centre of the Athenium-street frontage, and the mayor's chamber and the art-gallery against the noisy station; and a very grand hall and staircase in the centre, lighted from above. He does not aim at towers or turrets or dormers, or any superfluous effects of the kind, keeping even his chimney-stacks very low. His rusticated basement floor and his pilastered upper floors and balustrated parapets remind one of our old War Office buildings at the Horse Guards.

"Nineteenth Century," the second premiated design, plans to have the council-chamber at the angle of the two streets, catching thereby the noises of both; but by placing the art-gallery reception-room adjoining it he obtains a fine suite. His main frontage in Fawcett-street is entered by a well-arranged pedimented entrance in the centre of it, and he uses a Mansard dome roof to cover and light the central hall. If seen in a perspective, this dome would be so low, according to the elevation, as to be out of sight.

"Stabilitas."—This is the design to which

the adjudicator has given the first premium of 100l. It is shown by four sheets drawn in sepia,—two containing the plans of the four stories, one the two elevations, and one three sections. The council-chamber, 44 ft. by 31 ft., is placed at the angle of the steamy station and Athenium-street, and the mayor's chamber at the corner of Fawcett-street, with an ante-room between them. The art reception gallery is away from these at the opposite end of the site, intercepted by various committee and other rooms. The entrance vestibule is to the centre of the larger frontage, and a grand staircase occupies the centre, lighted from above and by two internal courts. The style of the exterior is Henri Quatre. The basement story is rusticated. The roofs are high-pitched Mansard, and crested with handsome dormers leading out of them, and a lofty central square clock-tower, with a very large clock-face and an octagonal dome-roof surmounting it, occupies the centre of the main street.

One good provision in this design is a kitchen in the top story, provided with a lift to convey the dinners downward on festive occasions. But what the "Sanitary Museum" is to be like, and why it is placed up so high as the second story, is a puzzle.

On the whole, this is decidedly the best design. But provision for deafening the noises from the railway station against the council-chamber should be made, and it would have been better if the arrangement of the seats in the council-chamber and the reporters' and public gallery had been shown.

One of the designs in this collection shows the council-chamber open and ventilated above it, whereas this by "Stabilitas" shows a "cast-room" and "painting-room" over it. Let us hope that he will make the floors sound-proof.

"Time and Tide" is the third premiated design. The author of it has the council-chamber in the same noisy position as that by "Stabilitas"; but he makes a fine room of it by keeping it open and ventilated into the high-crested Mansard roof above it. His façades are much like the Government Offices elevation in Parliament-street. He has no towers or turrets.

"Ad Rem," with his design and alternative design, has some good features and good planning. He places his council-chamber quite in the rear corner close to the station, but away from the noise of the streets. His elevations are very Adam-esque. His oval and festooned attic windows make his elevations look, drawn as they are in black and white, like a leaf taken out of designs by Adam.

"Waiting for the Verdict" has a conscientious set of well-drawn and well-considered



plans and alternative plans. They have not been premiated, probably because there is too much wealth of work in his ornamented façades.

"To be or not to be" has some funny points, notably in placing his council-chamber oval shaped in the middle of the dingy rear of the site. He places seats for the mayor and aldermen and council, but gives no desks for the unfortunate aldermen. He has a corridor round one side of the chamber, which he calls a lumber-room for banquet tables and chairs, and places a gallery over it. It is altogether a very ponderous design.

"Speedwell" shows the council-chamber boldly in the centre of the long Fawcett-street site. Had he marked it better as a feature externally this would have been a very promising design. He has a very lofty central ventilating feature in the dome-roofed tower. His design could scarcely be carried out for the limited 27,000*l.* with that costly feature in it.

Going carefully over all the rest of the designs, including those by "Light," "Dum spiro spero," "Forward," "Auspice Deo," "Utility," "Nil Desperandum," "Plan," "Ars," "Renaissance," "Lux," "Fides," "Hope," one comes necessarily to the conclusion that not one of these designs would show to posterity that the buildings are essentially municipal. At Leeds, at Liverpool, at Birmingham, Chester, Bolton, Bradford, and many cities elsewhere, the ordinary observer cannot mistake the use and intention of their town-hall. Newcastle-on-Tyne has made a great mistake in this respect, from which its citizens will, we are led to believe, on the first opportunity, redeem themselves.

Sunderland will, upon the execution of even the premiated design, only boast of having a fine set of buildings which may be taken for a club-house, hotel, "sets of chambers," anything or everything but a "town-hall" or "municipal building."

#### AT THE PARIS SALON.



THE interest of the *Salon* for a visitor who is studious either by inclination or "par métier" does not reside in the greater or less number of pictures exhibited, nor in the more or less extraordinary vagaries of what may be called sensation works. What is really interesting is to follow the fluctuations of the French artistic spirit, and the manner in which it is subject to the ascendancy of this or that eminent painter, and imitates his good or bad qualities. Scarcely ten years ago a whole pleiad of young painters were giving all their powers to reviving the vigorous colouring of Delacroix. Now M. Puvion de Chavannes is the master, and the young painters are all on the opposite tack. Every year there is an increasing tendency to imitate and exaggerate his style and technique,—a tendency so marked that it has even received a definite and recognised title. "Puvionisme" is the prevalent malady in French art, and seems to supplant in its followers all their natural faculties. One cannot deny that there is a powerful inspiration in the immense painting with which the master is to decorate the Musée at Lyons, his native town. "Le Bois sacré cher aux Arts et aux Muses," exhibited in 1884, has been the suggestion for two new compositions, entitled "Vision antique" and "Inspiration Chrétienne." The first transports us to a Greek landscape, in which various ideal personages are grouped. It is an idyll of Theocritus interpreted in all its charm. Unfortunately the blue of the sea seems to have left a little of its colour on the bodies of the figures reclining on its margin. In the "Inspiration Chrétienne" we are taken into the Middle Ages, at the epoch when ascetic artists decorated with their naive paintings the walls of convents. Monks in dark garments stand out against the white arcade of the cloister, through which a landscape is visible, treated with appropriate severity of line. A third picture, between these two, symbolises the Rhone preparing to join her stream to the Saône. The design of

these two latter figures leaves much to be desired, and their colour is wan and disagreeable; but in this collection there is visible the conception of a great and poetic artist.

The decorative paintings made by MM. Humbert and Lagarde for the Mairie of the Fifteenth Arrondissement are an application of "Puvionisme" to scenes of modern life. The first belongs to the time of the bombardment of Paris: an ambulance woman is giving water to a dying soldier, the street is lighted up with the blaze of shells, and dead and dying men and horses make dark blot on the snow-covered ground. As a contrast, M. Lagarde has painted a picture of domestic happiness in the courtyard of a farmhouse. M. Baudouin chooses also a modern scene for the decoration of the Mairie of St. Maur: peasants, artisans, and a landscape background taken from the banks of the Marne. Though with a more rich colouring, this picture also echoes the style of M. Puvion, of whom the author was a pupil.

The *Salon* contains four other large decorative works, executed for the city of Paris. That by M. Chartran, intended for a "salle de mariage," is a hymeneal allegory. It is a great deal better than the cattle-market scene with which M. Gervex lately decorated the Mairie of La Villette, but it required all M. Chartran's ability to contend against the commonplace of a subject worn threadbare by repetition. In two other decorative pictures, intended for the Mairie at Passy, M. Emile Levy shows himself as archaic as ever. His "Famille" we do not care for much, but there is a great charm in his composition symbolising "Jeunesse et l'Amour."

It is in Arcadia evidently, in those fabulous regions that only exist in the imaginations of the pupils of the Ecole des Beaux Arts, that M. Comerre has placed the rose-water personages who compose the two subjects intended for the Mairie of the Fourth Arrondissement. The first symbolises rustic love, *sub tegmine fagi*; the second personifies the family, *bent qui procul negotiis*, &c.; but it was hardly worth while to arrive, by the process of public competition, at such very negative results. M. Bouguereau, whose art we do not admire very much, is, nevertheless, always an admirable "virtuoso" in his way. In his picture, entitled "Printemps," a young girl, remarkably beautiful, undergoes the kisses of a crowd of little *amoureux*, who are painted with marvellous dexterity. The picture wants the expression of soul, but its execution defies criticism. The same technical qualities and the same coldness of feeling are found in his other work, "L'Amour désarmé." M. Henner adds another to the list of Magdalens in the desert. The subject is certainly not new, but, with its grace and charm and luminous colour, it is far preferable to the "nymphs" of M. Feytaud and M. Collin, which are its neighbours. We cannot say the same of the "Triomphe de Vénus," of M. Barrias, a painter whose talent seems to have gone astray entirely.

In historical painting, M. Benjamin Constant, who possesses the art of giving light and scintillation to rich stuffs and jewels, exhibits a "Justinien," immovable and as if crystallised among these ornaments. The details hold so large a place, and the figure so small a one in the general effect, that we are almost tempted to class it among paintings of still life. The "Torquemada" of M. Laurens is a vigorous though rather brutal picture, full of serious qualities; the "Mort de Pichereu," by M. Moreau de Tours, a theatrical scene of doubtful interest. As for M. Rochegrosse, who revels in atrocities, after promeneading us successively through the massacres of Troy and the horrors of the Jacquerie, he has plunged us this time into sacred history. His "Nebuchadnezzar" changed into a beast is a kind of orgy of colour which fatigues without attracting the eye; when will this very gifted young artist learn that epilepsy is not a form of artistic talent?

Are we to class the "Œdipe" of M. Gerôme among historical paintings? It shows Napoleon on horseback contemplating the Sphinx, whose enigmatical countenance he seems to scrutinise.

This little work, painted with the highest art, ought, perhaps, rather to be classed as a *genre* painting.

Among military paintings, numerous enough this year, M. Protais can put to his credit one more good picture. His "Bataillon carré" is a work full of grand and gloomy poetry. On a wide plain and under a starry sky all is death. As far as one can see there are corpses stretched on the ground; lines of dead bodies marking the limits of the last conflict. In the "Combat de la Fère Champenoise," by M. Leblant, a crowd of Cossacks attack from all sides a line of "Gardes Nationaux" in all kinds of heterogeneous costumes, the blouse of the peasant, the capote of the veteran, and the ordinary dress of the citizen who has taken up arms "pour la patrie." M. Leblant shines in these heroic scenes. Two scenes of the war, by M. Bontigny, are also to be noticed,—*"Les Otages"* and *"La Confrontation."*

Among portraits, M. Besnard seems to have been bent on "astonishing the natives." He has only been half successful in his portrait of a young woman in a lilac-coloured dress beside some yellow flowers, which seem somehow to have shed all their colour down one side of his model. A lamp behind the scenes is apparently the cause of this surprising attack of yellow. Nothing can justify these aberrations of colour, and M. Besnard is making a great mistake in spoiling the fine qualities of his painting by false sensationalism. After this one has to refresh the eye before the two admirable pictures by M. Cabanel representing "Le Fondateur" and "La Fondatrice" of the "ordre des petits sœurs des pauvres"; an old priest,—

"A l'air calme et bon, au regard rechauffant," and a "sister" whose pale figure is shadowed by a white head-dress. Here there are tricks, no display of finery, no glistening silks and jewelry; the two portraits are admirable models of artistic truth and sobriety, that of the "religieuse" especially. In another line of subject the portrait by M. Carolus Duran of a young lady in a roseate dress is a charming piece of delicate execution. M. Bonnat, another masterly painter, but too violent in his method, has made a portrait of M. Pasteur, which is a good likeness, but nearly so pleasing as that by M. Edelfelt. The former is the *savant* formally posing for the gallery, the latter the *savant* working unostentatiously in his laboratory. What makes the triumph of a portrait is its presentment of the individual in his everyday habit and manner, and in this way M. Roll has produced an excellent work in the portrait in which he shows us the landscape-painter, M. Damoy, in travelling dress and carrying his paint-box, canvasses, and umbrella, amid the crowd and bustle of a railway station.

There are two portraits of Victor Hugo taken after his death, an incident which might have been foreseen; but these will add nothing either to the glory of the poet or to the reputation of the painters, MM. Glaize and Laugel. Among the great number of portraits we must note a very splendid one of M. Meilhac, by M. Delaunay, that of M. Cain, the sculptor, by his son; that of a brunette, who serves M. Duez as a pretext for a brilliant variation in the gamut of red tones; a portrait of a lady in black by Mr. Sargent; a young girl caressing a greyhound, by M. Mathey; and the portrait of the Duchesse d'Uzes, in Louis XV. costume, by M. Gustave Jacques.

*Genre* painting takes us into the category most numerous, most interesting to the majority of the public, and most difficult to classify, for it touches on the confines of all the other classifications. The "Vieux Paysan" of M. Adan, seated at a cross road on a dull autumn day; the "Enterrement d'une Jeune Fille," by M. Blayn; the "Vieux Coin de Bretagne," picturesquely rendered by M. Emile Breton; the "Jeune Femme" by M. Roll, who stands out brightly from a background of verdure, all these are really landscapes; while on the other hand the two pictures which M. Abbema calls "Tragédie" and "Comédie" are

\* Victor Hugo, "Les Rayons et les Ombres."



iously portraits, the chief merit of which consists in the originality of the frames, which consist of great natural palm leaves glued on the wood.

J. Gervex inclines one to think that his nude study, entitled "La Femme en Masque," is a portrait of one who, more modest than the Duchess of Ferrara in the well-known Titian story, did not sit for the favoured painter except that condition. This fancy, which is inferior execution to preceding works by the same artist, we should class among *genre*. In the same class may be placed the spirited but false painting in which M. Raffaelli has introduced us into the mysteries of the process of casting "à cire perdue." Then we have a fine series of scenes which constitute a kind of drama of misery. In one, M. Jean Bérard, better known as a painter of "Society," uses himself by ranging before us a number of wretched women waiting at the *dépot* to be transferred to the St. Lazare prison. Among the types copied from nature with heartless realism, is seen an impassible "religieuse," whose habit has rendered indifferent to such scenes. The picture shows great talent, combined with a disagreeable hardness of style. M. Bérard, who has made the sufferings of the people his artistic speciality, exhibits a painting of a blind and emaciated mendicant, his feet stiff with cold. The "Les Affamés" of M. J. Troy is a collection of people in sordid circumstances precipitating themselves with savageacity on nameless scraps of refuse.

"Still Life" is well represented by M. Gerret in his painting of lobsters and prawns, treated with remarkable technical ability. M. Bérard, whose talent has survived the sufferings of a long illness, sends some admirable studies of fruits and cheese, executed with finishing realism. M. Vollen's pottery effects are masterly in their way, and M. Desgoffes continues to chase and emboss armour and precious stones with the elegance of a Benedictine. Among flower studies, the first place must be given to the efficient dahlia of M. Jeannin; while for a vase, Madame Muraton disputes the palm with M. Claude.

Among *genre* pictures properly so-called we mention the "Maquignon d'Esclaves" of M. Langer, only in view of the archaeological value displayed in it. "La Réception à la Galerie Royal," by M. Delort, is a tender and humorous painting; the "Fête Nationale" of M. Dumoulin is the repetition of a picture often seen before, and not nearly so good as the "Vue de la Porte Maillot" so skilfully rendered by M. Luidgi Loir, which municipality will probably purchase.

A painting under glass, executed with just the delicacy of a water-colour, M. L. Flammeng takes us to Dieppe in 1798, his belles of the Directory have no occasion to envy the powdered Marquises who walked under the shadow of the groves of sailles. The "Marché aux Chevaux" in hand, by M. Chelmonski, is a curious ethnological study. M. Connon, a painter generally represented by large, grave, historical pictures, here in colour, has let himself this year run into *genre*. His "Déjeuner d'Amis" is placed in the corner of a studio, among models very little clothed and painters of an entirely gay temperament; and the Sunday is contemplated with surprise this scene *romanesque*, which gives them a strange notion of the really laborious artist existence.

Animal painters and landscape-painters can be altogether separated, and M. Barillot, instance, in his "Matinée d'été," and M. Connon in his "Bœuf à l'Herbage," treat both of this subject with equal success. "A l'Allegande" by M. John Lewis Brown, and "En Aller" by M. Penne, are two amusing *genre* scenes, but it is the military scene titled "Le Boute-selle" that shows the really qualities of M. Brown, who understands no anatomy better than any contemporary painter, and studies closely and reproduces vividly the costume and manner of past eras.

Le Vallon," by M. Bernier, is a fine and poetic Breton landscape; "La Plaine" of M. L. A., a large and broadly-treated piece of

work. The two little views at Plombières by M. François, the "Néufars" of M. Hanoteau, and the "Saules" of M. Harpignies merit special mention. M. Lellievre exhibits two fine views on the Loire, and the "Ile aux Oies" of M. Pelouze is a masterly landscape. They are dazzled by the remarkable transparency of the "Lac Suedois" of M. Normann, pauses with pleasure before the green meadows of M. Rapin, wet with the dew of morning; and we salute in passing the last landscape of the late regretted Ségé, a view in the environs of Grandville, of which the painter's death cut short the completion. Among marine paintings we may mention "Les Rochers de Quiberon" by M. Damoye, the beautiful "Plage Normande" by M. Guillemet, two fine views of Dieppe by M. Elodie Lavillette, the "Port de Bordeaux" by M. Lapostolle, a pathetic shipwreck scene which M. Renouf calls "à la dérive," and the view of the Thames at London by M. Flameng, with the *silhouettes* of shipping profiled against a misty sky.

Want of space obliges us to pass over the water-colours, pastels, and engravings, of which the flood mounts higher every year. It would be wrong, however, not to mention at least the exhibits of M. Fantin-Latour, the fine charcoal drawing by M. Allongé, the curious water-colour by M. J. L. Brown, "Le Paddock des Longchamps," and the remarkable portraits by M. M. Emile Lévy and Edelfeld.

We have now passed rapidly over the contents of the thirty-one rooms reserved for the 3,400 pictures and drawings admitted by the jury, which receives, with judiciously closed eyes, a number of works quite unworthy to figure in the *Salon*. The result is that true talent is drowned amid a sea of mediocrities; that young painters' works are sent up to heights where no one can see them; and that, with the best will in the world, the eye, fatigued in this pandemonium of painting, can hardly take note of the few original works signed by unknown names, for which a future might be predicted.

We may add, in conclusion, that as the Médaille d'Honneur cannot, according to regulations, be given this year either to M. Cabanel or M. Puvion de Chavannes, and there seems to us to be no other painting, even among those of the best names, which ought to receive this honour, it seems probable that this year the highest reward of the *Salon* will go to a sculptor. Of the sculpture we may give some notes separately.

#### NOTES.

**T**HIS is the season at which numbers of town dwellers are considering about hiring country houses, while many who live in the country are contemplating a little tour or a little sea-air out of the proceeds of a short "let." It is well to impress on those who are thinking of leaving their own well-drained houses to be very cautious in regard to the sanitary arrangements of country houses. There is no little recklessness shown by persons who take a furnished house for a short period. They think it is summer weather, and so plenty of air is admitted into the house, and therefore sanitary defects are less injurious than in the winter. There is some truth in this, but not enough to justify the running of risks to a family. Other people, again, are content to trust to the mere assertion of the occupier, who very likely scarcely understands what proper sanitary arrangements are. The consequence is that many dangerous and even fatal illnesses are contracted in temporary country homes. The knowledge of sanitary necessities is still very backward in the country as any one will find out who happens to go over a dozen country houses in any house agent's list. Carelessness, want of cash, want of knowledge, all tend to this end, and therefore, however tempting a place may be, it is the veriest folly for any one seeking a healthy home for the summer to overlook sanitary defects because a house is picturesque in itself or placed in a charming spot.

**L**ORD ELGIN'S answer to Lord Hardinge's inquiries last week in the House of Lords as to the new site for the National Portrait Gallery was far from satisfactory. The gist of the answer was that "the Government were obliged to allow the matter to remain in abeyance until the general financial condition of the country exhibited some improvement or the extraordinary demands of the country showed some abatement"; that is to say, that the Government do not at present contemplate building a new National Portrait Gallery, and when they do will probably build one of which the nation will be ashamed. It is clear, therefore, that those who are interested in English art as well as those to whom English history is not a mere collection of dry bones, should put pressure on the powers that be to carry out this undertaking. A Government which has uselessly spent millions in Egypt and contemplates spending many millions in buying out the Irish landlords, can scarcely expect to be allowed to get out of this matter as easily as they at present seem to expect to do.

**T**HE Railway Defence Association, at their meeting at the Cannon-street Hotel, on Tuesday last, discussed the Railway Rates and the Railway Regulations Bills "in the interests, not only of railway shareholders, but of the travelling and business interests of the country." The latter measure, which was brought in by Mr. Channing, and has not attracted so much public attention as the former, has for its object the prevention of accidents, the better protection of railway employees, &c. The Government, in accepting the principle of the measure and allowing it to pass the second reading, referred it to a Select Committee for investigation. The meeting on Tuesday passed resolutions protesting against both Bills as unwarrantably interfering with the property and business of railway shareholders, and the speakers seemed to think that the objects of the Bills were more likely to be attained by the voluntary action of the railway companies themselves than by coercion. The passing of these measures, however, goes to show that this opinion is mainly confined to themselves, and that the country has not much faith in internal railway reform. A point was made in the resolution calling upon Mr. Mundella to recommend that the Railway and Canal Traffic Bill be referred to a Select Committee in the same way as Mr. Channing's measure. In this case, of course, representatives of the railway interests would be allowed to give evidence in support of their objections to the provisions of the measure, thus being enabled to offer a more effective opposition to it than if the Bill went straight to a Committee of the whole House. However, upwards of seventy amendments have been proposed for that stage, and it is evident that the shareholders are going to offer a strong resistance to what was termed by the chairman of the meeting "the scattering of their property."

**T**HE Berlin "Kunstanstellung" just opened (May 23rd) to the public, offers one feature of great interest to archaeologists, the panorama of Pergamon. Not only is the Acropolis itself, with the great altar of Eumenes, the temple of Minerva-Polias, the temple of Augustus, and all the subordinate buildings, to be set forth, but the whole reconstruction is to be thrown up on a realistic background of purple hills, vineyards, woods, and rivers. The general aspect of the Acropolis is familiar enough by now to most people from the reconstruction published in 1882 by F. Thiersch; but the plan then presented has undergone important modifications owing to many recent excavations. It is needless to say that the present panorama will be archaeologically up to date. Never before has such an opportunity for the vivid realisation of ancient life been offered to the public. Germany, somehow, has the happy faculty (would that England shared it!) of making her national art-treasures the pride, not only of museum directors, but of the people at large.



IF any person holding strongly,—or, indeed, holding at all,—our advanced English opinions on the subject of coloured decoration should hear that the well-known Italian Church in Hatton-garden has undergone an important restoration and re-decoration at the hands of "eminent" Italian artists, and should be induced thereby to enter that building, we should much like to be present to see his countenance; for it is difficult to imagine anything that would more completely differ from what he would suppose it *should* be. A great part of the flat walls and ceilings is covered with painted *rococo* ornament, skilfully shaded in neutral tones, to produce an appearance of solidity; and the remainder, except the panels, is painted with a diaper pattern of an indescribable yellowish green tint, such as was common in cheap wall-papers not many years since. The clearest windows have what appears to be white linen stretched over them, and on the linen is painted alternately a cross and a sword surrounded by a garland in a halo, the whole enclosed in a rustic frame; the shafts of the columns are painted in imitation of a mouse-coloured marble, and throughout the building a skilful use of yellow and white paint has produced much of the effect of gilding. The panels, as they are confessedly pictures, might perhaps shock our æsthetic friends a little less, though the boy angels *do* rather sprawl, and though the colours are rather crude. The chief subjects are,—over the high altar, the Ascent of Our Lord; in the centre of the nave ceiling, the Assumption of St. Peter; on either side of the nave, the lives of SS. Peter and Paul; and over the altar of St. Joseph, the Death of that Saint. In Germany, as well as in Italy, as every one knows, this kind of decoration is admired and commonly adopted where funds will allow.

AN exhibition of the competitive designs for the International Exhibition to be held in Paris in 1889 was opened on Saturday last, in the reception-rooms on the first floor of the Hôtel de Ville. There are 107 designs shown upon drawings of the extent of more than 4,500 superficial feet, and suggesting all manner of ways of arranging the site, which comprises the Champ de Mars, the Esplanade des Invalides, the Palais de l'Industrie, and the adjacent quays. The most remarkable designs for monumental character are those of M. Eiffel, which include his gigantic iron tower 300 mètres high. The jury for deciding the competition is composed, as is usual on such occasions, principally of political personages, public civil servants and engineers, and includes only six architects, nominated by the Minister of Commerce, among whom, however, we notice the names of MM. Bailly and Ch. Garnier. The jury will find their task no easy one, for if there are few very new or happy ideas among the competitors there are at least fifty or sixty carefully and conscientiously thought-out designs of which from twenty to five-and-twenty might reasonably aspire to one of the all too few and insignificant premiums. Since this was written, we have seen it mentioned in the *Globe* that 89 of the designs have been rejected, 18 being reserved for re-examination in detail.

NEW York and its suburbs appear every year to be growing more and more rapidly. In Brooklyn operations are going on upon a very extensive scale. In the month of March alone, official concessions were obtained for the construction of no fewer than 424 new edifices. Of this number 192 were for villas, sixty-six for houses containing dwellings to accommodate from two to four families each, sixty-five were for shops and stores combined with dwelling-houses, thirty-seven for tenement houses, and the remainder for various kinds of factories and warehouses, including two breweries, two foundries, as well as two churches and one school-house. The estimated cost of the buildings begun in March in Brooklyn is upwards of two and a quarter million dollars, while the total for the last three months exceeds four and a quarter million dollars.

IT is good news to hear (from the monthly *Δελτίον αρχαιολογικόν*, now issued by Dr. Kabbadias), that the remains of the pediment sculptures of the Temple of Athene Alea at Tegea have been brought to Athens, and are now safely housed in the National Museum. We need scarcely remind our readers that these precious fragments (two heads of youths and one head of a boar) are the only pieces of sculpture we possess of which we can confidently say they are from the hand of Scopas. Many an archaeologist will now be spared the difficult pilgrimage to Tegea. However delightful it may be to the man of leisure to visit ancient remains on the very spot where they were found, we cannot but rejoice that remains such as these are now not only easily accessible, but also safe from the dangers they have hitherto been exposed to from provincial ignorance. Dr. Kabbadias further reports that the missing half of one of the heads hitherto in the possession of the discoverer had been secured for the Museum. The laudable zeal of the new director has also secured for the National Museum the beautiful female head found some years back at Lerna, and hitherto kept at Argos. The head is life-size, of Parian marble, and from the unworked state of the back (it ends abruptly in a flat surface), evidently belonged, not to a statue in the round, but to a single figure or group in high relief. From its peculiarly soft and pathetic charm, it has been interpreted by some as a head of Demeter, but no attitude remains to give any certainty to this view. Its style is of the third century B.C.

MESSRS. COOPER, of Pulteney-street, have been getting up a novelty in their show-rooms, in the shape of a Greek room, suggested a good deal, apparently, by details occurring in Mr. Alma Tadema's paintings. In particular there is at one end of the room a massive seat on a semicircular plan, resembling a good deal in design the marble seats on which Mr. Tadema's figures are wont to sit; but as this is executed in wood it is somewhat questionable whether it can be regarded as truly Greek in spirit. A Greek would hardly have made a wooden seat on a similar design with a marble one. Other details in the room are well worked out, and the whole effect is very good.

#### ARCHITECTURE AT THE ROYAL ACADEMY.—V.

1,671. "Carlisle Grammar School," Mr. G. D. Oliver. A large drawing, showing a perspective of the building from a very high point of view, in fact, nearly a "bird's-eye view," and cleverly hung so high as to put such a perspective view in the very worst position. It might, one would think, have occurred to those who are concerned in hanging architectural drawings that to place a drawing of this kind far above the eye is to destroy all chance of its being seen with the effect intended by the author. The building is a plain structure, of domestic Gothic character, with mullioned windows. It is fairly scholastic in character, though it might, after all, be taken for a large private mansion, which should not be the case in a building of this kind. The only marked feature in the design is a square block, which rises above the roofs, over the entrance, and is crowned by a high-hipped roof, with an open-louvered timber story under the eaves. Is this a drying-room? No plan.

1,683. "First Design for the People's Palace at the East End," Mr. E. R. Robson. This design was, we believe, thrown over on account of its costly character. It is a grandiose conception, though we question whether it quite suggests the idea of a people's palace; there is rather a taint of aristocracy about it. The main features are a long ground-story arcade or loggia with a triglyph frieze and Roman Doric half-attached columns running through the impostes, the capitals and astragal of which, by the way, are drawn in very exaggerated proportions, as would be seen if they were enlarged. We like to see clean details, on however small a scale, in a Classic building. Over this loggia, which is stopped by pavilions at the ends, is seen the wall of a great circular enclosure, partly occupied by windows, partly by a frieze

representing, apparently, arts and sciences. This is broken by a central pavilion with a dome over it, and a curved pediment beneath in the tympanum of which is a clock face "supported" by two enormous griffins, whose scale dwarfs all the parts beneath them. A little back from the end pavilions, and outflanking them, are two towers, solid wall in the lower stories, with an Ionic order above, and then a circular drum carrying a smaller upper drum with caryatides attached, and ending in a short bulb-roof. This latter is shown with a black surface; it seems to want the surface breaking up in a decorative manner, to give its scale. This and some other parts of the detail we cannot like much, but it is a fine conception as a whole. No plan.

1,689. "New Hatcham School for Girls, New Cross," Mr. Henry Stock. This does look like a school; indeed, could be taken for nothing else. Hung too high to see detail; a red-brick building with three gables over large ranges of windows, and a turret with leaded roof coming in well at one angle. No plan.

1,690. "West Kent College, Brockley," Mr. W. Charles Evans. A large building shown on a small perspective drawing, and cannot be well seen at the height it is hung. It is built round three sides of a central open space, the chapel, which looks a good solid bit of design, occupying part of one side. The walls are prettily regularly pierced with square mullioned windows, and parts of the ground-story treated as open arcades. Apparently a picturesque and suitable building. No plan.

1,691. "New Carmelite Monastery, Kensington," Messrs. Goldie, Child, & Goldie. A very nicely-executed water-colour drawing of what looks at first like a row of terrace-houses with a cloistered garden (and, after all, who should not terrace-houses have cloistered gardens? How it would add to the happiness of life!), but the treatment of the ground-story with the large long mullioned windows takes the building out of the domestic category. The upper portion hardly seems, however, to harmonize with this ground-story, and wants connexion horizontally also. Otherwise a quiet, suitable, unpretentious building. No plan.

1,692. "King Henry VIII. Grammar School, Coventry," Mr. Edward Burgess. A very pleasant picturesque building, in Late Gothic style, set back from the road, with returning wings; the entrance is marked by a low square battlemented tower. The arrangement of the rather low mullioned windows, with flat arched heads to the top lights, carries the eye round the elevation in restful horizontal lines. Long vertical windows come in at the east of the right wing, which seems to be the dining-hall; an octagon stair-turret breaks the re-entering angle. A building which is very picturesque without struggling to be so. No plan. If the author had stuck even a small plan up in the sky, where he has stuck that heraldic armed hand, he would have made a more practical use of that corner of his paper.

1,700. "Infirmary at Champion-hill," Messrs. H. Jarvis & Son. A curious but not unappealing building, balancing between Elizabethan and Queen Anne; the windows, with their plain sashes and keystones, recall the latter phase of the gables, with their strap ornament in the tympanum, the former. In the centre portion, which apparently retreats a little between wings, the windows are more Elizabethan in character, or even earlier, and terminate in odd corners compounded of little pilasters and scrolls, gables, and "knobs," and "spikes." Behind the wings on each side is seen the upper portion of a large square tower, the top stage of which is overhanging on corbels, and made of half-timber work. Now, if the authors had put even a small plan, we might have had some clear notion what these towers were there for, and what part they played in the economy of an infirmary; but, as it is, we can only hazard wild guesses. Are there laundries or drying-rooms up there? Or is it a new way of placing isolation wards, with lifts up to them? But this, though a little eccentric, and the drawing rather scratchy, is yet an amusing and interesting bit of building.

1,704. "Competitive Design for the Admiralty and War Offices: View from the Park," Mr. P. J. Marvin. This drawing we publish this week, and we leave our readers, therefore, to form their own judgment; they can see it in our lithograph, whereas one certainly cannot at the Academy, where it is hung very high. It strikes us as a design refined in feeling and



detail, but rather wanting some greater degree of variation and subordination in the treatment of the different stories.

1,711, "Hackford-road Schools, Lambeth," fr. T. J. Bailey. This is a small, very plain drawing of some new or recent Board schools, erected in the style which has been adopted for the London Board Schools; the drawing being ternly confined to exhibiting the building, without even a figure of a boy playing marbles to relieve its severity. The style of drawing, however, is suited to the peculiar "bouquet" of the architecture, and seems to partake of a prim neatness. The details are so completely in harmony with each other, and the whole so characteristic, that one might find very high expressions of admiration in place, if one could forget that all this, after all, is only a carefully-studied reproduction of the manner of a past generation; a manner supposed, for one reason, to be especially characteristic of London. So it is of the London of one age, not why that particular age for Board schools? However, we prefer to have a recognised Board school style for London than to have them in all styles; and they might possibly have been more original, and less pleasing and suitable.

This completes our remarks on the designs coming under the head of public buildings and institutions, which we have taken separately, leaving domestic and decorative work for further notices.

#### THE FOLKESTONE EXHIBITION.

THE artistic importance of this Exhibition has been greatly exaggerated by the press generally; one of the results of the system, now pursued in connexion with such undertakings, of inviting representatives of the press to meet on a specified day and go round under the guidance of some one connected with the concern, whose mouthpiece the reporter is fated to become. Our contemporary *Punch* is an exception; he obviously declines to be pumped into, and is sarcastic hints in regard to the pictorial part of the show are much nearer the truth than other accounts we have seen. There are some good pictures there, including among others a very fine and well-known one by Israels; there is also a "Blackberry Gathering," and Linnell's "Hesperus," both fine examples of their authors' work; but many of the good names to be found in the catalogue are represented by works which are not among their best, and there is a great deal of entirely uninteresting work; mediocre paintings by mediocre painters. Among the more interesting ones is Mr. F. Holl's "Deported," and a large painting by the late P. Poole, "The Visitation and Surrender of Syon Tumery," which we do not remember to have seen before; and which is an interesting example of Poole's efforts (not very numerous) in historical painting, which, however, is of the field of art in which his special and most characteristic power was displayed. There is also a very fine sea piece by Mr. H. Moore, which we think we remember in the Grosvenor Gallery a year or two ago. The gallery of "Old Masters" is a very poor display of doubtful and second-class works. The making up of the catalogue seems to have been beyond the energies of the committee so far; only a few of the pictures in it have the numbers affixed; few have descriptive cards attached; the rest must be guessed at, except where signed by the artist.

The building, though certainly not beautiful, is well planned and fairly well lighted for its purpose. The main entrance leads into a large oblong central hall, on each side of which are rooms leading into two suites of galleries, so arranged that the visitor enters by one door, and traverses them to return into the central hall by another door. The hall is decorated rather crudely in strong colours, and with a great deal of bunting depending from the roof, which has a gay effect. At the upper end is an organ and orchestra. Among the picture exhibits here is Mr. Birch's "Godiva," and several other works which will be remembered in recent Royal Academy Exhibitions.

Some cases in the large hall contain some interesting exhibits of early examples of printed and engraved books, including a fine edition of *Costius*, with engravings by Verard (Paris, after-end of the fifteenth century), a copy of the "Player's Edition" of *Shakespeare* (1623), and some good specimens of bookbinding. In

this hall also is a large stand of Messrs. Doulton's ware; a case of silversmiths' work from Messrs. Hunt & Roskell, mostly modern, but including some interesting examples of old work; and a collection of specimens of Messrs. Diespeker's mosaic; and near this is to be seen the model of Mr. Onslow Ford's fine memorial bas-relief, which was in the Lecture-room at the Royal Academy last year, and of which we gave an illustration.

The chief interest of the exhibition, however, lies in the north-east gallery, where there are various loan collections of furniture, armour, ironwork, tapestry, Japanese work of different kinds, &c. In the middle of the room is an ancient specimen of one happily extinct kind of furniture, of which there are probably very few examples preserved, — namely, a pillory, in such preservation that, with the addition of a hasp and padlock to fasten down the top rail, it could still be used for its benevolent office. It forms a sinister reminder of the brutality of the forms of punishment once existing among us; though perhaps it was the most suitable kind of treatment for some of those whose heads were locked into it, and possibly some fitting occupants for it might be found even now. From the Goodrich Court collection come some fine tapestries, which line the walls of this room, including a grand piece of Renaissance design, covered with mighty scroll-work, and with a picture of a fountain supported by Cupids in the centre. It is impossible to particularise further than this, as neither descriptions nor numbers were affixed in most cases, and the catalogue merely gives the most general summary.

The Canterbury Museum contributes some bronzes, and a medal said to be "the original model" of the Bastille, or for the Bastille, a grim specimen of architectural design, expressive enough in its way. From the Maidstone Museum comes a small but interesting collection of porcelain, old keys (some of them very artistic), and examples of a very curious local pottery manufacture, that of Wrotham, Kent, which is long since extinct. It is a ware decorated with buff powderings and rudely executed escutcheons and other ornaments, on a dark red ground, and is of interest from its marked individuality of style; there are only a very few specimens of it, however. The collection of old iron work lent by Lady Dorothy Nevill includes some most interesting work, a good deal of which was to be seen not long since in London, at the Exhibition of Artistic Wrought-iron Work got up by Mr. A. Newman in Bond-street. Among the furniture scattered about this gallery are some good specimens of eighteenth-century French work, and some older examples of various kinds. Mr. Seymour Lucas sends some swords, helmets, and buff jerkins, some of which we have probably admired in his pictures, and the Baron de Cesson contributes a very fine collection of swords. Mr. G. Trefusis sends some old English jewelry, and we find from the catalogue a "rare and unique key," formerly the property of Mary Queen of Scots; and there are a good many little objects of artistic and archaeological interest which one might comment on more particularly if there were any means, either from the catalogue or from labels, of identifying them. Among the curiosities of this portion of the exhibition there are, among a case of things lent by Mr. Ernest Hart, a great number of what appear to be Japanese metal key-scutcheons (a label was on them, when we looked at them, specifying them as "old china"); these are diverse and curious in design, and form rather a novelty in the way of Japanese collecting. Among the more usual forms of Japanese work in another case are two excellent pieces, a large lacquered paper box, and a double *cloisonné* beaker, part of the "loot" from the Summer Palace at Peking, which turns up in so many places now, of unusual and fine design.

If the objects in this gallery, and the old books and armour in the main hall, were collected in one room, they would make a very good and interesting small exhibition of works of art of this miscellaneous class. But the whole building and the whole undertaking, one may say, is far too large for the amount of real interest included in it, and though it may prove a centre of attraction to Folkestone and the neighbourhood, it can hardly be said to be an exhibition worth going far to see, except for those who have seen very little of such exhibitions.

#### LARGE-SPAN IRON ROOFS: A COMPARISON.

ENGINEERS and architects are much at variance among themselves respecting the merits and disadvantages of single and multiple spans. It is often argued that the cost of painting large spans is an argument against their adoption, and that the cost of erection is greatly in excess of smaller spans. The friends of multiple spans maintain that columns in the centre of a station are not more in the way of passengers than the ordinary lamp-posts, seats, &c., which are usually placed in large stations, but it must not be forgotten that the latter can be easily removed without endangering the structure, if it should at any time be deemed desirable to change the position of the rails and platforms, whereas in a station of two or more spans the central columns might be found to be in the way of an advantageous alteration of the platforms. For instance, the central columns of the Victoria Station of the London, Chatham, and Dover Railway, as at first arranged, stood between the lines of railway, whereas they now very inconveniently come in the centre of the narrowest platform. In the adjoining station of the London, Brighton, and South Coast Railway, the central columns remain, as at first, in the centre of the broad carriage road. In our opinion, a better architectural effect can be produced with a single than a double or multiple span, and certainly better arrangements for ventilation in a railway station can be obtained with the use of a large single span. At Euston Station, where several comparatively small spans are adopted, the roofs were a few years ago raised about 6 ft., as the station was found to be deficient in ventilation. The lifting was effected by the aid of some powerful screw-jacks, which were afterwards employed for lifting the eastern goods- shed roof of the Great Northern Railway Co.

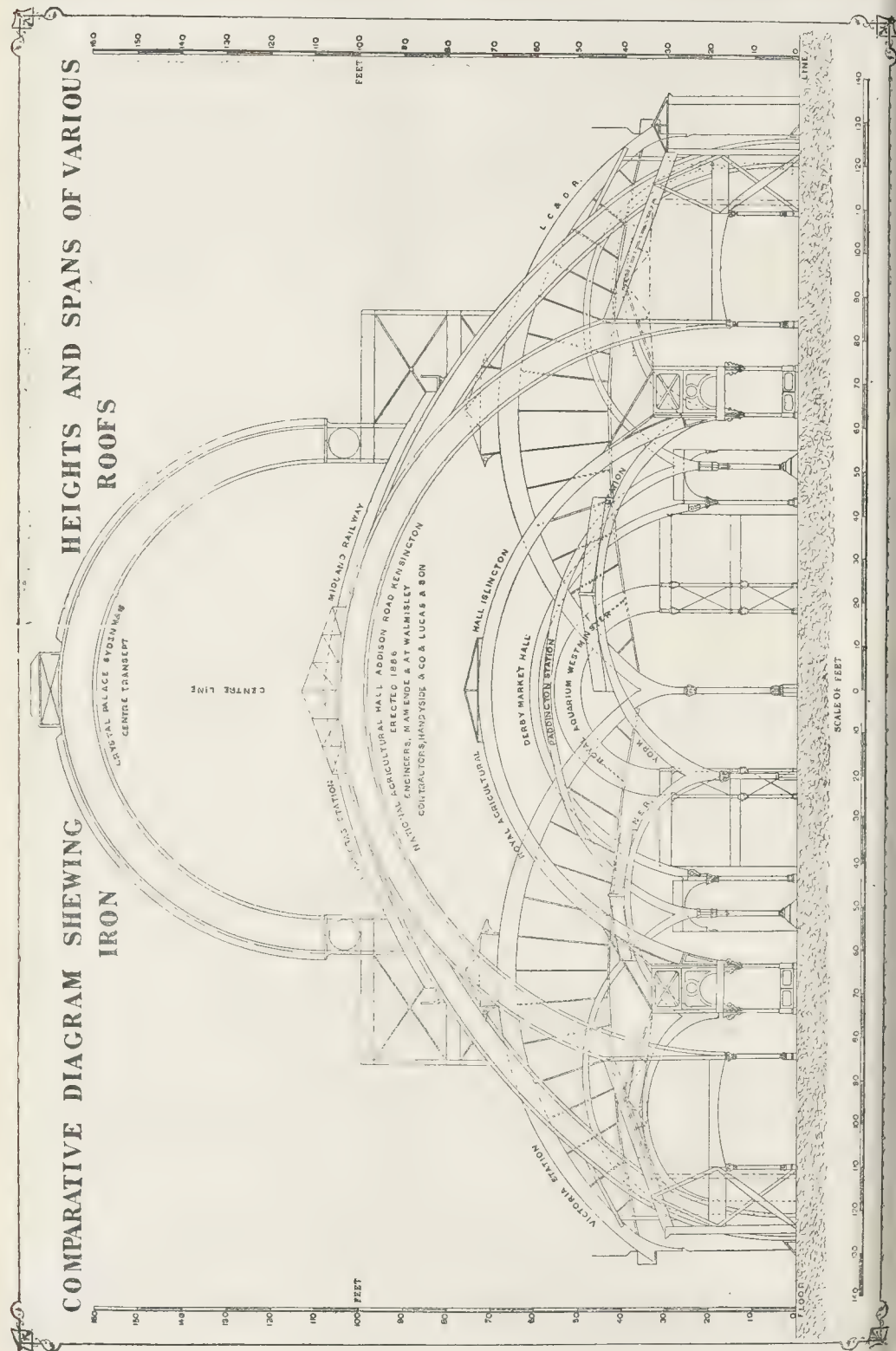
The following spans have been adopted at the Euston terminus of the London and North-Western Railway:—62 ft. 6 in. (widest span) over two arrival platforms; 26 ft. 6 in. over the cab-drive next to Seymour-street, arrival side; 34 ft. over cab-drive, arrival side; 26 ft. 6 in. over cab-drive; 40 ft. and another 40 ft. over the east departure; 29 ft. over the local traffic; 39 ft. and 43 ft. 6 in. spans, and 49 ft. 6 in. over the west departure (old London and Birmingham railway station).

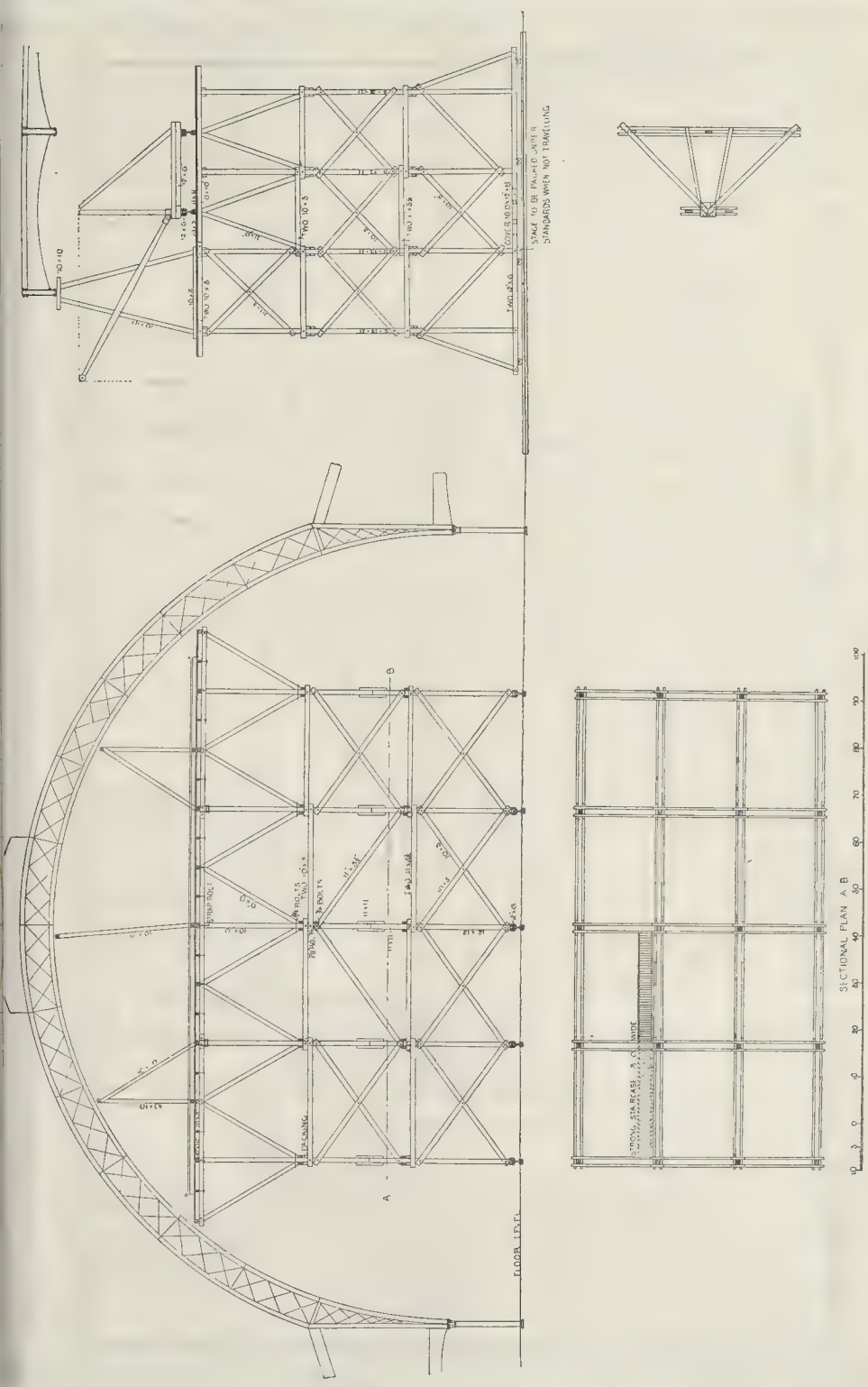
The comparative diagram which we publish showing heights and spans of various iron roofs illustrates a width of from 240 ft. to 250 ft. covered in one span at St. Pancras Station (Midland Railway), in two spans at the Victoria Station (London, Chatham, and Dover Railway), in three spans at Paddington Station (Great Western Railway), and in four spans at York Station (North-Eastern Railway). We would refer our readers to the table of examples of fifty iron roofs given on page 37 of *Walmisley's "Iron Roofs,"* published by Messrs. E. & F. N. Spon, in which the principal dimensions are arranged in a tabular form, and are placed in the order of their span, which varies from 240 ft. to 40 ft. The roof over the New National Agricultural Hall, now in course of erection at Kensington, covers a space between walls of 440 ft. in length by 250 ft. in width, and is surrounded by buildings and open space, bounded by Blyth-lane, the houses on the north side of Hammer-smith-road, and the Addison-road railway station, providing an available area of 6½ acres for the company's purposes, which they propose to extend by the acquisition of a site upon the opposite side of Blyth-lane, recently laid out for proposed markets, but which is now suggested to be reserved for pleasure-grounds.

The main roof of this building is 170 ft. clear span, having a gallery floor 40 ft. wide upon the north, west, and south sides, and 26 ft. wide upon the east side. The roof is semicircular, with ribs 7 ft. deep placed 34 ft. apart in eleven bays, and springing from columns described in the *Builder* for April 17. The comparative diagram also shows the size of the semicircular arched roofs of the Crystal Palace, Sydenham, and of the Royal Aquarium, Westminster.

The design of the roof of the National Agricultural Hall at Kensington is by Mr. Am Ende and Mr. A. T. Walmisley, both of Westminster, who have been engaged as joint engineers for this portion of the work. Since the publication of the illustration of the building in our issue of October 3, 1885, we understand that the design for the closed glazed screens at the west and east ends has been altered from







THE NATIONAL AGRICULTURAL HALL, KENSINGTON.—ROOF PRINCIPAL AND STAGING.



the radial construction there shown, to a vertical ridge and furrow form, whereby a better connexion with the screen rib is effected, and the appearance of heavy horizontal members avoided. The screen will present the nearest approach to the idea of a folded curtain that it is possible to produce, in the given situation, with ironwork. The main purlins which run from screen to screen are made to act as continuous girders, and communicate a portion of the wind pressure from one screen to another. The longitudinal inner floor girders under the north and south galleries, which come in line with the inner row of columns, also act as continuous girders, and the stability of the ironwork is independent of the surrounding walls. We may observe also as a peculiarity of the design that, except where required for covers, plates are almost wholly omitted, and the various parts are made up of flat bars and angle irons riveted together. About 1,200 tons of iron will be required, and the cost will be from 26l. to 27l. per square of 100 ft. area.

We illustrate the staging designed by Messrs. Handyside & Co., of Derby and London, for erecting the roof. The stage is 62 ft. on the top platform in width, so that it overhangs 14 ft. longitudinally from the centre of the main ribs, which are 34 ft. apart. Thus, one bay can be completed between two main ribs, and the stage then moved forward to erect the next bay. The stage travels from west to east, working towards the railway. The skeleton iron framework admits of planks being stretched or suspended in any position, so that there will be no necessity to wait for the help of the travelling stage to execute the painting. There are about 10,000 cubic feet of timber in this stage, including the staircase and top platform, an amount which, compared with other travelling stages, shows that no needless expense has been incurred, while the scantlings are amply sufficient for the work required. The travelling stage for the erection of the roof over the King's Cross Station, Great Northern Railway (arrival side) contained 14,000 cubic feet of timber. This stage was designed so that no hindrance was occasioned to the railway traffic passing underneath it, and it was arranged to move a distance of one bay or 20 ft. at a time. In the St. Pancras Station of the Midland Railway more than 50,000 cubic feet of timber were used for the travelling stage, which was divided into three parts, a central and two-side divisions. Two of these travelling stages, moving one after the other in the same direction, were employed, and a smaller separate staging was subsequently erected at the north end for completing the gable. This latter portion was so constructed that trains might pass under it into the station before the completion of the work.

The following is a comparative statement of the dimensions, &c., of the roofs shown on the diagram on p. 774:—

Name of Roof.	Total transverse width.	No. of spans.	Main span.	Clear height above floor or rail level.
	ft. in.		ft. in.	ft. in.
Crypt Palace, Sydenham, Centre transept	104 0	1	104 0	160 0
St. Pancras Station, Midland Railway	240 0	1	240 0	100 0
National Agricultural Hall, Kensington	250 0	1 with side galleries	170 0	99 7½
Royal Agricultural Hall, Islington	239 0	1 with side galleries	125 0	73 0
Victoria Station, L.C. & D.R.	256 4	2	129 0	63 6
Derby Market Hall	111 6	1	89 6	59 6
Paddington Station, G.W.R.	240 6	3 with side galleries	102 0	54 7
Royal Aquarium, Westminster	80 0	1 with side galleries	36 0	49 6
York Station, N.E.R.	234 0	4	81 0	45 0
Liverpool-st., G.E.R.	314 0	4	109 0	82 0
Canon-street, S.E.R.	180 4½	1	180 4½	79 6

**Garston.**—Mr. Renben Bennett, of Manchester, has submitted designs and obtained the contract for proposed decorations at Garston Parish Church, near Liverpool.

## THE NATIONAL AGRICULTURAL HALL, KENSINGTON.

THE ninth Saturday afternoon visit of the Architectural Association was made on Saturday afternoon last to the National Agricultural Hall, Kensington, now in course of erection adjoining the Addison-road station under the superintendence of Mr. James Edmeston, past president of the Architectural Association, Messrs. M. am Ende and A. T. Walmisley being the engineers. The engineers were present, and explained the drawings and construction of the iron roof, and conducted the party over the works, the novel and light construction of the roof being inspected with great interest. Three of the main ribs or principals of the roof are already in position. The roof will be covered partly with zinc and partly with glass, by Messrs. Hilliwell, on their patented systems. Messrs. Handyside & Co., of Derby, are the contractors for the ironwork, and Messrs. Lucas & Son, of Kensington, the general contractors, the amount of their contract being 131,573l. Mr. Howard is Messrs. Handyside's representative on the works, Mr. W. F. Siddall being the clerk of works. A novel and ingenious feature of construction adopted by the engineers consists in making the connexions of the columns partake of a ball-and-socket-joint-like arrangement, with the view of giving the columns a certain amount of lateral play, from the expansion and contraction of the roof, without danger of fracture, as mentioned by us in a "Note" in our issue for April 17 last, p. 567. For the purpose of erecting the roof, Messrs. Handyside & Co. have built a gigantic travelling stage, having a platform 62 ft. in width, and containing about 10,000 cubic feet of timber—not 1,000 ft., as was accidentally stated in the "Note" just referred to. We give some diagrams showing this staging. We gave full particulars and dimensions of the hall on the occasion of the laying of the foundation-stone (see *Builder*, July 26, 1885, p. 137), and on October 3 last we gave a view and plan of the hall, as designed by the late Mr. H. E. Coe, the architect, who was succeeded by Mr. Edmeston on his resignation through ill health a short time afterwards. As is elsewhere mentioned, however, the design of the end screens has been altered from the radial arrangement shown in our view of October 3 last.

## ARCHITECTURAL ASSOCIATION.

THE concluding meeting of this Association for the present session was held on the 21st inst., at 9, Conduit-street, Mr. C. R. Pink (President) in the chair.

The following new members were elected, viz., Messrs. H. S. Berridge, J. D. Michell, Henry Coldwell, J. H. Porteous, and A. F. Cutler.

A vote of thanks was unanimously passed to Mr. Alfred Waterhouse, R.A., for permitting the members to visit the National Liberal Club the other Saturday afternoon.

## Studentships and Prizes.

It was announced that the Association Travelling Studentship had been gained by Mr. R. W. Paul, and the second prize of 5l. by Mr. T. E. Key. It was further announced that only one set of drawings had been sent in for the Aldwinckle Travelling Studentship, and the judges did not consider these of sufficient merit to justify them in awarding the Studentship.

The following is the judges' report to the Architectural Association Sketch-book Committee:—

"April 14th, 1886.  
GENTLEMEN,—Having examined carefully the various sets of drawings included in the last volume of the Sketch-book, we are of opinion that prize 2, of four guineas, for the best set of two transfers should be awarded to Mr. Sydney Vacher, for his drawing of ornamental work and the figures from Schiavoni.

Prize 3, of three guineas, for the best set of three plates, we consider should be given to Mr. G. Oakeshott. In awarding this latter prize, we put out of consideration the sketch of the Hôtel de Ville, Orleans; but we consider the three others to be the best for value of subject and finish of drawing combined. We may take occasion to remark that some of the contributors have more or less spoiled their set, when considered in regard to a prize, by sending one or more drawings much inferior to their best work.

We had considerable difficulty in deciding on prize 3, and express our admiration of the work of several of the other sets.—We are, yours faithfully,

H. H. STATHAM.  
E. INGRESSE BELL.  
ASTON WEBB."

## Books.

Mr. R. L. Cox then read a paper on "Books," with special reference to those treating of architecture. At the outset he observed that if he could have been asked to read that paper three hundred years ago, his task would have been considerably lighter than the lapse of time had now caused it to become, for there were in existence at that period only about enough books concerning architecture to suffice for the study of one lifetime. But to-day the number of works connected more or less directly with architecture and its allied sciences had increased to such an enormous extent that the task of dealing with them, even for purposes of classification, was a formidable one. If one came to consider which, from an architect's point of view, was the most important element in the formation of an architectural book—letterpress or engraving,—he thought one would not have much hesitation in declaring in favour of the latter. To architectural students engraving was certainly of greater importance even than printing; one single page of illustration would often convey more meaning than a whole volume of letterpress. The lecturer proceeded to give an interesting sketch of the rise and progress of engraving and printing, pointing out that block books, printed between 1430 and 1450, were often profusely illustrated with figures in architectural borders or settings,—of which one of the earliest, the "Spectaculum Humanae Salvationis" had, amongst many other subjects, quite a good representation of a German schloss, with tall angle-towers and pointed extinguisher roofs, the borders to the plates being Gothic in character, with crocket-like foliage in the spandrels; whilst the "Biblia Pauperum" had archaic figure-subjects, bold and heavy outlines, and wide and coarsely-cut lines of shading, the letterpress being confined to short Latin texts in scrolls, and the plates framed with architectural borders of arches carried on shafts with capitals and bases of a Romanesque character. He then went on to say that it was a fact that whilst all the greatest periods of architectural magnificence had their rise and fall long ages before the age of printing, and left their traces,—whether at Thebes or Persepolis, at Athens or Rome, at Ravenna or Caen, at Cologne or Lincoln,—in work of which mankind might well be proud, a marked deterioration in artistic feeling followed rapidly on the universal diffusion of knowledge by the multiplication of precept and example as effected in the publication of works on art; until at length perhaps a lower depth of downright ugliness than ever achieved in the history of the most art-loving primitive nations was arrived at amongst our highly-civilized selves in the reign of his most sacred Majesty, King George the Fourth, of which unexaggerated examples might be seen in that most amusing volume by A. W. Pugin, published in 1836, and usually known as "Pugin's Contrasts." This fact could only be attributed to the unreasoning pursuit of the arts and literature of an ancient régime, the theories and fancies of which were blindly accepted as living truths and used like fetters to cramp the freedom of natural thought and action. It was the too ardent spirit of hero-worship that made excessive admiration of a bygone art overdo itself; and by forcing the art, admirable though it was at one period of the world's history, upon another and a totally different age, it degraded what was once noble and admirable into a mere empty fashion,—a thing to be slavishly followed because it was *à la mode*, checking in the end all further enterprise, and making men halt for precedents and authorities without whose leading-strings they did not venture to move. It would of course be vain to say that the attention given by Brunelleschi to the neglected remains of Classic architecture in Rome would not have made itself felt through his works over perhaps all Europe itself, the more especially as his visit to that city (about the year 1400) was impelled by the awakened interest in Classic architecture that was being felt in Italy, which would of necessity influence the art of the time; but it was by no means unlikely that but for this slight aberration, as it were, the course of architecture would have gone on towards fresh development could the "Great Dictator," as Evelyn called Vitruvius, have remained unknown until (say) the present century, when his study, from an antiquarian point of view, would have been of the highest



possible value, and in this our present more healthy and vigorous state would have been less likely to be productive of harm. Fate willed it otherwise, however, and Vitruvius combined all the qualities that were necessary to attract attention at that particular time. First of all, he was a Roman of the true Classic period, and his treatise, in Augustan Latin, was exactly the kind of composition then most in demand. The discovery of his work turned the current of architectural literature, then in its very infancy, into the channel through which it has flowed without interruption down to quite recent times. Having given an account of some of the various editions of Vitruvius, of which there are seventy-six, and quoted some quaint passages from the translation into English by Robert Haydocke, published in 1598, probably the first translation of a writer on Roman architecture published in England, Mr. Cox pointed out that one good result of the spread of Classic literature was seen in the attention that was paid to the careful measurement and delineation of the examples of Classic art, and many magnificent works resulted, of which Stern's Illustrations of Vitruvius's "Villa Papi Giulio," published in 1784, the plates in which were masterpieces of engraving; Palladio's "Ancient Roman Architecture"; or Wood's "Ruins of Palmyra,"—the latter a book after the style of Stuart's "Athens," and of great practical value,—might be quoted as examples. When at last the Classic monopoly began to wane, and architects began to study in a more generous and cosmopolitan spirit the artistic work of other countries than Classic Italy, they found themselves not only actually deprived of many buildings and remains of artistic and historic value that had been wantonly destroyed by neglect, or removed to make way for something elegant and chaste of the approved style, but they were also totally unable to observe and delineate correctly the therto-despised styles. There were no works of the early days of the Gothic revival the value or execution of which approached that of Classic books that had been common a hundred years before. Such works, for instance, as Birmingham's "Henry VII.'s Chapel," published in 1822, or Cayrol's "Specimens," in 1834, could not be compared with some of the Classic works quoted; and although many numbers of antiquarian works, in which there were illustrations of a pictorial character, the greatest merit in almost any quantity, existed from the days of Dagdale's "Monasticon," downwards, it was not until the time of the Pugins that works on Gothic architecture began to be of any real value to the professional architect. Eastlake had mourned at the publication of such fine works as those of the Pugins, as well as others of a later date, could offer such tempting opportunity to the plagiarist, who, to save himself trouble, would put up a steeple all out-and-dried ready to hand out of the book; but the pillory of public scorn would be sufficient punishment to prevent the misuse of books in such a way as at, and therefore the author did not see any reason why careful monographs of buildings could not be multiplied, since every day the growth of taste in art rendered it less likely at the use of them would be thus abused. The immediate effect of books in cramping the development of architecture seemed to have arisen from the one-sided twist or bias that happened to be imparted to them at the outset, the result of which was the undue favouring of one particular class or quality of art to the exclusion and almost extinction of the rest,—an evil that would always have a tendency to recur were too strong a feeling of partisanship, or too blind a following of any particular idol or whim of the moment, was allowed to take the place of better judgment, and which could only be prevented by the exercise of a generous and liberal spirit, more able to look out for and acknowledge the good points that were to be discovered in a thing, than to be only on the alert to criticise and condemn what might turn out, after all, to be so bad.

The Chairman, in opening the discussion, complimented Mr. Cox on his paper. It was a result of very wide and extensive reading, and had taken his hearers to many out-of-the-way corners which few of them perhaps would have otherwise visited. Mr. Cox had spoken fully of the untrustworthiness of books of the thirteenth, seventeenth, and eighteenth centuries as regards to Gothic architecture. Books were

one of the chief means by which the student had to gain a knowledge of his profession. The list of books issued by the Institute for the guidance of those students who were seeking to pass the Examination in Architecture was an exceedingly valuable one, if it was regarded as it should be, viz., as a sketch of the student's library of reference. He was afraid that some people thought that it was meant that the student should thoroughly read and study all the books contained in the list as text-books, but that was an absurd idea. So largely, however, had it obtained, that it had been stated that a student in the country had written to Mr. Batesford to send him the whole lot, and was much surprised when he received the estimate. The list would be found most valuable as a list of books for reference, and as a list from which a selection of books which every student should study as text-books might be made. It was necessary that the student should actually possess some, so that he might have them constantly at hand. The list omitted, he thought, some few books which were valuable to the student. With regard to the history of architecture, every one would agree that Ferguson's book was the best in any language. Although it was so valuable, yet the student would possibly, in the first instance, do well to thoroughly study Rosengarten's Handbook and those smaller ones by Mr. John Slater and Professor T. Roger Smith. Then, with respect to drawing, Burchett's "Perspective," some good book on Cosmography, Tarn's "Geometrical Drawing," and similar volumes, would be useful; while, in regard to science, Tarn's "Science of Building" was a capital primer in that branch. Mr. S. F. Clarkson proposed a vote of thanks to Mr. Cox, and complimented him on his ability for dealing with such a subject.

Mr. J. A. Gotch, in seconding the vote of thanks, remarked that Mr. Cox had given a good architectural flavour to his paper on "Books." Any product of the early days of printing must be of interest to the architect, and it was curious why the books of that period were so much more interesting, as specimens of typography, than those of the present day. He was inclined to think this was largely owing to their inaccuracies, though such a statement might seem somewhat paradoxical. He believed their charm was greatly owing to the inaccuracies more or less consequent upon hand work. Ancient buildings were also often set out in a most inaccurate manner, and this, perhaps imperceptibly, formed part of their beauty. The Musée Plantin, at Antwerp, contained a series of beautiful designs for title-pages, but to title-pages nowadays no particular interest seemed to be attached. The designs to which he referred were most fanciful and dainty, and it was a pleasure to the members of the Association to feel that they were keeping up this good custom in connexion with the Sketch Book. The bindings of books, again, were very interesting, some of those published in the sixteenth century being quite a revelation to people who had never before seen them, the amount of fancy expended on the character of the designs being very great indeed.

Mr. John Slater, B.A., said he always had a taste for old books, and, like Mr. Gotch, he had often been struck with the curious inaccuracies in those printed from wooden blocks. What astonished one was the courage of the old wood-printers, who never "shied" at anything, the "Nuremberg Chronicle," published in the sixteenth century, beginning with a representation of what one should have thought unrepresentable, viz., Chaos. One also noted in those books the recurrence of the portrait-blocks, the same one doing duty for Moses and Joshua, and even for people who had lived a few years before the book was printed. Again, the relative proportions of virtue and viciousness in the character, were always strictly represented by the amount of clothing. Mr. Cox had said that if Vitruvius had lived several centuries later he would have been able to give his views on some of the Mediæval buildings, but several later writers had not been struck with Gothic work, and even the Frenchman, Quatremère de Quincy, was as much opposed to it as any of those who had been mentioned. Books were invaluable, but they must be consulted and read with a certain amount of care, and with the idea of what they were intended to do. Hand-books must be considered merely as hand-books, and it must not be supposed that the information contained in so small a compass would free the student from the necessity of

consulting the larger works. He was glad that the Chairman had referred to the list of books put forward by the Institute, because a great deal of misunderstanding had arisen from it. The list might have been made even fuller, but it was intended for use all over the country, and was so compiled as to give an alternative choice of books which might be had for purposes of reference. He would like to conclude with the caution that no amount of book knowledge would do away with the necessity for striving to make acquaintance on the spot, or by the inspection of models, with the buildings described.

The vote of thanks was then carried by acclamation, and Mr. Cox made a suitable reply.

#### Election of Officers for Session 1886-87.

The result of the election of officers for Session 1886-87 was next announced. The complete list is as follows:—

President.—Mr. J. A. Gotch.

Vice-Presidents.—Messrs. J. Slater and E. J. May (Mr. Henry Lovegrove having withdrawn his nomination).

Committee.—Messrs. Cole A. Adams, W. H. Bidlake, F. R. Farrow, Arthur J. Gale, W. J. N. Millard, C. R. Pink, W. A. Pite, L. A. Stokes, S. Vacher, and G. G. Woodward.

Hon. Treasurer.—Mr. J. Douglass Mathews.

Assistant-Treasurer.—Mr. H. W. Pratt.

Librarian.—Mr. W. Burrell.

Hon. Secs.—Messrs. H. D. Appleton and T. E. Pryce.

Solicitor.—Mr. F. Truefit.

Auditors.—Messrs. M. Fawcett and A. C. Balmer-Booth.

Registrar.—Mr. T. H. Watson.

Cordial votes of thanks were passed to Mr. C. R. Pink for the manner in which he had discharged his Presidential duties, and to the Hon. Secretaries, Messrs. Appleton and Pryce.

#### THE SOMERS TOWN GOODS STATION OF THE MIDLAND RAILWAY.

PEOPLE who have passed along the Euston-road of late will have noticed that a structure of large dimensions is in course of erection there. The building in question is the Somers Town Goods Station of the Midland Railway Company, the site of which covers an area of upwards of fourteen acres, occupied until within a few years back by an urban population of more than 4,000 persons. It was in the year 1877 that the Midland Railway Company obtained an Act of Parliament under which they secured powers for the purchase of the site. The clearance of this site and of the site of the St. Pancras Terminus some years previously involved the demolition of several hundred houses and the displacement of thousands of people. It was not until about 1882, or some five years after the company obtained their Act, that the site of the new goods depot was finally cleared. A considerable period elapsed before anything was done with it beyond the ground being enclosed by an unsightly hoarding, and in the meantime the local authorities lost the rates which had been paid on the house and shop property now swept away. Various rumours were from time to time current as to what purposes the railway company intended to apply the land. At one period they were credited with an intention to convert it into a huge wholesale vegetable market, to be supplied by the agricultural localities within the districts served by the line; at another time it was rumoured that a considerable portion of the site was about to be utilised as a locomotive and carriage manufactory; whilst at a subsequent period the story prevailed that it was to be laid out as an ornamental garden in connexion with the company's adjoining hotel, a sufficiently improbable application of a property which is understood to have cost the company a sum approaching 1,000,000. All doubt was, however, set at rest about two years since, when it became known that an unusually large and costly goods station was about to be erected on the site. The getting-in of the foundations involved some heavy excavations, and near to the bed of the old Fleet river it was found requisite to sink cylinders to a depth of 40 ft. through soft mud, in order to arrive at a sufficiently firm bottom.

The external features of the building are designed to harmonise as far as may be with the adjoining hotel and station, of which it forms a continuation westward. Thus the Euston-



road frontage, which is about 300 ft. in length, extending from the Midland-road, on the west side of the hotel, to Ossulston-street, is upwards of 30 ft. in height, and contains twelve pointed openings, filled in by ornamental iron railing, with two spacious entrances at the east and west angles, closed by ornamental iron gates. The arches of the openings and entrance-gateways are in alternate Leicestershire brick and Mansfield stone, and the elevation is surmounted by a perforated and moulded coping and balustrade, also in Mansfield stone. The return frontages in the Midland-road and Ossulston-street, to the extent of upwards of 50 ft. in length, are of the same architectural character, and the remaining portions of these two frontages, each of which is about a quarter of a mile in length to their northern extremities at Phoenix-street, are faced with a series of pointed arches, those in Ossulston-street being in blank, whilst several of the arches in the Midland-road lead into offices in connexion with the coal and other trades. The area of the land widens considerably from the Euston-road northwards, until at its northern boundary in Phoenix-street it is more than 600 ft. in width. In the Phoenix-street frontage the Gothic character of the several elevations is preserved, the frontages being all faced with Leicestershire red brick; and the whole of the external walls vary from 3 ft. to 4 ft. in thickness. Immediately inside the external walls there is a roadway, 40 ft. in width, running parallel with the Euston-road frontage for its entire length, and also carried to a considerable distance along the east and west frontages. These roadways are bounded by inner walls, enclosing the main area of the station. The structure will comprise two floors, namely, the ground-floor and the floor above it, and as much of the traffic is intended to be marshalled and arranged on the ground-floor, there will be hydraulic lifts by which the railway waggons will be lowered and raised. The upper floor is the chief structural feature in the building. It is constructed chiefly of iron over its entire area of some fourteen acres. This upper floor is being constructed at an elevation of 18 ft. above the ground floor, and as the columns which carry it have to support a dead weight of ballast in addition to heavily-laden goods waggons, they have necessarily been made of exceptionally great strength. There are 400 of these iron columns, weighing 2,000 tons; 4,700 tons of main girders, and 8,300 tons of cross girders. The flange plates required in connexion with these girders are nearly forty miles in length, whilst the floor-plates weigh between 950 and 1,000 tons. Upwards of 16,000 tons of iron will, therefore, be used in the construction of this floor. A large block of warehouses is about to be built on the west or Ossulston-street side of the depot; it will be upwards of 400 ft. in length and four stories in height.

The estimated cost of these great works when completed is set down at the sum of 2,500,000l. Mr. J. Underwood, C.E., of the Midland Company, is the engineer, Mr. A. McDonald, C.E., being the superintending engineer. The execution of the works is in the hands of four contractors, Mr. Joseph Firbank, of Newport, Monmouthshire, being the general contractor, whilst the ironwork has been entrusted to three other firms, namely, Messrs. Eastwood, Swingle, & Co., of Derby; Messrs. Andrew Handyside & Co., of Derby; and Mr. John Butler, of Stanningley, near Leeds.

**Builders' Clerks' Benevolent Institution.**—A special general meeting of the donors and subscribers, convened by advertisement, was held at the offices, 21, New Bridge-street, E.C., on Tuesday last, the 25th inst., Mr. George Haward Trollope, President, in the chair, when the requisite permission was given to purchase another presentation to the Orphan Working School. This presentation, as in the case of the two already bought, will cost 250 guineas, and will entitle the Institution to present a child for a period of twenty-one years. At the close of the business, a vote of thanks was accorded to the chairman for his kindness in presiding on the occasion.

**Lying-In Wards, Wandsworth Workhouse.**—The Guardians of the Wandsworth and Clapham Union adopted, at their last meeting, plans prepared by their architect, Mr. T. W. Aldwinckle, for new lying-in wards, to be built at the new Workhouse, Garratt-lane, Wandsworth.

## Illustrations.

### COMPETITIVE DESIGN FOR WAR AND ADMIRALTY OFFICES.

THIS is a perspective view of the design submitted in the first competition by Mr. P. J. Marvin, the original drawing of which is now in the Royal Academy, as noted in another column, in our remarks on the architectural exhibits. The view, as will be seen, represents the building as it would have appeared from St. James's Park.

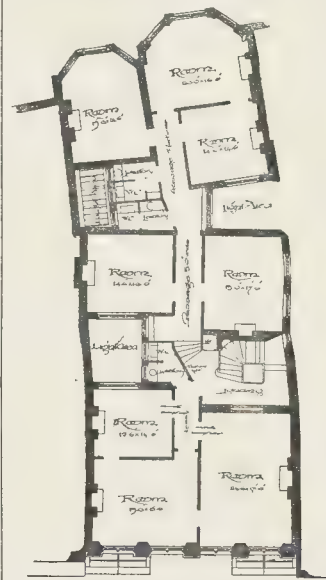
### SCULPTURE AT THE ROYAL ACADEMY.

We give three illustrations this week from this year's sculpture in the Royal Academy; one ideal work, Mr. Lawson's "Summer," and two portrait statues, that of Sir Erasmus Wilson, by Mr. Brock; and that of Mr. Carmichael, of Madras, by Mr. Adams Acton. We have already commented on all of them in our article on "Sculpture at the Royal Academy" (page 739 ante).

We may add that they are all reproduced from photographs forwarded to us by their respective authors for that purpose.

### LEGAL AND GENERAL LIFE ASSURANCE OFFICES.

We give a view of this very rich and effective façade, designed by Mr. R. W. Edis, about which we have already spoken in mentioning the original drawing in our notes on "Architecture at the Royal Academy" (see page 737 ante). The offices have been rebuilt on the site



LEGAL AND GENERAL LIFE ASSURANCE OFFICES.

of the old offices of the Society. The contractor was Mr. Boyce, and the materials of the exterior are red bricks, supplied by Mr. Edwards, of Raabon, and yellow terra-cotta dressings supplied by Messrs. Wilcock & Co., of Burmantofts.

### SKETCHES IN NORMANDY.

The external pulpit at St. Lo, shown in the first of these sketches, is at the north-east angle of the cathedral of Notre Dame there, and is of the fifteenth century.

The church of St. Gilles, Caen, the south-east porch of which is shown in the second sketch, is now used as a store-house. It stands on the heights of St. Gilles, at the top of the Rue des Chanoines, and close to the Abbey

aux Dames. The effect of the segmental arch, and the wall decoration and parapet above, abutting against the masses of plain wall on either side, is very good and very characteristic of the Mediaeval spirit in building. The abutting masses are as rocks between which a bridge of architectural detail is constructed.

The illustrations are reproduced from original sketches by Mr. Francis D. Bedford, which are very good examples of architectural sketching in pencil, a medium too much neglected by architectural draughtsmen at present.

### A SMALL STUDIO.

The studio of which interior and exterior views are given in this number was built for Mr. H. Gibbs, in an ordinary London garden, about 38 ft. wide. It comprises a painting-room, 28 ft. by 18 ft., with a large bay-window shut off by curtains, and a small dressing-room or lavatory, &c., with a porch at the side. The floor is polished, and the painting-room will be paneled in deal and painted. The walls are of stock bricks with red brick dressings. The architect was Mr. T. Edward Pryce.

### COMPETITIONS.

**Donald Drinking Fountain, Public Park, Dunfermline.**—On the 21st inst. the Town Council selected the design submitted by Mr. R. Cameron, of Edinburgh, awarding the 100l. premium accordingly. The style adopted is a phase of the French Renaissance. All the work is to be executed in polished red granite. The pedestal, which is raised on two large steps, is square in plan, having scrolled angle buttresses. On each side of the square is a circular niche with a carved corbel hollowed out to form a basin, the niches themselves terminating in a shelled hood. Beneath the large basins are recessed dog troughs. Over the niches are relieved pediments, which finish against a scrolled canopy. On the upper part of the canopy is a coursing of shields and other armorial bearings. The structure, which is about 14 ft. high, terminates in a carved cap, surmounted by the burghal coat of arms of Dunfermline. The approximate cost is 750l. There were fifty sets of designs submitted.

**New Schools, Horrabridge.**—In March last the Whitchurch United District School Board advertised for plans and specifications for new schools to be erected at Horrabridge, South Devon. In response sixteen architects submitted designs, and those prepared by Messrs. Henderson & Son, of Truro, have been selected for adoption by the Board. After the plans, &c., have been submitted to the Educational Department, tenders will be invited, and the works will be proceeded with forthwith.

**British Museum Lectures.**—The course of lectures recently given by Miss J. E. Harrison at the British Museum, on the "Monuments and Topography of Ancient Athens," will be repeated in the afternoon, to suit the convenience of those who are engaged during the morning hours. The course begins on Wednesday, the 9th of June, at 4.30 p.m. A course on "Vase Paintings" begins on Friday, the 11th of June, at 4.30. Letters in regard to admission can be addressed to the hon. sec., Miss Wilson, 45, Colville-gardens, W. The course is open to both men and women. We may also add that Mr. J. A. P. MacBride is now delivering a course of lectures at the Museum on Sculpture. His third lecture, on "Early Greek Sculpture," will be delivered on Tuesday afternoon next.

**Society of Arts Conversations.**—One of the two Fridays for which the right of excluding the public has been reserved by the Royal Commission for the Colonial and Indian Exhibition has been allotted to the Society of Arts for their annual conversations, which will be given at the Exhibition on Friday, the 16th of July. Arrangements have been made for the purchase, by members of the Society only, of tickets to the five, on the same system as that which proved so successful last year. Members, who will receive the usual invitation for themselves and a lady, will thus also be enabled to obtain tickets for other members of the family. The price of the ticket has been calculated as just to cover the actual cost of the entertainment, and to leave sufficient margin to repay the Royal Commission for the loss resulting from closing the Exhibition for the evening.





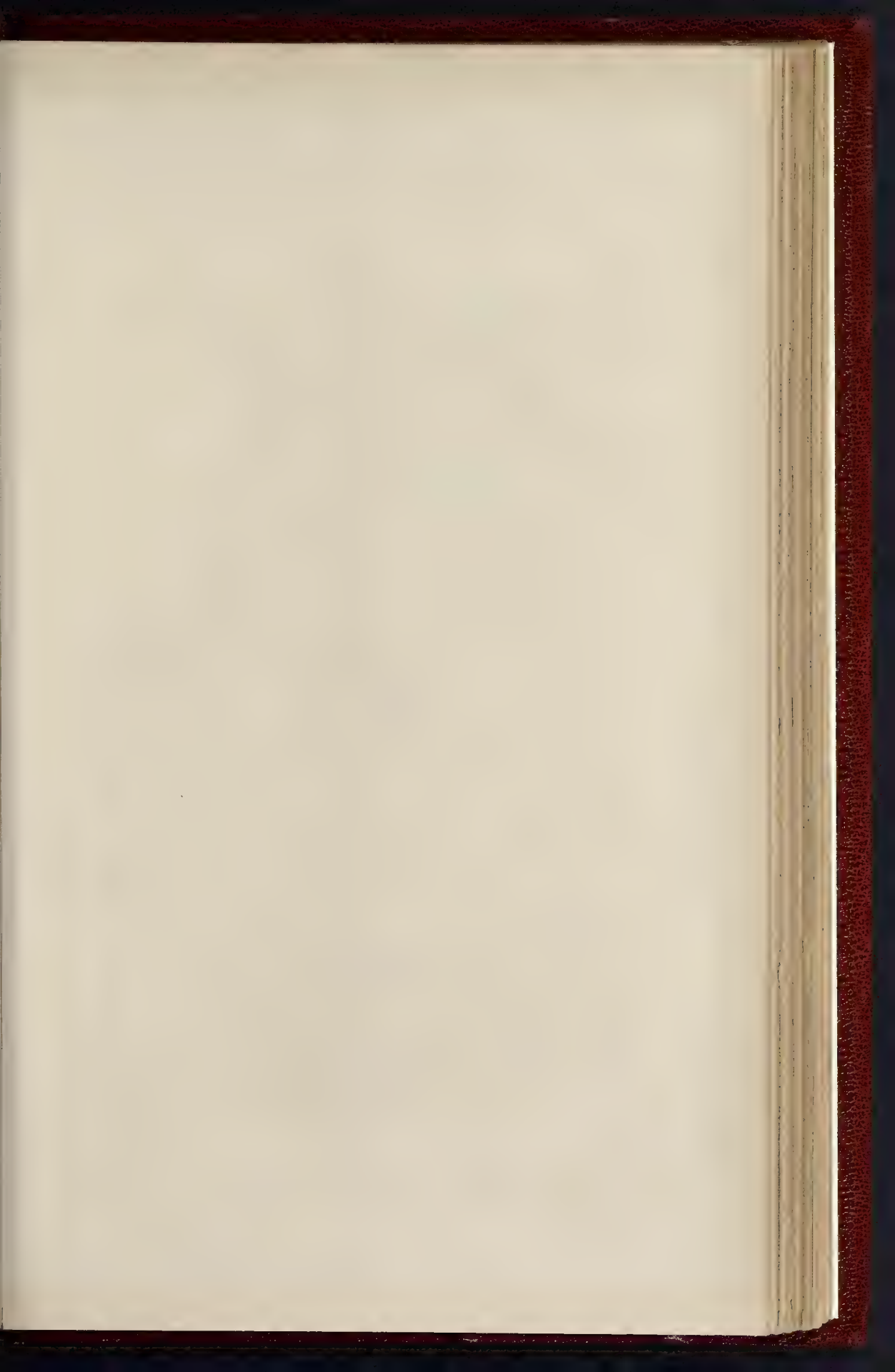


Wyman & Sons Photo Litho

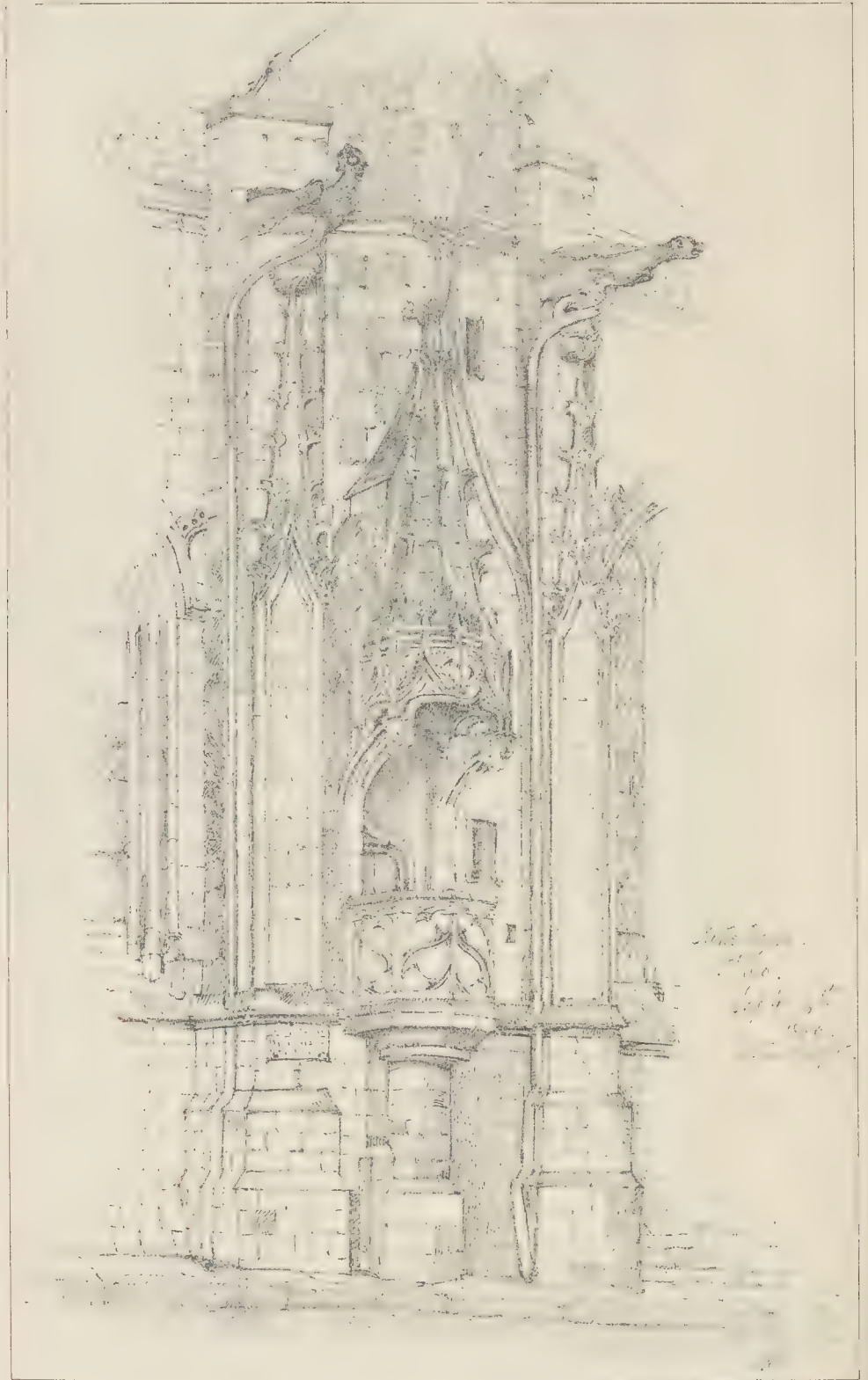
Between W & Dutton WC

LEGAL AND GENERAL LIFE ASSURANCE SOCIETY'S OFFICES, FLEET STREET.

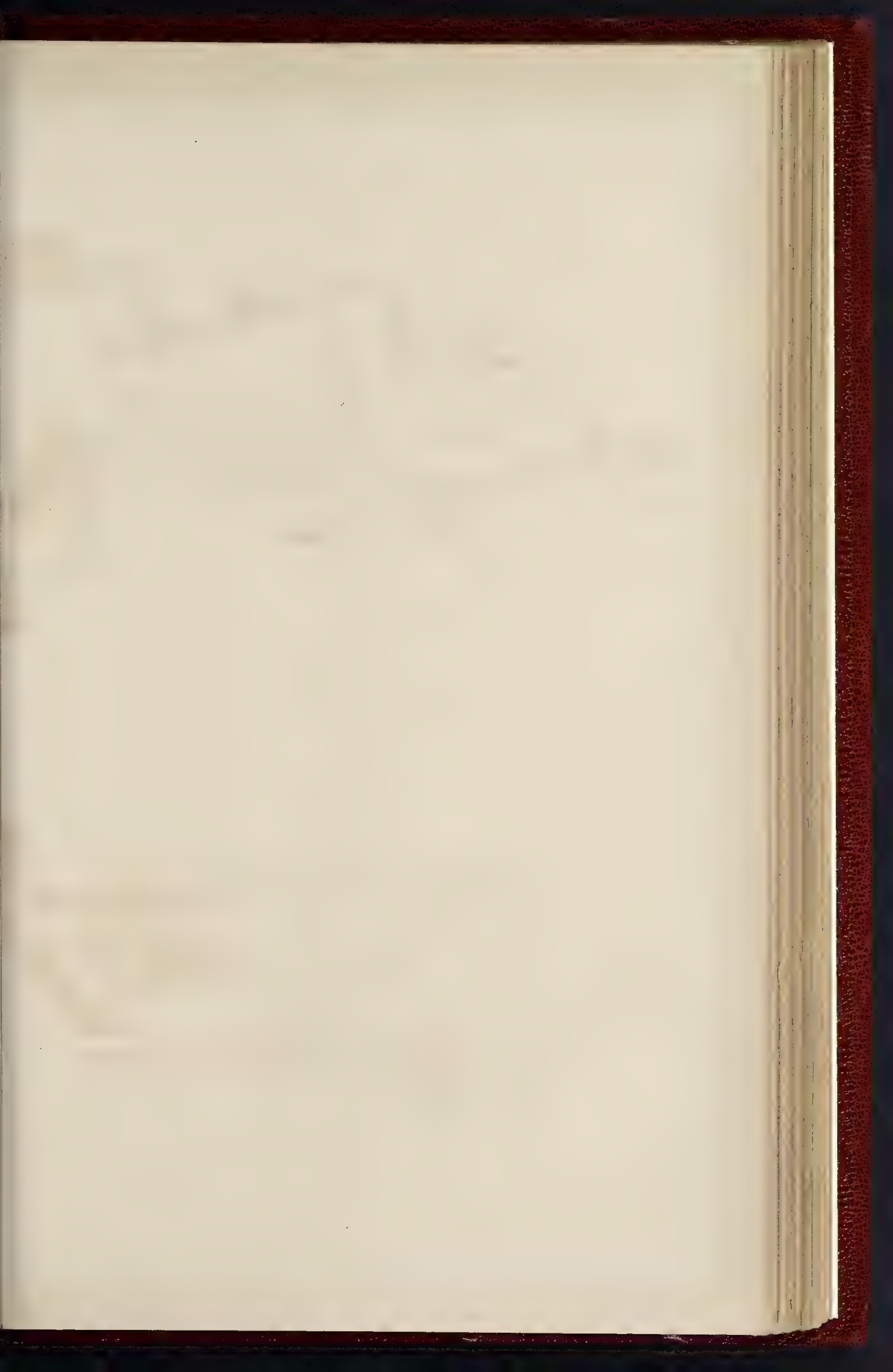
MR. ROBERT W. EDIS, F.S.A., F.R.I.B.A., ARCHITECT.



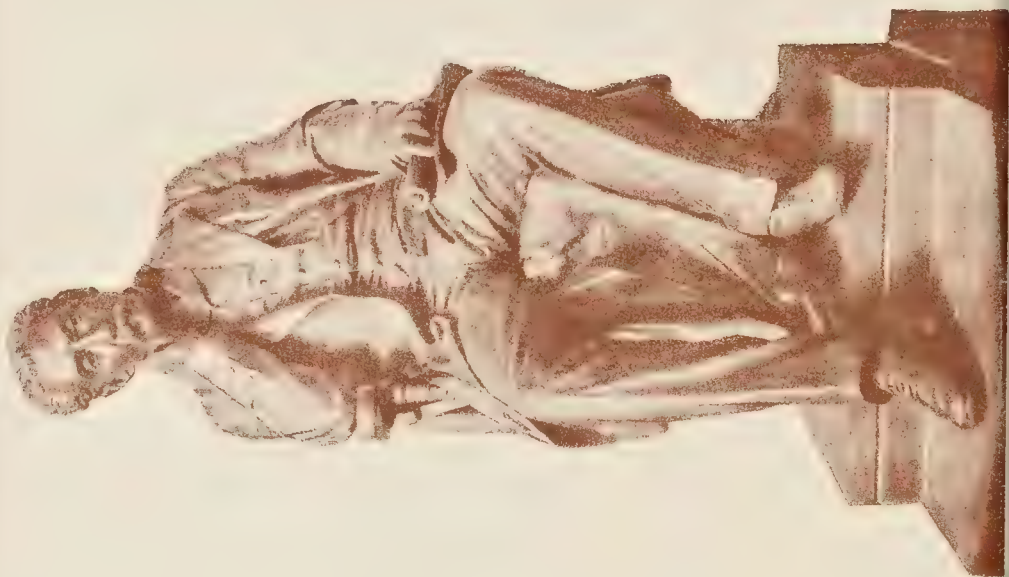




EXTERNAL PULPIT, NOTRE DAME, ST. LO.—SKETCH BY MR. F. D. BEDFORD.

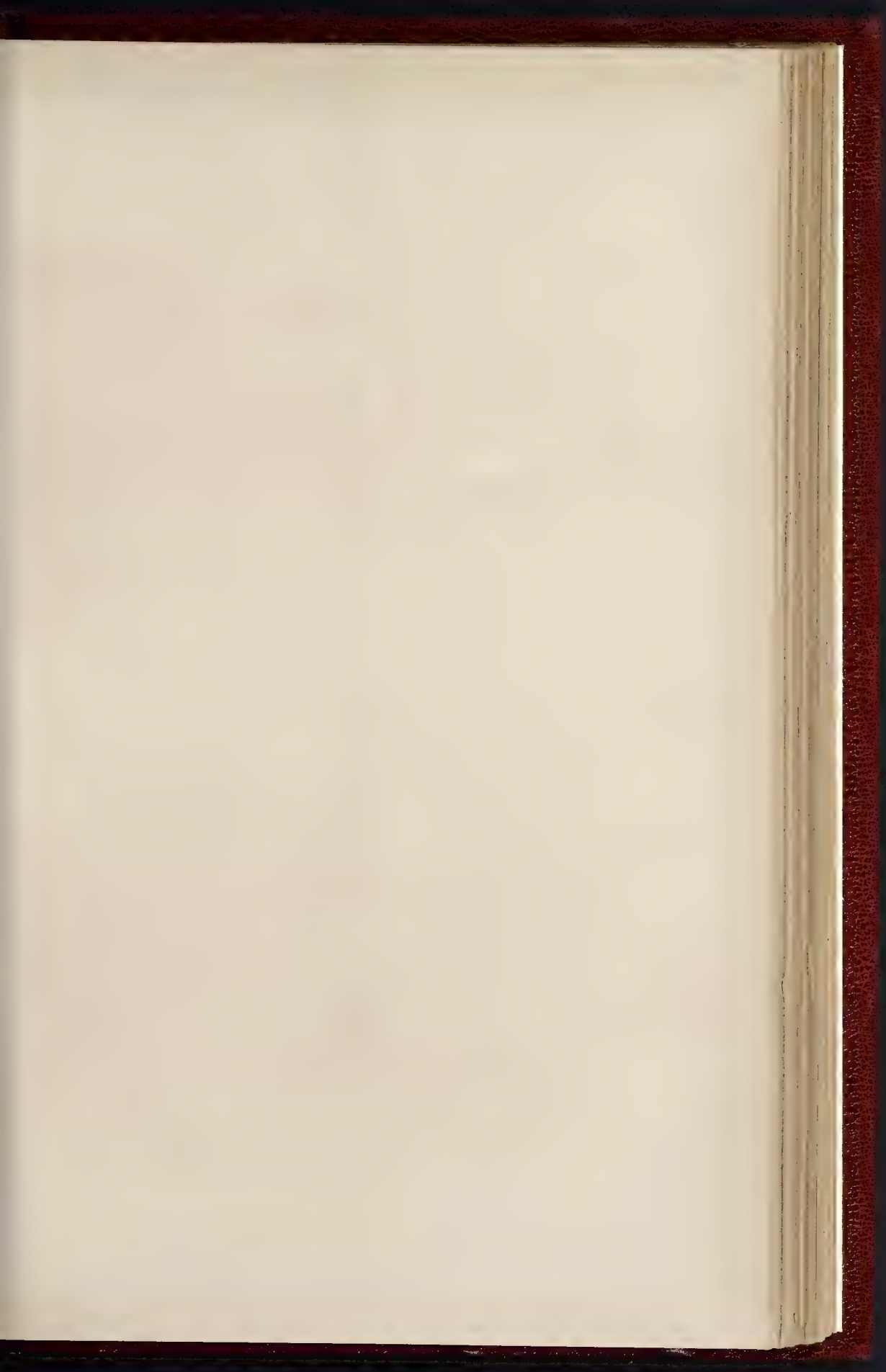






THE BUILDER, MAY 29, 1886.









COMPETITIVE DESIGN FOR THE NEW ADMIRAL



WAR OFFICES.—By MR P. J. MARVIN, ARCHITECT.





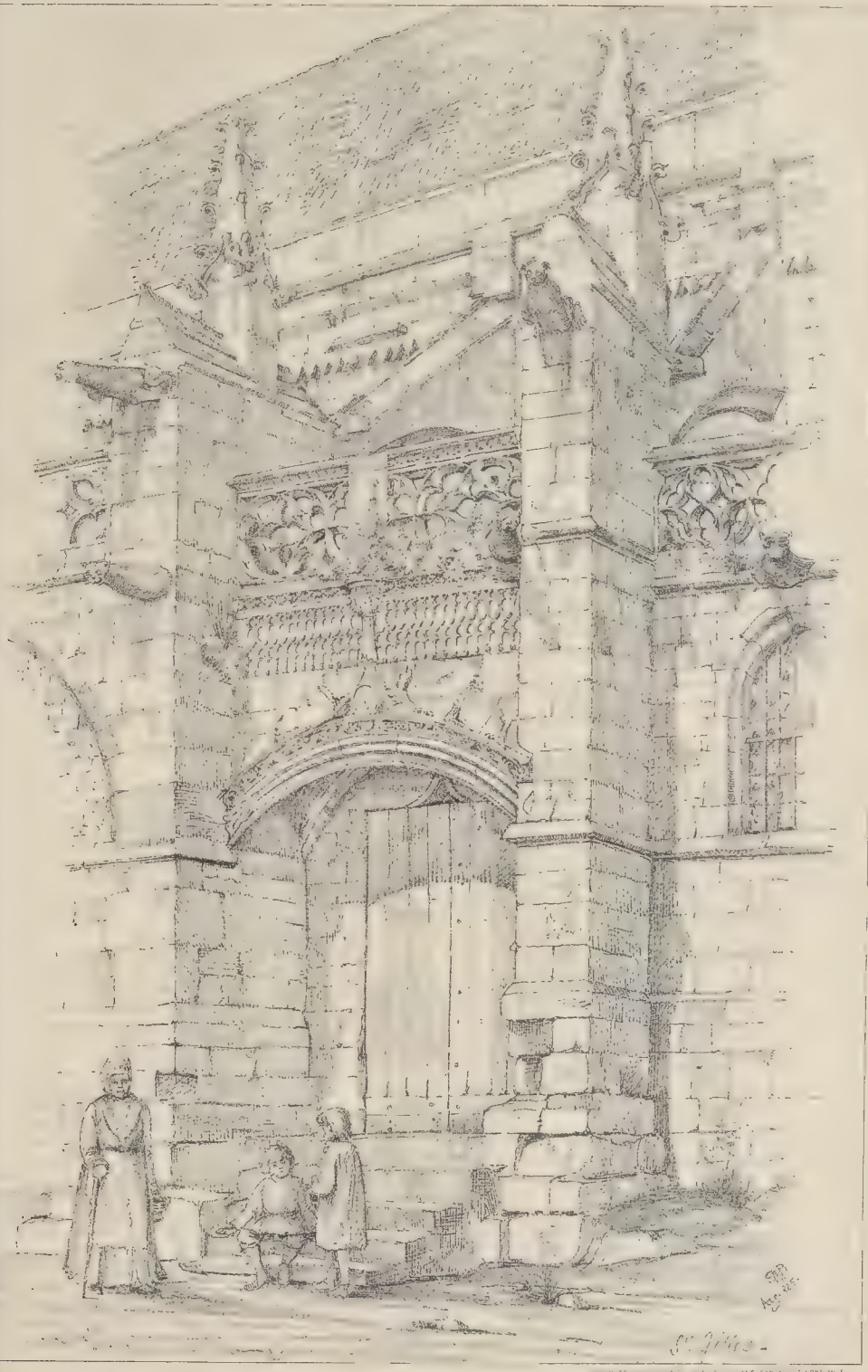


SCULPTURE AT THE ROYAL ACADEMY.

"SUMMER." MR. G. A. LAWSON, Sculptor.



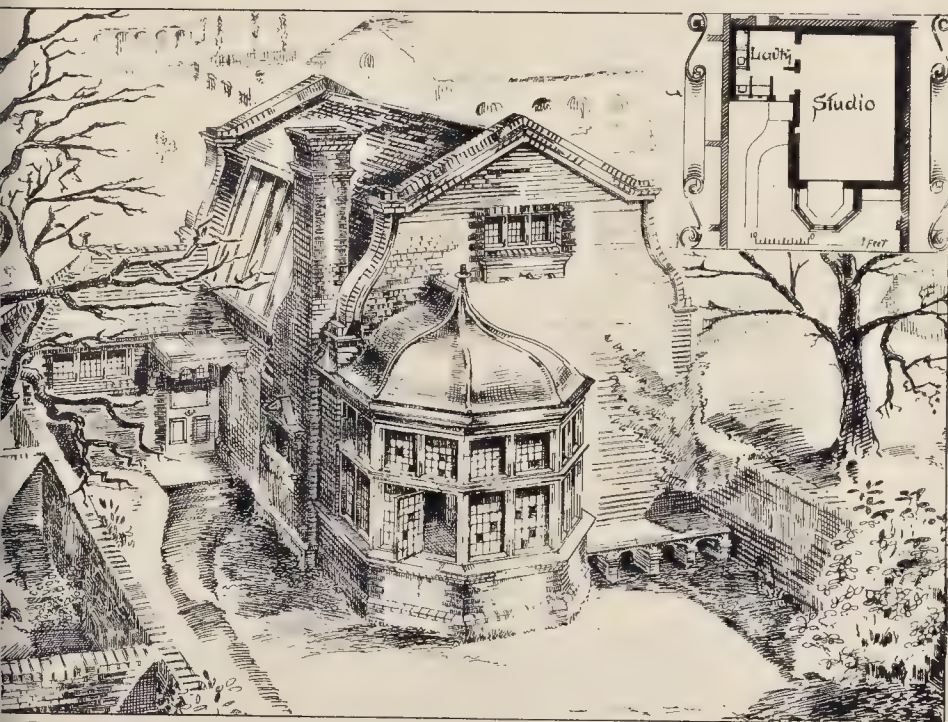




S.E. PORCH, ST. GILLES, CAEN.—SKETCH BY MR. F. D. BEDFORD.







ions Photo Litho

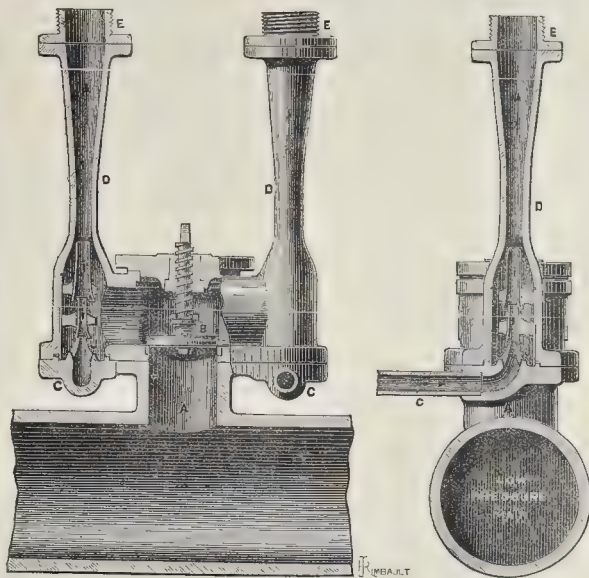
Queen of London WC

A SMALL STUDIO: EXTERIOR AND INTERIOR VIEWS.

MR. T. E. PRYCE, A.R.I.B.A., ARCHITECT.







The Injector-Hydrant.

# THE "INJECTOR-HYDRANT" FOR FIRE EXTINCTION.

In the *Builder* for November 1st, 1884, we gave a detailed account of the work of the London Hydraulic Power Company. Since that time, the Company's system of hydraulic mains, primarily for the supply of power for working lifts, presses, &c., has been greatly extended, and as the mains now traverse some of the most important parts of the City, Westminster, and Southwark, it is proposed to use them for another purpose, viz., that of energising and reinforcing the fire-hydrants fixed on the ordinary water companies' mains, in the manner which will be readily understood by the following particulars and illustration:—

Briefly described, the injector-hydrant, which has been introduced by Sir W. Armstrong & Co., on the suggestion, we believe, of Mr. J. I. Greathead, M. Inst. C.E., consists essentially of the ordinary hydrant D, rising from the water company's main at A, and having its nose-attachment at E, but slightly varied in vertical section so as to permit of the introduction of a pipe of small bore, C, leading from a high-pressure hydraulic main. The termination of this small high-pressure pipe, which is in the form of trumpet-shaped guide-tubes, I, rises upwards for a short distance in the centre of the hydrant, leaving plenty of space all round it for the passage of the water from the water company's main. As a matter of fact, the water from the company's main can be sent through the hydrant without the high-pressure hydraulic pipe being called into requisition, but in that case it will only rise to a height proportionate to the pressure in the water company's main. But when the valve of the small high-pressure pipe is opened, a jet of water at a pressure nine or ten times greater than that issuing from the water company's main is sent upwards in the midst of the low-pressure supply, which it carries or drags with it so as to enable the stream issuing from the nozzle at the end of the hose to reach to a much greater height. The injector-hydrant, in fact, to quote Mr. Greathead's own words, depends for its action upon the "lateral inductive action of fluids," a principle long well known and utilised in various ways, as in Giffard's injector and the last-pipe, for instance. (We may here mention that a full account of Mr. Greathead's proposals for fire extinction with the aid of this hydrant appeared in our contemporary *Iron* some time ago.)

To show the efficacy of the combined jet, some interesting demonstrations were given a few days ago, on a piece of unoccupied

land adjoining the Westminster Town-hall. The water main to which the hydrant was attached formed part of the Chelsea Company's system, and registered a pressure of about 80 lb. to the square inch. This alone was found to throw an inch jet of water, at an angle of about 45 deg., as high as the eaves of the Townhall; but directly the valve of the small branch pipe from the high-pressure hydraulic main was opened the jet of water was carried twice the height, thereby demonstrating the value of the injector-hydrant where high-pressure hydraulic power is available. It was stated that these hydrants have been used with much success in Hull.

It is thus evident that, by a slight modification, the effectiveness of street-hydrants for fire-extinction may be considerably augmented where there happens to be a high-pressure hydraulic main alongside, or in the immediate vicinity of, the water company's main. The matter is one of great importance, for an effective system of hydrants, combined with a constant supply of water, would go far to render a large retinue of fire engines a matter of secondary importance.

## CASES UNDER THE METROPOLITAN BUILDING ACTS. NON-DEPOSIT OF PLANS.

At the Guildhall Police Court on Tuesday, before Alderman Sir T. S. O'Brien, Mr. John Mowlem, of the firm of Mowlem & Co., was summoned by Mr. Hugh MacLachlan, District Surveyor for the Western Division of the City, for not having deposited plans of a certain building in course of erection near the Thames Embankment for the City School of Music.

Mr. Blackwell, who was counsel for the complainant, stated that the summons had been taken out under the Metropolitan Management Act, 1878, section 16, for a breach of the by-laws, in failing to send to the Surveyor the plans of the building mentioned.

Mr. Douglas, the Chief Clerk, pointed out that section 20 of the same Act put the complainant out of Court. This twentieth section ran thus:—"Provided always that the provision of part 2 of this Act shall not extend, or apply, to the City of London."

Mr. Blackwell remarked that his contention was that the exception referred only to dangerous structures.

Mr. Douglas said it referred to the whole of part 2, and section 16 was part of that section.

The Alderman.—It is evident that I have no jurisdiction.

Mr. H. H. Crawford, the City Solicitor, who appeared for the defence, said that Messrs. Mowlem were nominally defendants; but, as a matter of fact,

they were merely contractors under the Corporation. Had the case gone on he was prepared to take technical objections,—one of which was that the complainant was not entitled to take proceedings by reason of six months having elapsed since the plans had been acted upon. This was the second time the City authorities had been called upon to defend themselves against charges made by the District Surveyor, who appeared to be new in his office.

The Alderman dismissed the summons, and awarded one guinea costs.—*Times*.

## "WINDOWS."

SIR,—In the admirable paper on this subject, which appeared in the *Builder* of last week (p. 733), the author, while speaking in complimentary terms of Christ Church, Streatham-hill, cites it as an instance of the abuse of stained glass in the windows, which has so darkened the church that gas has sometimes to be used in the day-time.

This church was built in 1840; at that time 4l. per sitting was considered a handsome allowance for cost. To obtain with such slender means some dignity of style, I made the design as simple and massive as I could: there is hardly a moulding about the building. The windows, which are small and numerous, were amply sufficient to light the church, and were not intended to be filled with stained glass; and, trusting that means would be found in time to decorate the interior with mural paintings, I had the shafts of the columns painted dark red, as a sort of protest of my intention, and so left it.

During my long absence in Egypt, the apse was decorated by Owen Jones in a style different from the church; but it has many admirers. I also found on my return that some of the windows had been filled with stained glass, and since then others have been added, till now nearly all the windows are filled with figure subjects in rich full-toned glass. The different donors selected their own artists and designs. Many of them are very good. Had I been consulted, I should have advised the use of lighter tints, which would not have obscured the light so much. The excellent effect of such glass may be seen in a small cloister on the south side of Notre Dame, Paris, the windows designed by Viollet-le-Duc.

My intention that the church should be decorated with mural painting was generously seconded by my friend, Mr. E. Armitage (since made R.A.), who offered to make the designs and execute the work, free of expense, the scaffolding and materials being provided for him. But this project was but coldly received, and, indeed, by some, it was strongly objected to, as being "Puseyite," &c. Figures on glass are harmless, but on walls it was feared they might do mischief.

In conclusion, I beg to say that the loss of light in the church caused by the painted windows must have been foreseen, as the work was done at different stages during a long time. It has been endured with complacency for the last twenty years, and, indeed, the rich and solemn effect has been much admired. But last year the present churchwardens, in their zeal for more light, have perpetrated the most flagrant act of vandalism by punching various holes in the clearstory roof to admit the light. I protested as strongly as I could against this, but in vain, as I could not controvert their strong position, that it was the cheapest way of doing the business.

J. W. WILK.  
Soane Museum, May 26, 1886.

## THE LATE MR. SANCTON WOOD.

SIR,—Will you permit me to supplement Mr. Robins's interesting account of Mr. Sancton Wood? [See p. 761, ante.]

We were contemporaries in the office of Mr. Sidney Smirke, where he made the sketches of the design for rebuilding the Houses of Parliament which Sir Robert Smirke had prepared by order of Sir Robert Peel's Government; but the House of Commons interfered and decided for an open competition, which stopped our work midway.

His design for the Eastern Counties Terminus was a very different thing from what was executed. John Brithwaite to some extent anticipated the development of traffic and proposed a double station, one for the Cambridge line, and another to Colchester, making a



much more imposing work, but financial difficulties supervened.

Subsequently the first premium of 100l. was awarded to Wood for the station at Ipswich, and he designed several of the stations on the Eastern Union Railway for Mr. Bruff, the Engineer.

FREDERICK BARNES.

Ipswich, May 24.

#### CEMENT.

SIR,—Mr. Bancroft's letter in your issue of the 22nd inst., on tall chimney construction, gives a specification for cement which I think calls for a few remarks, inasmuch as though it was, no doubt, carefully considered when originally drafted, it hardly complies with the present requirements of a cement test.

Taking the items *seriatim* :—

1. Fineness.—Ten per cent. residue on a No. 50 sieve is, I consider, all that can be demanded of the manufacturer at ordinary market prices, being the limit to which he can economically grind the cement. If a greater degree of fineness is required, an extra price should be paid for it, and it then becomes a question as to whether the cost of the extra grinding is more economical than using a larger proportion of cement.

2. The tensile strength demanded at seven days is a little high, 350 lb. on the square inch, or 790 lb. on the 24 section, being generally considered enough. I may perhaps be permitted to say that the value of a cement cannot be determined by its tensile strength at only a single date, but that a three days' test should also be carried out, and the increase in strength between these two dates will more exactly determine the ultimate strength which may be expected from it, and this, if time permits, can be confirmed by a twenty-eight days' or even longer test.

3. The Vicat needle in no way determines as to when a cement is set; it is only an elaboration on the rough-and-ready practice of determining the set by the resistance of cement to the pressure of the thumb-nail. The best guide to determine when a cement is set is when a pat gauged with the minimum of water may be placed in water without cracking or alteration of form, but even this is not true in all cases, as some of the quick-setting cements may be put in water directly they are gauged without being in any way detrimentally affected. It is only experience in the use of cement and the testing of it that will enable a correct determination of the time which a cement takes to set being arrived at.

4. The amount of water required for gauging cement cannot be arbitrarily fixed at 9 oz. to 40 oz. of cement; nearly every sample of cement requires a different proportion of water in order that the best results may be obtained from it, some cements requiring as little as 15 per cent. of water, while others will take over 20 per cent. Before the briquettes for testing are gauged the exact amount of water required for the sample should be ascertained by making one or two small experimental pats.

HENRY FAJA, M. Inst. C.E.

#### THE CHURCH OF ST. BARTHOLOMEW-THE-GREAT.

SIR,—I had much pleasure in reading in the *Builder* of May 8th your interesting article on the glorious old church of St. Bartholomew-the-Great, Smithfield; allow me to add a few notes respecting its past history.

"In 1247 a strange scene took place in the choir. Archbishop Boniface, uncle to Eleanor the wife of Henry III., irritated at the want of deference on the part of the subprior, rubbed upon him, slapped him in the face, tore his cope to fragments, trampled it under foot, and finally, being himself in full armour under his vestments, pressed him against a pillar so violently as almost to kill him. A general scrimmage ensued between the monks and the attendants of the archbishop, and as the inhabitants of Smithfield poured in to the assistance of the former, Boniface was forced to fly to Lambeth, followed by shouts that he was a ruffian and cruel, that he was unlearned and a stranger, and, moreover, that he had a wife!"—*Hare's "Walks in London."*

The destruction of the nave about the middle of the sixteenth century is alluded to, but it is not mentioned *how*. The Protector Somerset having conceived the design of erecting a sumptuous mansion in the Strand, caused the demolition of the magnificent cloisters of St. Paul's, the nave of St. Bartholomew's Priory Church in Smithfield (which had just been completed), five churches, and three bishops' palaces for materials. Somerset House was begun in 1549, John of Padua being the

builder, and was unfinished at the death of Somerset in 1552.

The Parish Register records the baptism of William Hogarth, Nov. 28th, 1697.

Besides the fine canopied tomb of Roberus there is in the south aisle a spacious monument to Sir Walter Mildmay, founder of Emmanuel College, Cambridge. He was Under-Chancellor of the Exchequer in the reign of Elizabeth, and died in 1589.

There is a bust near Mildmay's monument of James Rivers (died 1641), which is probably the work of Hubert le Scur. OLD CLIFTONIAN.

#### MR. R. B. PRESTON ON ST. ANDREWS.

SIR,—My attention has been directed to the *Builder* of the 17th of April, containing a report of "part of a paper recently read before the Liverpool Architectural Society, by Mr. R. B. Preston." As that production is exceedingly inaccurate and misleading, I trust you will allow me to comment on it briefly.

One would have expected that in a paper read before such a society, care would have been taken, at least with the measurements, yet hardly one of those given by Mr. Preston is correct. In speaking of the cathedral, he says,—"The total length inside the walls is 370 ft.; width across transepts, 180 ft.; across nave and aisles, 65 ft." These figures should respectively have been 355 ft., 166 ft., and 61 ft. 6 in. The castle, he says, is at the top of a cliff 80 ft. high; the well in the courtyard is 50 ft. deep, and contains 14 ft. of water. In point of fact, the cliff is about 40 ft. high; the well is barely 38 ft. in depth from the top of the parapet, and it only contains 2 ft. of water! Mr. Preston is surprised that the water is not salt, considering that the well is within a few yards of the sea. But he need not wonder at that, as the bottom is above the level of the sea, though not nearly so much as his measurements imply. Recently, this well was perfectly empty, and various theories were propounded to account for it; but now it may be readily inferred that this traveller's surprise at finding "good fresh water" here was so great that he drank it dry! Some of the towers of the wall enclosing the Priory, he says, "were square, others round or octagonal." Nearly all this wall has been preserved, but the only trace of an octagonal tower which is to be found is in its sketch. Of the cathedral, he says,—"The upper triplet in the east gable was replaced by a large three-light window," whereas the large window was made to serve for two triplets or six smaller windows. He speaks of the east end of St. Leonard's Chapel as the nave; he mistakes the sea-tower at the north-west corner of the castle for the keep, which was at the south-west corner; and he confounds the chapel of the Black Friars Monastery with the chapter-house of the Grey Friars! These are only specimens of the extraordinary mistakes which disfigure his paper, and when such errors are made on points which any one can verify or disprove for himself, the reader may expect to find blunders still worse and more numerous, in what purports to be the *historical sketch*.

His greatest ignorance is revealed when he refers to the results of, what he is pleased to term, "the fury of the fanatics under John Knox," and to "the ruthless hands of John Knox and his herd of fanatics." He is reckless enough to aver that, "In St. Andrews alone, besides the cathedral and [Augustinian] monastery before mentioned, they demolished two churches, the monasteries of the Black and Grey Friars, and three colleges!" This is simply astounding, and is quite enough to take away the breath of any one who has ever been in St. Andrews. The Reformation here was carried out by the magistrates of the City, and such conduct on their part would have been much worse than insane! But the charge is thoroughly false. There is no evidence whatever to show that the cathedral was demolished at the Reformation; while, on the other hand, the proofs are plain and abundant that it fell in more recent times through its own inherent weaknesses and the want of repairs. The churches were certainly stripped of everything that savoured, or seemed to savour, of idolatry at the Reformation; but, with the exception of the Black and Grey Friars' monasteries, the buildings were otherwise uninjured. Mr. Preston fearlessly goes into details regarding the colleges. Of St. Leonard's he says,—"The college buildings have vanished entirely!" Why, sir, they are almost entire at the present moment. St. Mary's College, he says, "has been almost entirely rebuilt." But any one who cares to look inside the old quadrangle will at once see that the statement is more baseless than a dream. The other college, St. Salvator's, was pulled down, but not until Knox had been two centuries and a half in his grave.

I could easily point out a great many more blunders in Mr. Preston's paper, but that would occupy too much of your space, and, with his exception, said to show how utterly untrustworthy his communication is. In the words of Carlyle, "Knox wanted no pulling down of stone edifices; he wanted leprosy and darkness to be thrown out of the lives of men."

D. HAY FLEMING.

St. Andrews, May 26, 1886.

#### SCOTCH NEWS.

**Aberdeen.**—With the increase of the city the authorities of Aberdeen have found the existing Corporation stables, in West North street, which are, with the exception of a small addition built six years ago, very old, and of defective construction,—becoming daily more inconveniently situated, and altogether too small to enable them to cope with the city manure traffic and other carting requirements of the street cleansing and other public departments. This defect is now to be remedied, the Town Council having lately accepted estimates amounting to 5,235l. for the erection of new police stables, according to designs prepared by Messrs. W. & J. Smith architects. The new buildings will occupy a rectangular site, about an acre in extent, on the Harbour Reclaimed Ground, recently acquired by way of feu, the annual fee-duty being at the rate of 6d. per square yard. The site lies on the north side of Poyrnock-road, along which it extends 300 ft. The stabling occupies the eastmost half of the site, and will give accommodation for a stud of about fifty horses. It is grouped round a central building, which contains on the ground-floor, carpenter's and painter's shops, smithy, boiler and engine house, four large stores, mash-room, and prepared food stores, having a large hay-loft and corn store above. There are seven stables, three of them seven stalls each and the others three, four, six, and thirteen stalls respectively. The front of the buildings to Poyrnock-road is to be of regularly-coursed and square-snecked ashlar work of hammer-blocked granite, and the other buildings will be of half-ware rubble havelled in courses as to point in straight lines. The width of each stable is 19 ft., and the height 12 ft., and all will be well lighted by large windows. There being no loft over the stables a large straw store is provided in connexion with each. There will be two good loose boxes, and an infirmary containing one stall and a loose box. Fresh air will be admitted to the stables through the head-posts of the traverses, which communicate by a horizontal duct placed under the mangers, with inlets in the external walls. The vitiated air will be carried off through openings in the ceilings connected with Buchan's current ventilator fitted up on ridge of roofs. Water and gas are to be laid on to each stable, and drinking-troughs provided in the stable-yards. These yards will be causewayed with 4 in. by 6 in. granite setts, with the exception of a gravelled space in the centre of the largest stable-yard, on which lame horses may be exercised. The western half of the ground will be occupied by cart-sheds, the roofs of which are to be covered with galvanised corrugated iron, and supported on cast-iron pillars. A hall for congregational business, &c., meetings in connexion with Oldmachar Cathedral is to be erected in Dunbar-street, Old Aberdeen, at a cost of 950l. The north (gable) elevation towards Dunbar-street is in the Early Gothic style. The hall measures 37 ft. by 62 ft., and will be seated for 400 persons. There will also be two committee-rooms behind the hall. The architects are Messrs. Ellis & Wilson, Aberdeen.—The trustees of Holburn Parish Church have ordered from Messrs. Harrison & Harrison, Durham, an organ for the church. The instrument will cost 420l., and will, it is expected, be ready for use in the beginning of August next.

**Paisley.**—New buildings for the use of the Paisley Liberal Club are approaching completion. The buildings occupy a double site on the east side of Churchill, forming No. 90, High street. The ground-floor is occupied as shops. The upper floors will be occupied entirely by the club. The principal entrance of the club is from High-street, to which it has an imposing frontage three stories in height. The buildings have been erected from the designs of Mr. James Donald, architect, Paisley, and will cost 11,000l., including price of site, which is 3,300l.

**The Superintending Architect, Metropolitan Board of Works.**—At the meeting of the Metropolitan Board of Works to be held this Friday, the 28th, the Works and General Purposes Committee will submit a report recommending that a retiring allowance of 1,020l. 10s. 8d. per annum be granted to Mr. William Superintending Architect, from the date at which his resignation takes effect, namely, the 29th of September next.



## CHURCH-BUILDING NEWS.

**Beebles.**—The fine old parish church of Beebles, Suffolk, has just received an embellishment at its east end, which it much needed, in the shape of a handsome reredos. Owing to the height up to the sill of the east window from the floor-line being unusually great, i.e., 10 ft. 6 in., the height of the reredos has not been cramped. The central portion is loftier and more decoratively treated, containing a floriated Latin cross on Calvary steps, above which are seven ornamental panels, with various emblematic carvings suitable to the position. The wings of the reredos have richly-cusped panels. All the cornices contained carving, that in the centre being crosted. As the interior of the church has little variety of colour, it would have been out of place to have introduced diversified tints in the reredos, and it has only been attempted to give a little warmth of colour by using Corsehill stone, except to the lower parts of the wings, which are of Forest of Dean stone for contrast. The architect is Mr. B. Edmund Ferrey, F.S.A.; and the work has been executed and fixed by Messrs. White & Sons, of Vauxhall Bridge-road. In style the design is in harmony with that of the church, which is principally fifteenth-century work.

**Hebburn-upon-Tyne.**—The extensive works connected with the new church of St. John the Evangelist have just been commenced from designs prepared by Mr. Fred. R. Wilson, of Enwick, Diocesan Surveyor for the Archdeaconry of Lindisfarne. Mr. M. Temple Wilson is the resident architect, and Mr. John Munroe, of Hebburn, is the contractor.

**Ipswich.**—On the 6th inst. the memorial stone to commemorate the commencement of the restoration of the tower of St. Nicholas' Church, Ipswich, was laid by Lord Elcho, M.P. For some time past the condition of the structure has given rise to serious apprehensions. A committee having been empowered by the parishioners to undertake the restoration, Mr. E. F. Bishopp, architect and diocesan surveyor, was consulted. A careful external examination of the tower was made, and it was at first believed that it merely required refacing. As soon, however, as the work was commenced, it was found absolutely necessary to pull down the walls from the parapet to the level of the belfry floor, and the contract, which was let to Mr. Geo. Nevard, of Nayland, had to be increased from 450l. to 528l. Designs for the restoration were prepared by Mr. Bishopp, and the work is being carried out under his personal superintendence. The bases as the angle pinnacles, which fortunately remained, by the band of flint panelling below, gave the key to the design for the new parapet. This is really the only new piece of design in the tower, and may be described as being of ashlar and narrow flint panels divided by cusped-headed mullions, and attaining a height of 6 ft. The coping is double sunk, stepped, and battlemented. Niches, with groined and crocketed canopies, are placed centrally in each face, the figures rising from a pedestal with cherubim below. The saints represented are St. Nicholas and St. Michael on the west and east, with St. Peter and St. Paul on the north and south, each group with its characteristic emblem. The pinnacles are crocketed and terminated with copper flags, carried by delicate wrought-iron work. The water escapes through a gargoyle in the east side. The old flag-staff and vane are to be refixed, and the roof is to be entirely renewed in substantial oak timbers covered with lead boarding and lead. The works also include an entirely new face to the tower in knapped iron, tied to the body of the walls by long piers, and replacing the former decayed and fluted facings. The masonry, with the exception of the arch to the west door, is to be entirely new, the stone specified being Aubigny and weather-bed Ancaster. The west window is to be reglazed in antique glass, with new slate turrets to the belfry windows.

**Llanddewi Brefi (Cardiganshire).**—The dilapidated chancel of this church has been restored and reopened by the Bishop of St. David's, new windows, roof, and floor being added; the expenditure was 500l. The works and a continuation of the restoration commenced in 1873, when the tower and nave were completed. The canopies are still demolished and will be the next work to be undertaken. Messrs. J. & D. Evans have carried out the whole work; Mr. Griffiths being the architect.

**Tottington (Norfolk).**—Tottington Church was

re-opened on the 4th inst., after restoration. Although of small proportion in comparison with many Norfolk churches, it is one of the most beautiful in its varied detail. Scarcely two windows are of the same design, and the carving on the bench-ends and poppy-heads are all of different tracery, while few screens can be said to equal that dividing the nave from the chancel, which contains some of the most unusual crocketing and carving of natural foliage in the spandrels. The necessity of preserving so much artistic work of the Mediaeval age induced Lord Walsingham to have the work of restoration taken in hand at once, and in May of last year the roof of the nave, which was in a roof of pitch-pine erected upon the lines of the thirteenth-century roof, and covered with corrugated glazed tiles, made upon the Merton estate. The clearestory walls were rebuilt from the nave arcade, and on each side three-light windows, filled with cathedral glass, were inserted. The south porch has been partially restored, and the north and south walls are new. In the taking down of the clearestory windows a richly-carved shield was found in a state of good preservation. The carvings are a series of fleure-de-lis upon the field, and all round the sides and top, and represent the armorial bearings of a member of the Mortimer family. This shield has been attached to the south aisle wall by wrought-iron brackets. Much still remains to be done to the roof of the south aisle, the porch, and the tower, but want of funds delays further restoration. The works have been executed by Messrs. Cornish & Gaymer, of North Walsham, from plans prepared by, and under the superintendence of, Mr. E. Preston Willins, architect and diocesan surveyor, Norwich.

**Warwick.**—The external restorations to St. Mary's Church, Warwick, have now been completed, and a new reredos has been erected. The central portion consists of an arcade in three divisions, filled with sculptured subjects in white alabaster, the Nativity being the central group, with the Adoration of the Shepherds and Kings on either side. The framework is of coloured alabaster, enclosed by buttresses and cornice of Derbyshire bird's-eye marble; beyond this, on each side, in continuation of the reredos, is a triple arcading, also of polished alabaster and marble. The work has been executed by Messrs. Thos. Earp, Son, & Hobbs, of London and Manchester, from the design of Mr. W. Butterfield, architect, London.

**Wembury.**—The restoration of Wembury Church, at the cost of Mr. Cory, of Langdon Court, is progressing so favourably that Tuesday, June 8th, has already been fixed as the re-opening day. Wembury Church is a storm-beaten fifteenth-century edifice standing upon a frowning rock at the mouth of the River Yealm, only a few yards from the seashore. The long-needed work of renovation has taken place from the designs and under the superintendence of Messrs. Hino & Odgers, of Plymouth, and has been carried out, in the main, by Mr. Cory's own permanent staff of workmen, under the foremanship of Mr. W. J. Shortwell. The new massive oak roofs are richly carved on wall plates and on ribs and purlins, whilst all the intersections are stopped by carved bosses. This work is by Mr. Harry Hems, of Exeter. Mr. Hems is also making three carved oak screens. These screens will form a chapel in the south chancel aisle in which will stand the organ. All the oak seating in the body of the church is elaborately carved by Mr. Hems, who is also making the sculptured reredos. The font will be in red Corsehill stone. The pulpit will be octagonal and in oak, upon a granite and polished marble base. Both font and pulpit are Mr. Hems's work.

**Canada.**—A large block of buildings has just been erected for the Salvation Army in Toronto, Canada, at a cost of 8,000l. It comprises a large hall, and offices, shops, &c., to be used as headquarters. There is also a large basement extending over the entire area, which is to be used for printing and publishing purposes. The roof over the hall has a span of 96 ft., and is supported on walls 4 ft. thick. This is the widest span without intermediate columns of any roof to any public building in Canada. The work has been carried out under the direction of Mr. Herbert Paul, architect, of Toronto, from plans prepared by Mr. E. J. Sherwood, architect, of London.

## The Student's Column.

## OUR BUILDING STONES.—XII.

## THE SELECTION OF STONE.

**S**TONE used in building may be selected by two different methods,—theoretically and practically. Hitherto these methods have to a large extent been applied to the subject, independently of each other, and the result is that each has been regarded as fallacious by the advocates of the other; for the man who works on the theoretical side, in his anxiety to point out the various agencies which may affect the durability of stones, often fails to recognise the fact that facility of working, and other matters of a pecuniary nature, are quite as important to the practical man. On the other hand, the practical man being guided by appearances only, and frequently knowing but very little of the structure and causes of decay of stones, leaves the question of durability to chance. He is sometimes backed up by the knowledge that some of the works apparently produced by the theoretical man have come to the ground. During the course of this inquiry, for instance, we have been met by men who have pointed out the failure of the Houses of Parliament, as an example of the fallacy of the theoretical method of selection. They tell us that, after spending a considerable sum of money on a Royal Commission of inquiry into the subject, the stone selected by that Commission was of no use.

As a matter of fact, although the foundations were well looked after, the greater part of the stone of the Houses of Parliament was not selected at all. Professor Kerr, speaking at Carpenters' Hall not long since, said that "Mr. C. H. Smith, a well-known mason of Titchfield-street, was one of the Commissioners and was appointed to examine the stone as it arrived, but, by reason of some difficulty in the matter of his remuneration, he naturally declined to serve. The consequence was that the stones came in without being checked, and the result was that those which were non-crystalline were the stones which had decayed."\*

It is noteworthy that wherever competent persons have had charge of the selection of building stones, the latter have almost invariably resisted decay, even in the metropolis. Take the Museum of Practical Geology, for example. The stone used in the front of that building is a magnesian limestone, the same as that used in the Houses of Parliament. It is evident that, as the stone in the former building is even now in a good state of preservation, the selection of stone on a scientific basis is not a matter of mere chance. We will go so far as to express our belief that it would pay to secure the services of a competent man, that is, one who has both theoretical and practical knowledge, for the purpose of selecting stones at the quarry, in all cases where the magnitude of the work allows a sufficient margin of profit for the purpose.

The following are general rules which may be observed in selecting:—

The first thing we would urge as a test of durability is to ascertain the amount of water the stones under consideration absorb. This practically costs nothing, as we have explained, p. 491.

All rocks contain "quarry" water, and, as a rule, they are then most easily worked with the chisel. They are then softer than when on exposure to the atmosphere, that water is, to a certain extent, evaporated, and the rock thus rendered harder. When a very compact variety is being dealt with, there is not much fear of a great amount of absorption.

The architect or builder, however, has very often to deal with rocks whose qualities are not so superior in point of durability; for he has frequently to be guided by facility of dressing and working, cost of carriage, and various other items of a pecuniary nature. In the desire to do justice to his work, and in the absence of such of the most durable kinds of stone from his locality, he is obliged to select those which present only fair qualities. To fulfil this he cannot be too particular in choosing those the least absorbent of water.

It is highly desirable in selecting stones that visits should be paid as often as possible to the different quarries whence they come. The

\* The Builder, ante, p. 421.



manner in which they respectively weather may then be easily ascertained, and the exact horizons of the desired qualities fixed.

Much useful information may be gained by observing the condition of the stones in the various cottages and other buildings in the vicinity of each quarry. It is a remarkable fact that in country villages the local stone built into the labourer's cottage in many instances lasts longer than that in the stately mansion of his employer. It may be that this has resulted from the following circumstances. In the quarry, the material selected for the mansion (which probably required external decoration) has been a freestone, capable of being dressed with facility and of pleasing tint; while the cottage was made of refuse,—odd, hard pieces,—which would not tool well. It often happens that this refuse is, after all, more durable than the freestone, and could with but little extra trouble be utilised for the more exposed parts of the mansion.

Information as to the durability of certain stones may be obtained by observing their condition in old buildings, whether in town or country.

More hardness or softness forms no sure index to the comparative power of a rock to resist weathering. A tolerably pure limestone may weather with little or no crust, and yet may be continually losing an appreciable portion of its surface by solution, whilst some igneous rocks may have a thick decomposed crust and yet weather with extreme slowness. In the former case, the substance of the rock being removed in solution, few or no insoluble portions are left to mark the progress of decay, whilst in the igneous rock the removal of but a comparatively small proportion causes the disintegration of the rock, and the remaining soluble parts are found as a crumbling crust.\*

Stones are often required to be of certain colours, and are selected accordingly. Now, we have no objection to this, providing that they are of good quality, and the tints are likely to be permanent. Stone can be found which will answer these conditions as far as buildings in the country are concerned, but it is an exceedingly difficult matter to find such for buildings in the metropolis. The colouring of stone in many cases is due to chemicals which the London air soon finds out, and tries its very best to remove. The result is, that in a short time the stones change colour. Besides, the London air soon disfigures the stone by covering it with dirt.

In selecting a stone for its colour, care should be taken to look inside the larger blocks when broken, as the outside colour is so often only superficial, and such blocks should have been exposed to the weather for some time.

In selecting *granites*, the principal things to attend to are the condition of the felspar, the nature of the blotches that so frequently occur, and the easily decomposable accessory and secondary minerals, especially iron oxides. Granites which contain an excess of lime, iron, or soda, are the most liable to decay. Compact medium-grained varieties are generally good stones.

Those containing large crystals of mica are unfit for architectural purposes, and the same may be said of varieties in which soda-felspar and very deep red (iron) felspar predominate.†

Granite is very susceptible of injury by fire, much more so than compact sandstone with a siliceous matrix. This latter is, no doubt, the best natural stone for withstanding fire. Formerly it was exceedingly hard to work with the chisel, and although this difficulty has been much lessened, yet the tendency of siliceous sandstones to have a splintery fracture will always be a great drawback to their general use.

In selecting *sandstones* for building purposes, it is of the first importance to observe what the cementing material is made of, for on it the weathering and facility of working almost entirely depend. Those with a calcareous or ferruginous matrix should be regarded with suspicion. When these are carefully selected, however, they might do well enough for local purposes. Medium and fine grained sandstones, having a siliceo-felspathic matrix, are usually very durable, and not difficult to work.

If the sandstones under selection contain small flint pebbles here and there, as they frequently do, the purpose for which the material is required should be considered. Any mould-

ing for an ornamental structure cannot, of course, be made from such a stone; but if the work is to be plain in character, there is no reason why a rock of this description should not be selected, providing it fulfils the other requirements as to durability, &c.

Sandstones presenting a mottled appearance are almost always of doubtful quality, and so are those having vents, shakes, and spots. This more or less applies also to limestones.

So much care is necessary in selecting *limestones*, that it is difficult to lay down any rules which will apply to the whole. Consequently, the relative remarks previously made during the progress of these articles must be strictly observed. If these rocks are carefully selected they are unquestionably the most durable and most easily worked of all the stones used in building. We have pointed out the principal causes of their decay, and nothing short of a close examination of the structure of each kind is of any practical value. Good limestones are generally rather crystalline in character.

## Books.

*Domesday Book in Relation to the County of Sussex.* Edited for the Sussex Archaeological Society. Lewes: H. Wolff. 1886.

**A**S feudal tenures disappear the interest in them, from an antiquarian point of view, increases. That wonderful record of the great survey of England made by King William the Conqueror and known as Domesday Book is just 800 years old, and its value has not been impaired by age. In fact, it is only in comparatively modern times that any serious attempt has been made to investigate thoroughly the contents of the record, and to place it within reach of the ordinary student of history.

The Sussex Archaeological Society, which has long held a foremost place among the numerous bodies devoted to the study of English antiquities, has issued to its members a noble volume containing a *fac-simile* of that portion of the survey which relates to the county of Sussex. To this has been added, chiefly through the zeal and industry of the Rev. Chancellor Parish and Mr. R. G. Raper, of Chichester, a valuable appendix, containing not merely a translation of the record, but also lists of the tenants, suggestions for identifying the place-names, and a glossary. The *fac-simile* has been executed by H.M. Ordnance Department in photo-zincography, and, were it not for the numerous contractions, might be easily read by any one possessed of a small knowledge of Mediæval Latin.

As a specimen of the mode in which the Conqueror's officials did their work as surveyors, as well as of the nature of this most interesting record, we give some of the particulars relating to Brighton:—

"Radulfus tenet de Willelmo Bristelmestune. comitis  
Brictric/ tenuit de dono Godwini. T.R.E. et  
modo se defendebat pro v hids/ et dimidia.  
Terra est iii carucum. In domini est dimidia  
caruca et xviij villam/ et ix bordarii cum iii  
carucis et uno servo. De gablo iiii millia  
allecuna/ T.R.E. valebat viii libras et xii  
solidos et post C solidos. Modo xii libras."

This is rendered in the following way:—  
"Ralph holds Bristelmestune of William. Brictric held it by gift of Earl Godwin. In the time of King Edward [i.e. the Confessor] and now it vouched [or was taxed] for 5 hides and a half. There is land for 3 ploughs. In demeane is half a plough and 18 villeins and 9 bordars with 3 ploughs and one serf. Of rent four thousand of herrings. In the time of King Edward it was worth 8*l.* and 12 shillings and afterwards 100 shillings. Now worth 12*l.*"

The change of name from Bristelmestune to Brighton is infinitely less than that of the obscure fisher-village to the most popular watering-place, and the entry clearly disproves the current notion that Brighton derived its appellation from the amount of sunshine it enjoys. What we learn from Domesday is that at the Conquest the lordship of the manor, which had belonged to the great Earl Godwin, and, doubtless, devolved to his son Harold, was bestowed by the Norman invader upon his son-in-law William de Warrenne, who retained a small part of it, namely, one-sixth, in his own hands. This was cultivated in his behalf by eighteen villeins or labourers, attached to the

manor and enjoying some restricted privileges; by nine cottagers, who were in a somewhat better position; and by one serf, who was as much the property of the lord, for life or death, as any beast that grazed the pastures of the manor. No mention is made of any mansion or church. The ecclesiastical duties were probably performed by priests from the far more important town of Lewes, where William de Warrenne built his castle and founded the great Priory of St. Pancras. The rent paid by Brighton to its lord was in the shape of 4,000 herrings, which would find their way to the Baron's larder at Lewes and help to feed his numerous retainers.

Here and there in the record distinct reference is made to a church as attached to a manor, and, as might be expected, we find this to be the case in the account given of Bosham, which, insignificant as it now is, has an early history of no ordinary interest. The church is depicted in the Bayeux tapestry, where Harold and his knights seem to be entering it with a view to imploring divine protection for their voyage across the Channel. Every student of architecture has some knowledge of Bosham Church and its claims to be regarded as embodying the Roman basilica which stood upon its site. Somping, again, is another place which is mentioned in Domesday as possessing a church, and there can be no doubt that the tower of the existing edifice and some other parts date from pre-Norman times. Under Hovingdene (Ovingdeane) we find mention made of "a little church,—*ecclesia*,"—which Mr. Gordon Hills has described as "an almost perfect Saxon church," and such may have been true also of Falmer, where the same term is used in Domesday, but unfortunately the ruthless hand of the restorer has destroyed every ancient feature in it.

The indications of secular buildings in the record are less frequent and distinct. In general terms we are told that in the Rape of Pevensey William de Warrenne had twelve mansions, seven inhabited and five not; but as the object of the survey was to discover areas to register sources of revenue, castles and halls were of less importance than mills and salteries and smithies. Sir Henry Ellis estimated the population of Sussex, from the Domesday returns, to be 10,411, of whom only fifteen were tenants-in-chief. Whether the latter have in the present day any lineal representatives we need not discuss, but it is interesting to notice that 800 years have not destroyed some of the Sussex families of lower rank. "The Canals are still to be found near Claverham, and the name of Elphick is still associated with Seveston, where it is clearly pronounced, as written in Domesday, Alfec." The publication of the Great Survey is one which other societies may well take in hand, and the success achieved by the Sussex archaeologists will, we hope, encourage them so to do.

*Registration of Titles. Prize Essay by R. L. MORRIS, Barrister-at-Law. London: Printed and Published for the Building Societies Association by Shaw & Sons. 1886.*

A LARGE part of this pamphlet is occupied with an historical *résumé* of the questions touching, for example, on the Act of Elizabeth which required sales of land in Lancashire, Cheshire, or the bishopric of Durham to be enrolled, and ending with the Yorkshire Registration Act, 1884. This is a useful little sketch to the present time. More about it need not be said. In the latter part of the pamphlet it is to the system proposed, Mr. Morris advocates registration of titles. He meets the case of settlements of land by making the trustees the registered owners. If ever titles do become generally registered in this country, it is clear that the plan will have to be adopted; that is to say, so long as settlements of land are permitted by the law. Whether land should be the subject of settlements is too large a question for discussion in this place. On the whole, this is a clear little publication, and may do something towards the elucidation of a subject which the ordinary reader is apt to avoid.

*Compensation for Personal Injuries on Roads, Railways, and Rivers. By J. T. WESLEY BARNETT, F.R.S.L., F.C.A. London: The Commercial Gazette Office. 1886.*

THIS little book consists of two parts: advice to those who desire to be compensated for injuries received, and reports of cases tried in the La-

\* See Gaskie's "Text Book of Geology," pp. 334-5.

† See Page's "Economic Geology," p. 60.



Courts. As in nearly every "accident case" circumstances differ, this collection is of next to no value. As to the advice, a good deal of this is sound enough, in fact, it is so sound as to consist of truisms. The injured man is to be "ready to assent to any fair and reasonable compensation"; when injured he is to call in his usual medical attendant; he is to be careful not to exaggerate his claim; and so forth. All this is very true, but it is what any sensible man, be he layman, lawyer, or doctor, would know himself without being told.

## RECENT PATENTS.

## ABSTRACTS OF SPECIFICATIONS.

2,590. Door Spring Holder. R. W. Roberts. This relates to a spring-holder for keeping open doors, to be used in place of cabin-hooks for holding doors open. A hollowed plate with a rim and groove is fitted with a spring, whereby a projection is elevated so as to keep the door open, and when the door is required to be shut, the pressure of the foot on a knob releases the catch.

15,856. Slate or Glass Roofing. J. S. & W. Thompson.

The slate, glass, or other material is made in the form of a flat, shallow, trough, and its sides rest on two adjacent rafters, made higher than usual as they have to carry less weight. A covering piece is fitted on the edges of the troughs to cover the interstices. The troughs or tiles are preferably made with cement edges. The cement of one edge almost abuts on that of the other, but not quite, the cement adhering to the slate but not to the rafter. A thin row of cement is added after the tiles are in place.

7,748. Imitations of Woods and Marbles. T. S. Worthington.

The grain of woods or veins and colour of marbles is transferred from a pattern previously prepared as transfer-paper, that is, paper coated with a solution of starch and glue, on which the design is printed or painted. For preparing these transfers the process of zincography is used, and a large number of patterns printed off. In the case of oak a transfer is taken from the natural wood and laid down on one or zinc. The paper is moistened and applied to the surface to be grained, and after being left a short time the paper is stripped off, leaving the film in the previously-prepared ground. The film is allowed to dry naturally, and is then varnished.

8,254. Weatherboards, &c. W. B. Shorland. Where the weatherboard consists of a slip of wood sustained in its place by a central spiral spring and two short levers, an improvement is effected by attaching a short rod of metal to one of the levers, the fulcrum, the other end of which rod is adjustably connected, and adjusted to press upon the rod or door-check or jamb. The door is closed with much less friction than where weatherboards are actuated by levers above the fulcrums.

## NEW APPLICATIONS FOR PATENTS.

May 14.—6,475. T. & W. Garforth, Appliance for Joining Bricks or Stones together.—6,476. B. B. Rogers, Repairing Old Water-pipes.—6,486. H. P. Hopper, Ventilating Casements.—6,509. P. Rice, Gas-fittings.—6,517. A. Rust, Stoves.—May 15.—6,543. W. Pollock and R. Boyle, Back-pump Hinge for Doors, &c.—6,559. W. & G. Riker, Wardrobes and Portable Cupboards.—6,563. J. Bean and W. Gaines, Closing and Preventing the Slamming of Doors.—6,565. G. Hardham, Wood Screws.—May 17.—6,580. S. Wright, Flushing Cisterns for Water-closets, &c.—6,581. S. Wright, Trapping or Discharge-pipes of Cisterns, &c.—6,582. S. Wright, Exhausting Syphons for Cisterns, &c.—6,583. C. Cox, Electric Indicators.—6,621. C. Hart, Indicators for Electric Bells.—May 18.—6,640. J. Shanks, Water-closets, and water-supply Valves.—6,663. J. Higson, Riddles in the Manufacture of Bricks, &c.—6,663. J. Moll, Hydraulic Door Springs and Checks.—6,700. C. Herz, Electric Bell and House Telephone Apparatus.—6,693. L. White, Cements and Plasters.—7,708. H. Gregson, Cramp.—May 19.—6,709. J. Wetherstone, Joints for Connecting Metallic Tubes or Pipes.—6,749. G. Graham, Acting Window-sash Fastener.—May 20.—6,761. R. Bradshaw, Mounting Rollers for Printing Machines, &c.—6,766. G. Walker, Construction of Doors.—6,776. R. Oldham and Sons, Planing Machines.—6,784. R. Taunton, Joining or Connecting Metallic Pipes.

PROVISIONAL SPECIFICATIONS ACCEPTED.  
49. J. Williams, Metallic Window Sashes.—9. A. Henderson, Automatically Flushing Closet.—4,915. J. May, Self-acting Electric Burglar Alarm.—6,297. D. Toye, Staging for Use in Paint Rooms.—6,019. R. Best, Gas Brackets.—6,920. R. G. Gas Chandeliers and Pendants.—4,708. F. nt, Sash Fastener.—4,872. D. Cottier, Imitating Marble, Terra Cotta, &c., for Decorating Buildings, &c.—6,454. C. Meyer, Combined Ward-

robe, Bookcase, and Secretaire.—5,795. C. Gannaway, Ventilator.—5,843. C. Howe, Cement or Plaster.—6,200. C. Vincent and T. Downing, Burglar Alarms.

## COMPLETE SPECIFICATIONS ACCEPTED.

## Open to opposition for two months.

6,813. C. Kingsford, Manufacture or Treatment of Cement.—7,927. J. Midgley, Instantaneous Grip Vices.—8,367. C. Holden, Metal Roofing.—8,490. F. Holloway, Ventilated Water-closet Basin.—5,022. H. Lake, Stove.—2,639. J. Ritzdorf, Imitating Inlaid Wood.—5,488. C. Soysmith, Boring, Tunnelling, or Excavating Apparatus.—5,574. H. Glendinning, Springless and other Locks and Latches.

## RECENT SALES OF PROPERTY.

## ESTATE EXCHANGE REPORT.

## MAY 17.

By COOPER & GOULDING.  
Oxford-street—No. 495, term 64 years, ground-rent 45s. .... 23,800  
Gunnery-bury—39 and 32, Bradenbury-road, freehold ..... 1,075  
By VENTON, BULL, & COOPER.  
West End-lane—Hythe House, freehold ..... 3,100  
Crown Lodge, 43 years, ground-rent 20s. .... 1,425  
Ponder's End, Scotland-green—Two freehold cottages ..... 330  
By DOWSETT & WOODS.  
Norwood, Albert-road—A plot of freehold land ..... 285  
Fulham—402 and 474, Fulham-road, 63 years, ground-rent 51s. .... 600  
By J. McLACHLAN & SON.  
Clapham-common—A plot of freehold land ..... 650  
By MILLAR, BOOKER, & CO.  
Montague-square—No. 6, ground-rent 20s. .... 1,350  
By M. HUBBARD.  
Regent's Park—48, St. George's-road, freehold ..... 800  
60 to 57, and 59 to 58, St. George's-road, freehold ..... 7,490  
19 to 27 odd, Manley-road, freehold ..... 1,750  
8 and 12, Manley-road, 63 years, ground-rent 24s. to 28 and 29, St. George's-road, 77 years, ground-rent 26s. .... 2,925

## MAY 18.

By W. HALL.  
Mile End—268 and 270, Bardett-road, 75 years, ground-rent 14s. .... 830  
Hendon—Ground-rent of 38s. reversion in 97 years ..... 780  
East Finchley—Ground-rent of 38s. reversion in 98 years ..... 850  
Willesden—Ground-rent of 18s. 10s. reversion in 98 years ..... 350  
By FARRBROTHER, ELMS, CLARK, & CO.  
Brixton-hill—Willow Cottage, and Ca. 3r. 20p., freehold ..... 2,600  
Somers-road—Agnes Villa, and 9, 11, 13, 17, and 19, Somers-road—Ground-rents of 40s. reversion in 64 years ..... 1,270  
Archbishop's-place—Ground-rents of 97s. 10s. reversion in 65 years ..... 1,110  
6 to 23, Archbishop's-place, freehold ..... 2,270  
By ROBINSON & RUDKIN.  
Lambeth—33, Priory-road, freehold ..... 670  
338, 338, and 347, The Crescent, freehold ..... 2,980  
City-road—49 and 50, Moreland-street, freehold ..... 855

By ROGERS, CHAPMAN, & THOMAS.  
Fimlico—37 and 39, Cumberland-street, 47 years, ground-rent 16s. .... 1,070

By DUNHAM, TAYLOR, & CO.  
Stoke Newington—The Manor House, and 1a, 2r. 4p., freehold ..... 5,000

By W. KENNEDY.  
Wellington—61, Talgarth-road, 98 years, ground-rent 10s. 10s. .... 1,175  
Surbition-hill, Ditton-road—Four plots of freehold land ..... 570  
Lovelace-road—Six plots of freehold land ..... 1,530

By O. W. MILLAR.  
St. John's Wood—21, Wellington-road, 34 years, ground-rent 6s. 10s. .... 185  
Upper Holloway, Magdala-road—A plot of freehold land ..... 60

By W. R. SMYTH.  
Surbition—The freehold residence, Holly Cottage ..... 810

By J. & R. KEMP & CO.  
Regent's Park—60, Albany-street, 38 years, ground-rent 8s. 10s. .... 1,000

By J. & R. KEMP & CO.  
Camden-road—100, Brecknock-road, 63 years, ground-rent 6s. .... 700

By J. & R. KEMP & CO.  
Regent's Park—15, Albany-street, and stabling, 30 years, ground-rent 9s. 9s. .... 1,000

By J. & R. KEMP & CO.  
14, Albany-street, 36 years, ground-rent 12s. .... 850

By J. & R. KEMP & CO.  
108, Great Portland-street, 9 years, ground-rent 30s. .... 400

By E. OWENS.  
Haverstock-hill—No. 87, term 78 years, ground-rent 8s. .... 1,350

By E. OWENS.  
West Hampstead—28 plots of freehold land ..... 1,855

By MESSRS. CHADWICK.  
Regent-street—1, Langham-place, 32 years, ground-rent 5s. .... 1,930

By MESSRS. CHADWICK.  
Fleet-street—Ground-rent of 200s., reversion in 72 years ..... 6,100

By MESSRS. CHADWICK.  
St. Martin's-lane—Ground-rent of 115s., reversion in 72 years ..... 3,060

By MESSRS. CHADWICK.  
Chelsea—One-fourth share in ground-rents of 570s., with the reversion to one-fourth of 44 houses, expiring in 58 years ..... 3,015

By HAYES & FARRISON.  
Fulham—222 and 634, Fulham-road, freehold ..... 5,000

By NEWSON & HARDING.  
Hackney—44 and 45, Tudor-road, 37 years, ground-rent 8s. 8s. .... 545

By NEWSON & HARDING.  
Barnaby—3 and 4, Bellin-villa, 27 years, ground-rent 2s. .... 1,015

By H. J. BILES & SON.  
Old Ford-road—No. 126, term 16 years, ground-rent 3s. .... 4195

By H. J. BILES & SON.  
Bethnal-green—203, Solator-street, 19 years, ground-rent 28s. .... 60

By H. J. BILES & SON.  
Kingland—40, 42, and 44, Downham-road, 32 years, ground-rent 7s. 17s. 6d. .... 470

By H. J. BILES & SON.  
46 and 48, Downham-road, 32 years, ground-rent 4s. 17s. 6d. .... 470

By H. J. BILES & SON.  
83, Hertford-road, 32 years, ground-rent 12s. 16s. .... 550

By H. J. BILES & SON.  
Bethnal-green—The Prince Albert, term 41 years, ground-rent 22s. 10s. .... 765

By H. J. BILES & SON.  
4 to 14 even, Mape-street, 41 years, ground-rent 18s. .... 275

By H. J. BILES & SON.  
74 and 76, Durbyle-street, 41 years, ground-rent 8s. .... 475

By H. J. BILES & SON.  
Hackney-road—4 to 12 even, Temple-street, 20 years, ground-rent 7s. .... 300

By H. J. BILES & SON.  
92 and 94, Temple-street, 20 years, ground-rent 4s. .... 390

By H. J. BILES & SON.  
75, 84, 86, and 88, Treadway-street, 20 years, ground-rent 6s. .... 215

By H. J. BILES & SON.  
38 and 40, Treadway-street, 19 years, ground-rent 9s. .... 400

By H. J. BILES & SON.  
Poplar—80, High-street, freehold ..... 400

By A. G. THOMPSON & CO.  
Acton—63 and 65, Bello Bridge-road, freehold ..... 400

By SMITH & BOGGS.  
Hackney—1, Urban-place, 60 years, ground-rent 3s. 2s. .... 165

By SMITH & BOGGS.  
Bethnal-green—33 and 37, Wolsey-street, 6 years, ground-rent 6s. 6s. .... 70

By ROBERT REID.  
Brook-green—Beech Cottage, and 1a, Cr. Sp., freehold ..... 2,350

By WALTON & WILSON.  
Beckenham—The Residence, Passy House, 74 years, ground-rent 12s. .... 1,000

By WALTON & WILSON.  
Croydon-road—The Residence, Clifton Lodge, 78 years, ground-rent 18s. 16s. .... 1,175

By WALKER & RUTZ.  
Islington—7, 9, and 11, Rotherfield-street, 54 years, ground-rent 15s. .... 750

By WALKER & RUTZ.  
343, New North-road, 8 years, ground-rent 4s. .... 42

By WALKER & RUTZ.  
Camden Town—6, Priory-street, 38 years, ground-rent 3s. .... 296

By RYLANDS & EASON.  
Paddington—9, Victoria-street, 35 years, ground-rent 6s. 1s. .... 465

By RYLANDS & EASON.  
Upper Kensington—Ground-rent of 30s., reversion in 75 years ..... 705

By RYLANDS & EASON.  
Ground-rent of 91s., reversion in 89 years ..... 2,120

By RYLANDS & EASON.  
Lambeth, Lansdowne-road—Ground-rent of 102s., term 54 years ..... 1,695

By RYLANDS & EASON.  
Portland-place—Ground-rent of 7s., term 54 years ..... 110

By RYLANDS & EASON.  
Platistow, Howard-road—Ground-rent of 23s. 9s., reversion in 60 years ..... 425

By RYLANDS & EASON.  
74, 76, 78, 84, to 92 even, Howard-road, freehold ..... 950

By RYLANDS & EASON.  
New North-road—33 and 34, Wilton-square, 40 years, ground-rent 8s. 8s. .... 675

By RYLANDS & EASON.  
Hoxton—76 and 78, Cropley-street, 45 years, ground-rent 7s. .... 600

By BAKER & SONS.  
Brighton—30, Montpelier-crescent, freehold ..... 1,200

By BAKER & SONS.  
Ipswich—The Admiral's Head public-house, freehold ..... 1,050

By BAKER & SONS.  
Hanwell—The freehold residence, Hanwell Park, and 2a, 3r. 13p. .... 6,100

By BAKER & SONS.  
An enclosure of freehold land adjoining Seventeen shares of 100s. each in Law Life Assurance Society ..... 4,500

By BAKER & SONS.  
Horsham, near—Upper House Farm, and 125a, 3r. 32p., freehold ..... 1,800

By BAKER & SONS.  
Freehold woodland, 42 acres ..... 500

By BAKER & SONS.  
An enclosure of land, 7 acres, freehold ..... 100

By BAKER & SONS.  
Freehold rent-charge of 63s. 8s. 5d. a year ..... 900

## MEETINGS.

## SATURDAY, MAY 29.

Civil and Mechanical Engineers' Society.—Visit to the National Agricultural Hall, Kensington. 3 p.m.

Edinburgh Architectural Association.—Annual Excursion to Carnock and Stirling. 8.15 a.m.

Dundee Institute of Architecture.—Excursion to St. Andrews. 9.25 a.m.

## MONDAY, MAY 31.

Royal Institute of British Architects.—Mr. Josiah Conder on "Japanese Architecture." 8 p.m.

Surveyors' Institution.—Annual Meeting, 3 p.m.; Annual Dinner, Holborn Restaurant. 8.30 p.m.

## TUESDAY, JUNE 1.

British Museum.—Mr. J. A. P. MacBride on "Early Greek Sculpture." 2.30 p.m.

Society of Biblical Archaeology.—Mr. F. G. H. Price, F.S.A., on "Egyptian Antiquities." 8 p.m.

## WEDNESDAY, JUNE 2.

British Archaeological Association.—(1) Mr. A. Brent on "Ancient Seals." (2) Mr. George E. Wright, F.S.A., on "The Recent Discovery of a Roman Villa at Reims." (3) Mr. E. Walford, M.A., on "Painted Glass at Oriel College, Oxford." 8 p.m.

British Museum (Archaeic Room).—Miss J. E. Harrison on "The Topography and Monuments of Modern Athens."—IV. 11.45 a.m.

Builders' Foremen and Clerks of Works' Institution.—Ordinary Meeting. 8.30 p.m.

## THURSDAY, JUNE 3.

Royal Archaeological Institute.—Mr. R. P. Pullan on "Iconography of Angels." 4 p.m.

Society for the Encouragement of the Fine Arts.—Mr. Brodie Innes on "The Origin and Development of the English School of Poetry." 8 p.m.

## FRIDAY, JUNE 4.

Artists' Benevolent Fund.—77th Anniversary Dinner, Freemasons' Tavern. 7 p.m.

University College.—Professor C. T. Newton, C.B., on "Greek Myths Illustrated by Fictile Vases and other Monuments."—II. 4 p.m.

British Museum (Archaeic Room).—Miss J. E. Harrison on "The Technique of Greek Vases."—IV. 11.45 a.m.

## SATURDAY, JUNE 5.

Association of Public Sanitary Inspectors.—Annual Dinner, Holborn Restaurant. 6 p.m.



## Miscellanea.

**Waters of the Bagshot Beds.**—A paper was read at the rooms of the Society of Medical Officers of Health, Crane-court, E.C., on the 21st inst., by Mr. W. Eassie, C.E., F.G.S., upon the quality of the waters which are derived from the three main beds of the Bagshot geological series. Whilst admitting that many of the waters were sound in character, the lecturer said there were, nevertheless, various beds of a greenish tint, which interfered with the secretion of pure water, and he instanced examples where illness had followed cases in which no filtering provision had been made. The lecturer considered that the acids contained in many of the waters derived from the Bagshot beds ought to be eliminated previously to making use of them as drinking supplies, and he showed that by the use of a peculiar method of filtration the whole of the acids due to decomposed vegetable matter in solution, and always present in peaty waters, could be speedily removed, and that the water yield from the Bagshot beds could be redeemed, as regards their purity, and made equal to any water derived from the purest primitive rocks. He urged the necessity for every one residing upon these tertiary beds to filter the water of their wells, and so assist in rendering the families resident on these strata in the most healthy condition in respect of their water supply.

**Depreciation in the Value of Landed Property in Sussex.**—A sale which took place at the Auction Mart on Friday, the 21st instant, served to show the decrease which has taken place during the last few years in the value of estates and building land in some parts of Sussex. Messrs. Baker & Sons submitted for sale the freehold property near Horsham known as the Strood Park Estate, comprising the mansion with pleasure-grounds, and several farms, the whole of the estate containing an area of about 1,000 acres. The mansion and several farms, containing altogether 829 acres, were first offered, the auctioneer observing that in his judgment the property, at the very least, was worth from 30,000l. to 40,000l., but the highest offer was 23,500l., being less than 30l. an acre, at which it was withdrawn. As evidence of the decreased value of the property, it was stated in the room that not more than six years ago the estate would have realised almost double the sum now offered. A portion of the estate, adapted for building purposes, containing nearly 122 acres, was next submitted, and was sold for 1,800l., being at the rate of a little less than 15l. an acre.

**Strong Spring Hinges.**—We have received from Messrs. S. Gerish & Co., of Butland-street, Hoxton, a specimen spring hinge made by them under their patent, which embodies an improvement of great practical value. This improvement consists in making the hinge with a screwed rod at the end of the chain, on to which a cylindrical nut with a head pressing against the spring, is twisted on to the screwed rod. In this way the strength of the spring hinge can be readily adjusted to any strength required, simply by screwing up or unscrewing the nut. Another advantage consists in the fact that should a new spring be required at any time, the carpenter, after taking the hinge off the door, has only to unscrew the cylindrical nut, remove the old spring, and replace it with a new one. And further, in fitting these hinges to the door the spring can be removed from the hinge, there being no occasion to set the hinge open for fixing, thus avoiding liability to accident.

**Concrete Mixing Machines.**—We have this week had the opportunity of inspecting, at the works of Messrs. George Waller & Co., Holand-street, Southwark, two "continuous action concrete mixers," one for steam power, and the other for hand power. The larger one has a cylinder 6 ft. long, and is capable of delivering from 100 to 150 cubic yards per day. The smaller one is well adapted for mixing materials for concrete paving, floors, &c., and is fitted with handles and wheels, so that it can be wheeled like a barrow. The cylinders are provided with four deep grooves or channels, into and out of which the materials are continually falling during the rotation of the cylinder, thus ensuring effective mixing. Similar machines, made by the same firm, have been employed with much success on municipal works at Tunbridge Wells, Nottingham, Great Yarmouth, and elsewhere.

**The Artists' Benevolent Fund.**—The seventy-seventh anniversary dinner of this Fund will take place at Freemasons' Hall, on Friday next, June 4th, the Right Hon. Lord Coleridge in the chair. Since the institution of the society, the sum of £49,175 has been distributed in relieving widows and orphans of artists, whose circumstances rendered such assistance necessary. The committee will be glad to receive donations and subscriptions.

**Civil and Mechanical Engineers' Society.**—The annual dinner of this society was held at the Holborn Restaurant on the 19th inst. The President, Mr. H. Michell Whitley, occupied the chair, and a large number of members and visitors were present. The usual loyal toasts having been duly honoured, Mr. W. Worby Beaumont proposed "Success to the Civil and Mechanical Engineers' Society," coupled with the health of the President. The President responded, and in the course of his remarks congratulated the members on the close of a successful session, and referred to the importance of the opportunities given by the society for young students being brought into friendly intercourse with members of the profession, who are busily engaged in works of construction, who would give them advice and assistance. Several other toasts followed.

**The Sportsman's Exhibition.** opened on Monday last at the Royal Aquarium, Westminster, contains a few exhibits of special interest to architects and builders. First of all, we must notice the excellent stable-fittings, comprising two stalls and two loose boxes, exhibited by Messrs. Steven Bros. & Co. The castings are very clean and true. A portion of the bottom sill of partitions is removable with ease in case it is found necessary to insert a new board. The gruel-pot is made with tip-up action instead of plug-fashion. Some good bolts and latches for stables, a variety of harness-room fittings, and a very good adjustable hopper ventilator for stables, are also shown at this stand. Wilkes's Patent Metallic Flooring Company exhibit a stall showing the application of their material to the purpose of stable paving. Messrs. Winch & Son exhibit poultry-houses and garden furniture; Dr. Jaeger's Sanitary Clothing Company exhibit their all-wool garments for sportsmen and for "all sorts and conditions of men"; and at one of the stands the "Chamberland-Paster" filter is shown. Needless to say that all kinds of requisites for boating, fishing, shooting, hunting, riding, driving, bicycling, and for cricket, lawn-tennis, and other games, are shown in profusion. Some good billiard-tables are shown by Messrs. Burroughes & Watts, and by Messrs. Thurston & Co. The first-named firm exhibit a very simple though ingenious "rest," available for use in any position required, while the last-named firm show their electric marking-board, for billiard-rooms, and the "Cavendish" whist-table, which should be looked at. The Exhibition will remain open until June 5.

**The Banner Sanitation Company.**—As we announced some time ago, the well-known business of Messrs. Banner Bros. & Co., sanitary engineers, will be carried on in future under this title, and it has been removed from Billiter-square to Wessex House, Northumberland Avenue, where, in a well-lighted and conveniently-arranged show-room, is to be seen a good collection of their own appliances, together with a typical selection of the best sanitary fittings by various manufacturers. One of the novelties exhibited is the "Hygeis" ventilator, which claims to be an improvement upon the water-spray ventilator, inasmuch as the nozzle or spray-diffuser is self-cleansing, and is easily unshipped for examination. Some instructive specimens of bad plumbing work,—done on wrong principles, or rather on no principles at all,—are shown as "frightful examples" of "how not to do it." An automatic slop-sink, which is self-flushing, will meet a want which is felt where servants are too careless or too lazy to flush the sink after use. Banner's airtight manhole cover is now made with its top surface filled in with small blocks of hard wood, under Hawksley's patent, thus ensuring a good foothold. Banner's hollow kerb, for enclosing electric lighting, telegraph, and telephone wires, is another speciality which we should like to see largely used. These, with Messrs. Banner's well-known revolving cowls and fixed funnel ventilators, and many other sanitary fittings and appliances, go to make up an instructive little exhibition.

**The District Surveyorship of Chelsea.**—At the meeting of the Metropolitan Board of Works on the 21st inst., Mr. Ewin, Chairman of the Building Act Committee, brought up and moved the adoption of a report with reference to the vacancy in the office of District Surveyor for Chelsea, caused by the death of Mr. Sancton Wood, and recommending that the district be divided into two portions, to be designated North Chelsea and South Chelsea respectively; that the former district do consist of that portion of the parish to the northward of a line drawn along the centre of King's road and Sloane-square, and the latter of that portion of the parish to the southward of such line; that the usual course be taken for filling the vacancies in the offices of District Surveyor for such districts, and that the Board do proceed to the election on Friday, June 4.—Mr. Mossop moved, as an amendment, that the motion be referred back to the committee, as he thought that Chelsea should have the benefit of a man of thoroughly practical experience in similar duties who had been under the Board in other districts. He thought that there were officers under the Board who ought to be promoted. He did not think that a fair division had been made in the district, one having the ground for new buildings, and the other very little. After considerable discussion, the amendment was put and lost by twenty-five to twenty. The recommendation of the committee was then agreed to.

**The Medical Profession and the Church of St. Bartholomew-the-Great.**—Those who have received their education at the great School of St. Bartholomew will probably be familiar with this ancient and interesting edifice, founded by Rahere (who was also founder of the hospital in the year 1123, and which has endured nobly until now. The Builder of May 8th contains an excellent description of the church, and of the proposed restoration of this magnificent relic of the architecture of the period; and a letter which appeared in the same journal on May 15th shows very cogently that the project has a singular claim upon the sympathy of the medical profession. The lawyers of the Temple possess their fine memory of the church of the past; Lincoln's Inn is also similarly endowed. Why should not medicine be represented in its specially appropriate church of St. Bartholomew-the-Great? Its restoration would probably be costly, and funds would be needed, but the medical world of to-day will have reason to be proud if they render aid to this work of respect to their pious friend and benefactor of times gone by, Rahere.—*Lancet*.

**Colonial and Indian Exhibition.**—The arrangements of the Conference Committee, at which the Duke of Manchester is chairman, are now fairly complete, and meetings are announced for dates previous to Whit Sunday. The meetings are open to all visitors to the Exhibition. Among the subjects to be discussed are, "South Africa as a Field for the Emigration of the Industrial Classes," 4.0 p.m., Thursday, June 3, by Mr. Arnold White. "The System of Land Transfer adopted by the Colonies," 3.0 p.m., Friday, June 4, by J. D. Wood. "The Mineral Resources of India," 3.0 p.m., Saturday, June 5, by Prof. Valleried Ball. "Indian Carpets," 4.0 p.m., Thursday, June 10, by Mr. Vincent Robinson. "The Industries of New Zealand," 8.30 p.m., Saturday, by Mr. F. W. Pennefather. "Emigration to the Colonies," 3.0 p.m., Friday, June 11, by Mr. F. Young.

**The Sunday Society.**—The eleventh public annual meeting of the holders and supporters of this Society was held in Prince's Hall Piccadilly, on Saturday last, when Sir Haz E. Roscoe, M.P., F.R.S., delivered his Presidential address, and it was resolved—"That the Committee of the Sunday Society be authorized to send a memorial to His Royal Highness the Prince of Wales, K.G., requesting that the interests of the community, the Colonial and Indian Exhibition may be open on a few Sundays, by free tickets, either to the public generally, or in some restricted way, by means of tickets distributed through the Sunday Society, the London Trades Council, the Working Men's Club and Institute Union, and other agencies."

**Rolls Girders.**—Messrs. Gardner, Anderson, & Clark send us a new sheet of section of rolled girders, accompanied by a useful and convenient "pocket-card" of sizes and strengths of this class of girders.



**The Institution of Civil Engineers.**

The annual general meeting of this Institution was held on Tuesday afternoon last. The report, after giving a history of the growth and progress of the Institution, stated that during the twelve months ending on the 31st of March, 1886, there had been an increase of 57 members, 179 Associate members, and of 85 students, while the number of honorary members was the same, and there had been a decrease of six Associates. The effective increase had thus been 315, bringing up the total of all classes to 5,100. The accounts showed that the receipts from all sources had amounted to 19,945*l*. 15*s*. 9*d*, against payments (including an investment on capital account) aggregating 19,113*l*. 17*s*. 1*d*. Of the income, 2,041*l*. 5*s*. 2*d*. arose from dividends on capital investments, while as regarded the general expenditure, three-fifths nearly (or 9,178*l*. 4*s*. 11*d*. actually) would be found debited to publications. The adoption of the report having been duly moved and seconded, it was declared to be carried, and ordered to be printed in the Minutes of Proceedings in the usual manner. Hearty votes of thanks were then passed to the President, Vice-Presidents, and other members of the Council, to the auditors, to the secretaries, and to the scrutineers. The ballot for Council resulted in the election of Mr. E. Woods as president; Mr. G. B. Bruce, Sir John Coode, Mr. G. Berkeley, and Mr. H. Hayter, as vice-presidents; and of Mr. W. Anderson, Mr. B. Baker, Mr. J. V. Barry, Sir Henry Bessemer, F.R.S., Mr. E. A. Cowper, Sir James N. Douglas, Sir Douglas Fox, Mr. A. Giles, M.P., Mr. J. Mansgrove, Mr. W. H. Freese, F.R.S., Sir Robert Rawlinson, C.B., Sir E. J. Reed, K.C.B., F.R.S., M.P., Mr. F. C. Stileman, Sir William Thomson, F.R.S., and Sir Joseph Whitworth, bart., F.R.S., as other members of Council. The session was then adjourned until the second Tuesday in November, at eight p.m.

**A New Steerable Balloon.**—The largest balloon that has ever been constructed is, in all probability, that of Herr Ganswindt, at Berlin. The inventor states that by help of this colossal machine, which is capable of being steered with comparative facility in its course through the air, he is able to attain a speed of 14 yards to 16 yards per second, or a mile in less than two minutes. The maximum speed attained by the celebrated balloon of MM. Krebs and Renard, in their trials at Meudon, in 1884, was only about three-quarters this velocity. The Ganswindt balloon is of ellipsoidal form, or cigar-shaped, being about 160 yards long by 16 yards in diameter. Its capacity is 20,000 cubic yards, or about ten times the size of the Krebs-Renard balloon. The Ganswindt machine is said to be capable of carrying a load of nearly three tons and a half, independently of its car and steam-engines, which together weigh about 2½ tons. Propulsion is effected by means of three aerial screws. Two of these, each 11 yards in diameter, are vertical, whilst the other, measuring 8 yards in diameter, is horizontal. Herr Ganswindt, who has been making preparations for an exhaustive trial of his balloon, affirms that he will be able to travel in any direction he pleases, even in the midst of the most violent storms. It will be interesting to know what comes of this ambitious attempt.

**The New Bridge at Putney.**—The Prince and Princess of Wales will formally open the new granite bridge which crosses the Thames at Putney on Saturday afternoon next. Sir James M'Garel-Rogge, M.P., the chairman of the Metropolitan Board of Works, will present an address to the Prince and Princess, and introduce Mr. Francis H. Fowler, deputy-chairman of the Board; Mr. William Shepherd, chairman of the Bridges Committee; Sir Joseph V. Bazalgette, C.B., engineer; Mr. Edward Bazalgette, assistant-engineer; and Mr. Vaddell, contractor. We published several illustrations, showing the construction of the bridge, in our number for January 3, 1885.

**The Sign of the Cock Tavern, Fleet-street.**—It having been stated that the well-known "Cock," said to have been carved by rhyming Gibbons, and long used as the sign of the Old Cock Tavern, in Fleet-street, had been taken to America, we are asked to contradict this statement, and to inform our readers that it is now to be seen, together with the old carved "er-mantel," at "The Temple Bar," 22, Fleet-street, now occupied by the late proprietor of a Cock Tavern, who is also, we are informed, possession of all the old fittings recently sold "auction."

**British Archaeological Association.**

On Wednesday, May 19th, Mr. G. R. Wright, F.S.A., in the chair, the progress of the arrangements for holding the Congress at Darlington and Bishop Auckland in July was reported. Mr. J. M. Wood described the curious underground passages at Leigh's Priory, Essex. Some of these are 6 ft. high. They are constructed of red brick, of fifteenth-century date, and are evidently sewers of the monastic buildings. One passage is over 600 ft. in length. Mr. J. T. Irvine exhibited a drawing of the Norman Font at Wansford, which is covered with a series of figures within niches. Miss Turner exhibited a vase of Mexican pottery of early date. A paper was then read by Mr. W. de Gray Birch, F.S.A., on the sculptured slabs in the choir aisle of Chichester Cathedral. These were found in 1823, and are said to have been brought from the old Cathedral of Seley. The style of the figures carved upon them indicates, however, that they are no older than the present building. The slabs are formed of a number of stones built up and carved in position. The present appearance indicates that the stones have been displaced. The paper concluded with suggestions for an ingenious re-arrangement of the sculptures. A paper was also read descriptive of the remarkable pre-historic vessel found at Brigg, and was read by Mr. Loftus Brock, F.S.A. It was accompanied by photographs and drawings.

**Value of City Property.**—We are informed that in Carter-lane, St. Paul's, a building which occupies an area of about 840 square feet has just been sold by Mr. Hyman Marks, of Ludgate-hill, for the sum of 8,350*l*. This is at the high rate of 493,000*l*. per acre, or about 10*l*. per foot, and goes to show that the value of the City freeholds, even in the backstreets, remains remarkably high.

**PRICES CURRENT OF MATERIALS.**

TIMBER.		£.	s.	d.	£.	s.	d.
Greenheart, B.G.	ton	8	5	0	7	0	0
Teak, E.I.	ton	12	10	0	15	0	0
Sequoia, U.S.	foot cube	0	3	4	0	2	8
Asi, Canada	load	3	0	0	4	10	0
Birch	"	3	0	0	4	10	0
Elm	"	3	10	0	4	15	0
Fir, Dantzig, &c.	"	3	10	0	4	0	0
Oak	"	3	0	0	5	0	0
Canada	"	5	10	0	6	10	0
Pine, Canada red	"	0	0	0	4	0	0
" yellow	"	3	0	0	5	0	0
Lath, Dantzig	fathom	3	10	0	5	0	0
St. Petersburg	"	4	0	0	6	0	0
Waincoat, Rigas	"	2	10	0	4	0	0
" Odessa, crown	"	3	12	6	3	15	0
Deals, Finland, 2nd and 1st, std.	100	7	10	0	8	10	0
4th and 3rd	"	6	0	0	7	10	0
Riga	"	6	0	0	8	2	0
St. Petersburg, 1st yellow	"	9	0	0	14	7	7
" 2nd	"	7	0	0	8	15	7
" white	"	7	0	0	10	6	6

**TIMBER (continued).**

Deals, Swedish	ton	6	0	0	15	0	0
White Sea	"	7	0	0	17	0	0
Canada Pine, 1st	"	12	0	0	30	0	0
" 2nd	"	10	0	0	25	0	0
" 3rd, &c.	"	6	0	0	10	0	0
" Spruce 1st	"	8	0	0	11	0	0
" 2nd and 3rd	"	5	0	0	7	0	0
New Brunswick, &c.	"	5	0	0	7	0	0
Baltics, all kinds	"	4	0	0	12	0	0
Flooring Boards, sq. 1 in., Fro-							
pared, first	"	0	9	0	0	13	0
Second	"	0	7	6	0	8	0
Other qualities	"	0	5	0	0	7	0
Cedar, Cuba	"	0	0	33	0	0	0
Honduras, &c.	"	0	0	3	0	0	0
Australian	"	0	0	24	0	0	0
Mahogany, Cuba	"	0	0	5	0	0	0
St. Domingo, cargo average	"	0	0	5	0	0	0
Mexican	"	0	0	34	0	0	0
Tobacco	"	0	0	4	0	0	0
Roadways	"	0	0	44	0	0	0
Maple, Bird's-eye	"	0	0	6	0	0	0
Rose, Rio	"	7	0	0	10	0	0
Balis	"	6	0	0	10	0	0
Bor, Turkey	"	5	0	0	12	0	0
Satin, St. Domingo	"	0	0	7	0	0	11
Porto Rico	"	0	0	8	0	1	3
Walnut, Italian	"	0	0	4	0	0	5

**METALS.**

IRON—Pig in Scotland	ton	0	0	0	0	0	0
Bar, Welsh, in London	"	4	10	0	4	17	6
" " in Wales	"	4	5	0	4	10	0
" Staffordshire, London	"	5	5	0	0	0	0
Sheets, single, in London	"	6	15	0	8	10	0
Hoops	"	6	0	0	7	0	0
Nail-roads	"	5	10	0	6	10	0

COPPER—							
British, cake and ingot	ton	43	0	0	44	0	0
Best selected	"	45	0	0	46	0	0
Sheets, strap	"	50	0	0	0	0	0
" India	"	47	0	0	48	0	0
Australian	"	47	0	0	47	10	0
Chili bars	"	50	10	0	50	17	6
YELLOW METAL	"	0	0	4	0	0	48
LEAD—Pig, Spanish	"	13	7	6	0	0	0
Sheet, common brands	"	12	17	6	0	0	0
Sheet, English	"	13	10	0	13	15	0

SPRINKLER—							
Silesian, special	ton	14	3	6	14	5	0
Ordinary brands	"	13	17	6	14	0	0
TIN—							
Bacon	ton	0	0	0	0	0	0
Bilition	"	0	0	0	0	0	0
Strait	"	96	0	0	0	0	0
Australian	"	98	0	0	0	0	0
English ingots	"	100	0	0	0	0	0
ZINC—							
English sheet	ton	19	0	0	18	5	0

**OILS.**

Linseed	ton	20	0	0	20	7	6
Cocunut, Ceylon	"	29	0	0	30	0	0
Ceylon	"	23	10	0	25	0	0
Copra	"	0	0	0	0	0	0
Palm, Lagos	"	22	0	0	0	0	0
Palm-nut Kernel	"	25	0	0	25	0	0
Repeased, English pale	"	23	5	0	0	0	0
" brown	"	20	15	0	0	0	0
Cottonseed, refined	"	17	0	0	18	0	0
Tallow and Oleine	"	25	0	0	45	0	0
Lubricating, U.S.	"	6	0	0	10	0	0
" Refined	"	8	0	0	13	0	0
TURPENTINE—							
American, in casks	cwt.	1	3	6	1	4	0
Tar—Stockholm	barrel	0	17	0	0	17	0
Archangel	"	0	10	8	0	11	0

**CONTRACTS AND PUBLIC APPOINTMENTS.**

Epitome of Advertisements in this Number.

**CONTRACTS.**

Nature of Work, or Materials.	By whom required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Widening Roads, Brighton	Brighton Town Council	F. C. Lockwood	June 1st	ii.
Painting, &c., Gosport	War Department	Official	do.	ii.
Line-whiting, Painting, &c., Portsmouth	do.	do.	do.	ii.
Painting and Whitewashing, &c.	do.	do.	do.	ii.
Seats, Highbury Fields	Whitechapel Union	do.	do.	ii.
Painting, &c., Works, S.E. Hospital	Met. Asylums Board	do.	June 2nd	i.
Bench, Elm, and Deals, for Iron Chests	Dir. of Army Contracts	do.	June 3rd	ii.
Blue Guesney Granite	Brighton Local Board	do.	June 4th	xviii.
Extension of Stabling	St. G. (Globe) Works	do.	June 7th	xviii.
Making-up Roads	Wandsworth Bd. of Wks	do.	June 8th	xviii.
Broken Guesney Granite	Chelsea Vestry	G. R. Strachan	do.	xviii.
Making-up Roads	West Ham Local Bnd.	Lewis Angell	do.	ii.
Enlarging and Additions to Schools	do.	do.	do.	ii.
Cleaning, Distemping, &c.	School Bnd for London	Official	do.	ii.
Painting, Whitewashing, &c.	Poplar, &c., Sick Asylum	A. & C. Harston	do.	ii.
Road Making and Paving	Chelsea Guardians	Official	do.	ii.
Sewerage Works	Hammersmith Vestry	do.	do.	ii.
Cleaning and Painting Work, Caterham	St. Luke's Vestry	do.	June 9th	xviii.
Iron Staircase, Caterham Asylum	Met. Asylums Board	do.	June 10th	ii.
Two 6-h.p. Cornish Boilers	do.	do.	do.	ii.
Refriger Rooms, &c. Rugby Stat. Sorting Office	Guilford Union	do.	June 11th	ii.
Camp Sheddling, &c., to form Embankment	Com. of H.M. Works	do.	do.	i.
Supply and Fitting Steam-Engines, Darenth	Teddington Local Bnd.	H. York	do.	ii.
Dining and Recreation Hall, &c.	Met. Asylums Board	Official	June 12th	ii.
Main Drainage Works	Burntwood Asylum, Staffs	E. Griffiths	June 14th	ii.
Covering Roofs (Zinc or Corrugated Iron)	Acton Local Board	G. N. Lacey	June 22nd	xviii.
Laying a Drain	Met. Asylums Board	Official	Not stated	ii.
	Epping R.S.A.	do.	do.	ii.

**PUBLIC APPOINTMENTS.**

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page.
Clerk of Works	Harcroft Cor.	Not stated	June 2nd	xvi.
District Surveyor	Met. Board of Works	do.	do.	xvi.
Clerk of Works	Civil Service Com.	do.	June 6th	xv.



## TENDERS.

**BROCKENHAM (Kent).**—For new vestries and parish-room to St. Paul's Church, Brockenham, Kent. Mr. Sydney F. Bartlett, architect, Haddenham:—  
Wall & Hook, Brinscombe, Gloucester (accepted).....£475 0 0

**CHISLEHURST.**—For the construction of roads and sewers, Sandridge Park, Chislehurst, for the Trustees of the will of the late Sir Edward Scott, bart. Mr. W. H. Gibbs, West Kensington, engineer. Quantities supplied:—  
Nowell & Robson.....£10,175 0 0  
J. Mowlem & Co.....8,703 0 0  
W. Webster.....8,560 0 0  
B. Cooke & Co.....7,800 0 0  
H. R. Treherne & Co.....7,263 0 0  
E. Peill & Sons.....6,680 0 0  
T. Lansbury (accepted).....6,400 0 0

**CROYDON.**—For alterations and repairs to premises, Queen's-road, Croydon. Mr. R. Edge, Croydon, surveyor:—  
Shepherd.....£202 0 0  
Bryan.....151 0 0  
Gould & Glascock.....177 0 0  
W. G. Wyatt & Co.....175 0 0

**FRINTON (Essex).**—For the erection of portion of school, Frinton. Messrs. Mr. E. C. Homer, architect, Masson House-chambers. Quantities by Mr. W. Birds-eye:—  
Dabbs.....£3,298 0 0  
Nightingale.....3,187 0 0  
Kilby & Gayford.....3,100 0 0  
Dixon & Co.....2,679 0 0  
Hook.....2,249 0 0  
Gillingham (accepted).....2,247 0 0

**FULHAM.**—For road and sewer works on the Sand's End Estate, for Messrs. Last & Sons:—  
Marshall, Brighton.....£3,300 0 0  
Oliver, Harlesden.....2,890 0 0  
Oseinton, Erith.....2,653 0 0  
Wilson, Walthamstow.....2,469 19 0  
Harris, Camberwell.....2,233 0 0  
Woodham & Fry, Greenwich.....2,139 0 0  
Tomes & Wimpey, Hammersmith.....2,125 0 0  
Nicholls, Wood-green.....2,095 0 0  
Neal, Wandsworth-common.....2,033 0 0  
Bottoms, Battersea.....1,998 0 0  
Bell, Tottenham.....1,880 0 0  
Killingback, Camden Town.....1,797 0 0  
Felton, Brondesbury.....1,630 0 0  
Neave & Sons, Paddington.....1,619 0 0  
Ford & Co., Westminster.....1,670 0 0  
W. H. Saunders, Bournemouth.....1,569 6 6  
S. Saunders, Fulham (accepted).....1,519 10 0

**HENLEY-ON-THAMES.**—For erection of villa residence for Mr. W. J. Holland. Mr. H. M. Newlyn, architect:—  
Frost & Co., Union-court, London (accepted).....£700 0 0

**HIGHGATE.**—For bar fittings at Highgate Archway Tavern, for Messrs. Wheeler & Sons. Mr. J. G. Enson, architect:—  
Patrick.....£374 0 0  
Beale.....339 0 0  
Lambell.....297 0 0  
Godden.....275 6 0  
Lascelles & Co. (accepted).....264 10 0

**HORNSEY.**—For the formation of new roads for the Hornsey Local Board. Mr. T. de Courcy Meade, engineer and surveyor:—  
Tivoli.....£409 5 0  
Chifton.....448 15 0  
Coleridge.....419 0 0  
Hindle & Morrish, City.....409 5 0  
Heard, Hoxton.....448 15 0  
Marshall, Brighton.....419 0 0  
Cook & Co., Battersea.....476 0 0  
Dunmore, Crouch End.....467 2 0  
Nowell & Robson, Westminster.....495 0 0  
Jackson, Strand-green.....419 0 0  
Nicholls, Wood-green.....439 0 0  
Aspinall, Hoxton.....465 0 0  
Mowlem & Co., Westminister (accepted).....448 0 0  
Kilburn-Jane. Mr. Ernest Turner, architect:—  
Holloway Bros. (accepted).....£11,223 0 0  
[For full list see Builder, p. 787 ante.]

**LONDON.**—For alterations at Coventry Club Chambers, for Messrs. Salaman & Co. Mr. H. H. Collins, architect:—  
Howard.....£3,300 0 0  
Falcon & Fotheringham.....3,133 0 0  
Little & Senecal.....2,655 0 0  
Greenwood.....2,338 0 0  
Trent.....2,316 0 0  
Lascelles & Co. (accepted).....2,219 0 0  
\* Accepted subject to modifications.

**LONDON.**—For painting and repairs to six houses for Mr. Charles Best. Mr. Henry J. Treadwell, surveyor, Agar-street, Strand:—  
Clarke & Mannoch.....£398 0 0  
Styles & Son.....388 0 0  
Homann & Son (accepted).....380 0 0

**NEWCASTLE-ON-TYNE.**—For steam heating of the new buildings and laundry machinery and radial drying closet fittings of the Newcastle City Asylum, for the Visiting Justices. Mr. A. B. Plummer, A.R.I.B.A., architect and surveyor, Newcastle:—  
Bradford, Manchester (accepted).....£713 0 0  
Alterations and Additions to Boiler House. W. Scott, Newcastle (accepted).....£735 0 0

**SOUTHERY (Norfolk).**—For a new bridge over the engine drain, for the Magistrates of the County. Mr. T. H. B. Heslop, A.M.I.C.E., county surveyor, Norwich:—  
Brickwork &c. D. Porter & Sons, Southery (accepted).....£361 0 0  
Ironwork. Tidman & Sons, Norwich (accepted).....£217 10 0

**SOUTH NORWOOD.**—For additions to class-rooms, South Norwood Schools, for the Croydon School Board. Mr. Robert Ridge, Croydon, surveyor to the School Board, architect. Quantities by the architect:—  
Barton.....£539 10 0  
Holt.....525 0 0  
Howell & Son.....495 0 0  
Bryan.....459 0 0  
W. G. Wyatt & Co.....477 0 0  
Coles.....464 0 0  
Smith & Bulled.....454 0 0  
Sedgewick.....439 0 0  
Macrae.....430 0 0  
Jas. Smith Bros. (accepted).....411 0 0

**WATCHET (Somerset).**—For the repairs, restoration, re-seating of St. Dunstan's Church, at Watchet, Somerset. Mr. J. P. St. Aubyn, architect, London:—  
Wall & Hook, Brinscombe, Gloucester (accepted).....£1,363 0 0

**SPECIAL NOTICE.**—Lists of Tenders frequently reach us too late for insertion. They should be delivered at our office, 46, Catherine-street, W.C., not later than Four p.m. on THURSDAYS.

## PUBLISHER'S NOTICES.

Registered Telegraphic Address, "THE BUILDER, LONDON."

**CHARGES FOR ADVERTISEMENTS.**  
SITUATIONS VACANT, PARTNERSHIPS, APPRENTICESHIPS, TRADE, AND GENERAL ADVERTISEMENTS.  
Six lines (about fifty words) or under.....6s. 6d.  
Each additional line (or ten words).....0s. 6d.  
Terms for Series of Trade Advertisements, also for special Advertisements on front page, Competitions, Contracts, Sales by Auction, &c. may be obtained on application to the Publisher.

**FOUR Lines (about THIRTY words) or under.....2s. 6d.**  
Each additional line (about ten words).....0s. 6d.  
PREPAYMENT IS ABSOLUTELY NECESSARY.  
\* Stamps must not be sent, but all small sums should be remitted by Cash or Registered Letter or by Money Order, payable at the "Post-office, Covent Garden, W.C. to Douglas FOURDRINIER, Publisher.

Advertisements for the current week's issue must reach the Office before 11 o'clock p.m. on THURSDAY.  
The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c. left at the Office in reply to Advertisements, and strongly recommends that of the latter ONLY should be sent.

**SPECIAL.—ALTERATIONS IN STANDING ADVERTISEMENTS.**  
ALTERATIONS IN STANDING ADVERTISEMENTS must reach the Office before TEN o'clock on WEDNESDAY in advance.  
PERSONS Advertising in "The Builder" may have Replies addressed to the Office, 46, Catherine-street, W.C., if desired. Letters will be forwarded if addressed envelopes are sent, together with sufficient stamps to cover the postage.

**TERMS OF SUBSCRIPTION.**  
"THE BUILDER" is supplied gratis from the Office to residents in any part of the United Kingdom at the rate of 19s. per annum. Foreign, to all parts of Europe, America, Australia, and New Zealand, 25s. per annum. To India, China, Japan, &c. 30s. per annum. Remittances payable to DOUGLAS FOURDRINIER, Publisher, No. 46, Catherine-street, W.C.

## TO CORRESPONDENTS.

Registered Telegraphic Address, "THE BUILDER, LONDON."

T. R. S.—T. L. W. (we fear it is not a matter of which the law can take cognisance).—W. D. & Sons.—H. & Son.—G. A. & Co.—H. C. (the initials you require will be found in the Builder for Feb. 7, 1885).—J. S. & Co. (too late).  
All statements of facts, lists of tenders, &c. must be accompanied by the name and address of the sender, but not necessarily for publication.  
We are compelled to decline pointing out books and giving addresses.  
NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.  
We cannot undertake to return rejected communications.  
Letters or communications (beyond mere news items) which have been duplicated for other journals, are NOT DESIRED.  
All communications regarding literary and artistic matters should be addressed to THE EDITOR; all communications relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

**Best Bath Stone.**  
WESTWOOD GROUND,  
Box Ground, Combe Down,  
Corsham Down, And Farleigh Down,  
RANDELL, SAUNDERS, & CO., Limited,  
Corsham, Wilts. [ADVT.]

**Bath Stone.**  
BEST QUALITY OF ALL KINDS.  
PICTOR & SONS,  
Box, WILTS. [ADVT.]

**Doubling Freestones and Ham Hill Stone.**  
of best quality, in blocks, or prepared ready for fixing. An inspection of the Doubling Quarries is respectfully solicited; and Architects and others are CAUTIONED against inferior stone. Prices, delivered to any part of the United Kingdom, given on application to CHARLES TRASK & SONS, Norton-sub-Hamdon, Ilminster, Somerset.—Agent, Mr. E. WILLIAMS, No. 16, Craven-street, Strand, W.C. [ADVT.]

**Doubling Free Stone.** For prices, &c., address S. & J. STAPLE,  
HAM HILL STONE, Quarry Owners, Stone,  
BLUE LIAS LIME, and Lime Merchants,  
Stoke-under-Ham,  
(Ground or Lump), Ilminster. [ADVT.]

**Asphalte.**—The Seyssel and Metallic Lava, Asphalte Company (Mr. H. Glenn), Office, 35, Poultry, E.C.—The best and cheapest materials for damp courses, railway arches, warehouses, floors, flat roofs, stables, cow-sheds, and milk-rooms, granaries, tun-rooms, and terraces. [ADVT.]

**Asphalte.**  
Seyssel, Patent Metallic Lava, and White Asphaltes.  
M. STODART & CO.  
Office:  
No. 90, Cannon-street, E.C. [ADVT.]

**MICHELMORE & REAP.**  
Manufacturers of  
CHARLES COLLINGS' PATENT.  
COLLINGS' PATENT HINGES,  
LEVER, SCREW, & BARREL BOLTS,  
Self-Acting "FALL DOWN" GATE STOPS,  
and IMPROVED GATE FITTINGS of every Description,  
364, BOROUGH ROAD,  
DISCOUNT TO BUILDERS. LONDON, S.E.

GOLD AND SILVER MEDALS AT AMSTERDAM EXHIBITION.

## IRON CISTERNS.

F. BRABY & CO.

LONDON, LIVERPOOL, GLASGOW.

VERY PROMPT SUPPLY.

LARGE STOCK READY.

CYLINDERS FOR HOT-WATER CIRCULATION

Particulars on application.

Chief Office: 360, EUSTON ROAD, LONDON.



# The Builder.

Vol. L. No. 250.

SATURDAY, JUNE 5, 1896.

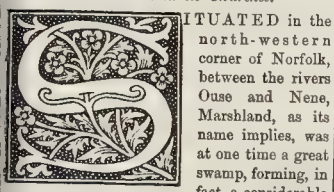
## ILLUSTRATIONS.

Window in the Hall of the Butchers' Company, London.—Executed by Messrs. Lavers & Westlake	811
Status of Berlioz: to be erected in Paris.—M. Alfred Lenoir, Sculptor	815
New Shops and Offices, New Broad-street, City.—Mr. F. Adams Smith, Architect	818-819
Sections and Details of All Saints' Church, Walsoken, Norfolk.—Drawn by Mr. A. G. Adams	822, 823, 827
A House at Carshalton.—Mr. H. D. Appleton, Architect	828

## CONTENTS.

Marshland and its Churches	803	State of Berlioz	812	The New Goods Depot for the Midland Railway	822
Relief of Old London: The Photographs for 1896	804	Shops and Offices, New Broad-street, City	812	The Student's Column: Our Building Stones.—XIII.	833
Notes	805	All Saints' Church, Walsoken	812	Books: Seldon's Builder's Work and the Building Trades	
Architecture at the Royal Academy.—VI.	807	Anglican House, Carshalton	812	(Livingston): Sargent's Ground-Rents and Building Leases	
Letter from Paris	807	Royal Institute of British Architects	829	(Swan, Sonnenschein, & Co.): Les Chroniques de la Société Propriétaire	
Further Notes on the Edinburgh Exhibition	808	The Royal Stani, Epsom	830	(Didot, Paris): Ornament and Form des Attaches Gratielles	
The Surveyors' Institution	809	The Contraintes Testament of Concrete	831	(Struensee, Struensee)	834
Architectural Societies	809	Case under the Metropolitan Building Act: Notice as to Shop	831	Recent Patents	833
Capitals, Lincoln Cathedral	810	Front	832	Recent Sales of Property	835
Examples of Japanese Work	810	"Lights"	832	Meetings	835
Decorative Panel	812	Durham	832	Miscellaneous	835
Window in the Butchers' Hall	812	Sanitary Institute of Great Britain	832	Prices Current of Building Materials	836

### Marshland and its Churches.



**S**ITUATED in the north-western corner of Norfolk, between the rivers Ouse and Nene, Marshland, as its name implies, was at one time a great swamp, forming, in fact, a considerable part of the Wash, impassable at low tide, and one great expanse of water when the tide was full; in breadth about seven miles, and extending from Lynn southward as far as the Por or Pa dyke; westward including Wisbech and the neighbouring villages in Cambridgeshire. The traveller in this district will probably at first be struck with the extreme flatness of the country (for it is a dead level), and also with its apparent baldness; but it improves on acquaintance, and it must be remembered that this is one of the richest grain districts in England, whilst the pasture for cattle is unrivalled, owing in great measure to the numerous dykes and ditches which intersect the land in every direction. The county is purely agricultural; and it is this which makes it so surprising that such splendid churches are to be found in almost every village, — often several within sight of each other. That much good work exists in King's Lynn is easily accounted for from the fact of its having been at one time, — as it is even now in a less degree, — a seaport of considerable importance, and its inhabitants a very wealthy class. Many traces of its former splendour are still in existence, and a short walk through the town will reveal much of interest. The streets wind about in most confusing fashion, and seem, as in so many old towns, to have been laid out without plan or reason. Curious courts and alleys, leading off from the main thoroughfares, excite curiosity, met sometimes by disappointment, but more often rewarded by the discovery of some quaintly picturesque brick gable, or perhaps of some old courtyard surrounded by a building which as at one time the abode of some wealthy merchant of two centuries back, but which is now divided into several small tenements, each with its own proprietor, who still takes a certain pride in his surroundings, and who will be only too happy to open his doors, — especially if assisted by that silver key which no traveller can long do without: it may be, wondering a little what there can be of special interest in his room, but nothing worth to do all in his power to oblige, saying, in the peculiar sing-song common to the Norfolk lower classes, and raising his voice at the end

of the sentence, — "Coomo in, sur, coomo in; they do saay as that boarding, sur, agin the wall be woonderful cold"; directing our attention, at the same time, to some Jacobean oak panelling which has survived the changes from which the building has suffered. In response, however, to a feeler thrown out as to purchase, we are met by the answer, which clearly shows that the same thing has already been attempted by others, — "Noa, no-a, sur; I loikes the room woonderful well, and I beant agooin to part." With a sigh, — for the panelling is very good and in beautiful preservation, — and, after further examination, we take our departure, not without some feeling of relief that, at all events, even if we are not to be the fortunate possessors, nobody else is likely yet awhile to obtain it. One such courtyard as that above mentioned goes by the name of "Hampton Court," and from the roof of the arched entrance hangs suspended a cannon-ball, which the inhabitants tell us was pitched into the middle of the building during the siege by Cromwell, when the town stood out for King Charles.

First and foremost as objects of interest in Lynn are the two great churches, St. Margaret's, and its wonderful chapel-of-ease, St. Nicholas. St. Margaret's is the more important of the two, being the mother church. It is said to have been built by Herbert de Losinga, Bishop of Norwich (1091-1119). Portions of his buildings still remain in the west front, and are good specimens of Norman work. The nave was destroyed in 1741, owing to the falling of the spire of one of the western towers, but it was rebuilt in the style (?) of the period. The Early English bases of the former nave-piers have recently been brought to light, and show a central column with four clustered and detached shafts. The choir is Early English, and very beautiful, the caps being richly carved with foliage, each one varying in design. In this church is the famous "peacock" brass (1374), now removed to a safe position in the south-west tower. This commemorates Robert Brauncle and his two wives. They lie under canopies with eight mourners, in male and female costume, at their feet a peacock feast is portrayed. King Edward III. is seated with his courtiers at table, and a peacock is being brought in; on one side a knight is reaching forward for the dish, with one leg thrown across the table in his haste. Another very similar brass, to the memory of Adam de Walsoken, lies by its side, with the date 1349. Both brasses are the same size, 10 ft. long by 5 ft. wide, and they probably came from Flanders, as they bear all the characteristics of Flemish work. Haines says: — "The principal lines are broader and more deeply cut, and wrought with a flat chisel-shaped

tool instead of the ordinary engraving burin."

The organ-case should be noticed as very fine, resembling in many points that in King's College Chapel, Cambridge. The Late Jacobean screen is worthy of notice; also the beautiful stall-work; this latter is of the most costly description, and very perfect, *temp.* Edward III. On one of the subellæ is a head of Edward the Black Prince, together with his device of feathers, besides many other coats-of-arms of worthies who have long since ceased to exist, and whose names in many cases are forgotten.

St. Nicholas, the chapel-of-ease to St. Margaret's, is a fine church, 200 ft. long, originally built in 1160. The tower alone remains of the old building, which was replaced by the present structure during the years 1374-1419. Unfortunately, the church has been robbed more than once; few of the bench ends, which were very fine, remain, and the old glass has almost entirely disappeared. There is a curious inscription on a tablet, with date 1600, which runs as follows: —

"A good steward is liberal and giveth to the poor;  
The wicked one as owner keepeth still his store;  
Distrusting God's providence hath made his heart  
hard;  
He doth not part from a penny in hope of reward."

Another slab in the pavement, with date 1789, in memory of Thomas Hollingworth, a bookseller, states that he was "a man of strictest integrity in his dealings, and much esteemed by gentlemen of taste for the neatness and elegance of his binding."

Leaving Lynn, and crossing the Ouse by the new bridge, we find ourselves in Marshland proper, — a district rich in churches. To the left the spire of Tilney All Saints; the grand tower of Terrington St. Clements on our right; a little further, the two churches of Walpole, — all these promise us good material for our sketch-book. Making our way to Tilney All Saints Church, we find a building containing work of every period, from early Norman to Perpendicular and Jacobean, with even some nineteenth-century additions. This is the more noteworthy because of the comparative sameness of the majority of those in the neighbourhood; with but few exceptions these are late Perpendicular, with occasionally small portions of a former structure remaining. This is the case at Walpole St. Peters, which possesses a Decorated tower and nave clear-story; how this latter feature has come about it is difficult to determine, for to all appearance the piers and arches which carry it are of a much later date, — but how or when it was done has not yet been settled, and it still remains an interesting but unsolved problem. Another noteworthy feature in this church is the way in which the altar is raised to a considerable height, to permit the construction of



a passage underneath. The total length of the old building equalled that of the nave as at present. The accommodation proving too small for the requirements of the parish, the church was remodelled, and a new chancel built at the east end of the existing one. A public right of way, however, cut across the proposed site, and apparently prevented this change from being effected; but the difficulty was met in the way indicated, and the height to which the altar is necessarily raised has an imposing effect. The roof of the passage underneath is richly groined, and has a profusion of elaborately-carved bosses at the intersection of the ribs. A similar expedient has been resorted to at St. Michael's, Norwich, but in this case it is not so conspicuous, as the church stands some way back from the main street.

The civility and kindness of the Norfolk folk are proverbial; this is specially noticeable in the way in which the architectural student or visitor is treated by the clergy of the churches he visits. At Walpole, the rector, besides offering the usual courtesies, takes the greatest interest in explaining the peculiarities of his church, when he can find an appreciative listener, and draws attention to many little points and details which the casual observer might fail to perceive. Of course some curious characters are to be met with. On one occasion a ladder was necessary to enable us to take some dimensions. On applying to the parson for help we were informed that one could be obtained opposite for the asking, and he gravely added, "I can assure you that that man (referring to the builder who owned the ladder) is a most excellent workman, although he is a Dissenter." At another time we were given permission to sketch, provided that beer-bottles and cheese-parings were not left on the founders' tombs. *Experientia docet*. Evidently, some one of the fraternity had been feasting at one and the same time both his inner and his outer man, and had left traces behind which were not altogether pleasing to the authorities that were. Our promise having been given, friendly relations were once more restored, to such an extent, indeed, that before parting, more than one empty bottle remained, not upon the founders' tombs, but on the rectory sideboard.

Making our way to Terrington St. Clements, we find a church well worthy of notice, containing an elaborate porch on the south side and a fine tower on the west. This latter is detached from the rest of the structure, having been built at a different date. It is thought by some to have been erected as a refuge from the floods which, in former times, so often devastated the country. The tower is built of stone brought down the river Nene from the Barnack quarries in Northamptonshire. This stone is of a blue grey colour, and is little affected by time or weather, the strings and moulded work being as sharp and clean now as when they left the hands of the mason. Almost all the neighbouring churches are partly built of the same stone, the only other material available being flint, and this latter is generally used for the body of the walling. The tower walls of Terrington, at the ground-floor level, are 7 ft. thick, fully bearing out the idea of having been built to resist the floods. It is related that in the year 1607 one of these floods occurred, and the Jury for the Hundred reported that, "in their distress the people of the town fled to the church for refuge, some to haystacks, some to the baulks in the houses, till they were near famished; poor women leaving their children swimming in their beds till good people, adventuring their lives, went up to the breast in the water to fetch them out at the windows. Whereof Mr. Browne, the minister, did fetch divers to his church upon his back. And had it not pleased God to move the hearts of the mayor and aldermen of King's Lynn with compassion, who sent beer and victuals thither by boat, many had perished; which boats came the direct way over the soil from Lynn to Terrington."

The danger of such a flood occurring again has been practically prevented by the great scheme known as the Nene outfall. A stream

some 200 ft. wide and 24 ft. deep, embanked on either side, was formed in 1830 by Messrs. Rennie & Telford. This, by a direct route, takes the drainage of the whole of the North Level,—a district containing 48,000 acres,—and has converted a barren swamp into rich pastures and cornfields. "We may mention, as a remarkable effect of the opening of the new outfall, that in a few hours the lowering of the waters was felt throughout the whole of the fen level. The sluggish and stagnant drains, cuts, and leams in distant places began actually to flow, and the sensation created was such that at Thorney, near Peterborough, some fifteen miles from the sea, the intelligence penetrated even to the congregation at church,—for it was Sunday morning,—that the waters were running, when immediately the whole flocked out, parson and all, to see the great sight, and acknowledge the blessings of science."<sup>\*</sup>

Perhaps the most remarkable of the Marshland churches is that at Walsoken, about one mile out of Wisbech on the Lynn road, and of which we give measured drawings in the present number. The west doorway of the church is a good specimen of Early English work, having a deeply-recessed and richly-moulded circular arch, carried by three slender detached shafts with carved caps,—these latter having been restored. The church is of large size, and presents internally a somewhat confused mixture; the arches which separate the nave from the aisles are semicircular, and have a heavy Norman zigzag moulding on the soffit; the columns which carry these arches are alternately circular and octagonal, and these octagonal piers are again varied by being placed the one with a plain face parallel to the axis of the church, the next one anglewise. This arrangement gives not a little variety to the arcade, an effect which is increased by the curious treatment of the chancel arch,—this is an unusual and not altogether pleasing feature. The arch is Norman, and is covered with several bold round chevron mouldings, as well as a lozenge ornament; it is pointed, and almost equilateral, while the shafts which carry the caps from which the arch springs are divided up every 2 ft. by large projecting annulets, which produce an effect of broken surface quite out of keeping with the severity of the rest of the work of the same period. The caps to the nave piers are carved, and are all different in design, but not specially noteworthy, except the responds at the east end, and these are good examples of the transition from Norman to Early English,—small knob-like leaves break out from the plain face of the cap, and these lead up to the chancel arcade, where the genuine Early English foliage appears. Over these arches a Perpendicular clearstory of three-light windows has been added, entirely obliterating in the nave all traces of the windows which formerly existed. In the chancel, however, the windows remain, notwithstanding later additions; the stone arches and jambs showing through the plastering clearly indicating the original design. A flat hammer-beam roof has also been added, and this will repay a careful examination, as it is in a good state of preservation, the greater part of the original colour decoration being very perfect. Taken as a whole or in detail the building is worth study, and a visitor to the neighbourhood should on no account miss seeing it, as the time occupied, even at some inconvenience, will have been most profitably spent.

The last church we can notice is that at West Walton, which is about one mile beyond Walsoken, and is of almost equal interest. The churchyard is entered under a detached Early English tower, which stands at a considerable distance from the main building, and is probably a trifle earlier in date; unfortunately the whole place is in a dilapidated and almost ruinous condition, besides having been sadly mutilated in past times; the clearstory is blocked up by the great fifteenth-century aisle roofs. The west wall has had two enormous buttresses added, in order to keep it from falling, and is painfully out of the perpendicular even now,—in fact,

everything points to neglect and decay. Why a restoration is not attempted it is difficult to say. Possibly the expense would be too great, for the work is so elaborate and costly that a very considerable sum would be needed. The nave arches are carried on central stone piers, with four banded and clustered Purbeck marble shafts, the caps being carved with fret. Early English foliage, similar, both in design and execution, to that in the nave of Lincoln Minster. Strange to say, the carving has been but little injured, though in many cases the marble shafts have disappeared, and those that remained were in many cases broken and otherwise defaced. This richness of work is not confined to any particular part, but is apparent in the whole of the older parts of the building,—these include the nave and chancel, south porch, and a considerable portion of the aisle walling. This church is easy of access, being but a short distance from Wisbech, and not more than a few miles from Lynn; but it is a great surprise coming upon it unawares, even in a country such as Marshland, where there are continual surprises. It is in a district which has not been much studied, or even much sketched, but is one which deserves to be better known than it is, and which will well reward a visit.

## RELICS OF OLD LONDON.\*

THE PHOTOGRAPHS FOR 1886.



We use no trite form of words in saying that we receive this collection of views with a not unmixed pleasure, for they constitute the final issue of the Society's publications. Mr. Alfred Marks, the honorary secretary, should be warmly congratulated upon the progress and conduct of the enterprise. We are sure that his brother subscribers will cordially acknowledge him to have been the leading spirit in their undertaking, and that to his exertions, as to the sketching of the Messrs. Dixon, the Society's photographers, its successful accomplishment,—despite many inherent difficulties of time and space,—is entirely due. That the work was not begun too soon is manifest from the circumstance that since 1875,—when the series was opened with six views of the Oxford Arms Inn, Warwick-lane,—many of the illustrated subjects have already ceased to be, including, for instance, one of the two fine old shop-fronts in Soho, Oxford Market, Sion College, Temple Bar, the Oxford Arms itself, together with various antiquated tenements in Leadenhall-street, Fore-street, Gray's Inn-lane, and Aldgate.

It has been urged against these photographs that they give us very good presentments of advertisement placards, drawn blinds, and closed shutters. Criticism of this kind is a ill-considered as it is easy and illiberal. The "posters" and "boards" will show a future age how we disfigure our streets. Most of the outdoor views were necessarily taken when the city was in the condition that so forcibly struck Wordsworth as he crossed over old Westminster Bridge. That these were done in the early morning is obvious enough from the direction and length of the shadows, the unextinguished gas jets, the time as shown on certain dials, and the absence of wayfarers. Devotees of the picturesque must not look here for such attributes as are conspicuous in the cognate etchings, say, of Mr. Ernest George. But we do get an otherwise unattainable fidelity of outline and detail, lacking only the brilliancy and colour of the image that is cast by the camera lucida. The later issues are singularly good in their treatment of a difficult matter, the photographing of dark interiors witness the Charterhouse and Temple groups. The exterior views are not free, of course, from what we may term the congenital defect of photographic pictures when applied to close perspective. The foregrounds stand out disproportionately vast as contrasted with the middle and remoter distances. The camera rigidly fixes those nearer objects which it

\* Smiles, "Engineers."

\* Photographs published by the Society for Photographic Relics of Old London. Alfred Marks, the secretary. Nos. 110-120. Issued, 1886.



eye does not take in except by its rapid,—albeit, unconscious,—movement. Moreover, no artistic skill has yet been able to transfer on to the flat sheet that indescribable effect of dimmed atmosphere and softened tones which by inductive experience the human vision associates with relative distance.

To the pictures under review, Clerkenwell and Westminster contribute eight subjects. Thus we have, on the one hand, St. John's Gate, the chimney-piece of Hicks's Hall, and the Court Room of the New River Company; on the other hand, Emmanuel (Anne, Lady Dacre's) Hospital, Queen Anne's statue in Queen-square, and three doorways in Queen-square, Grosvenor-road, and Delahay-street. This last "is from No. 17, Delahay-street, given by Mr. Hare,—I fear without sufficient authority,—as that of Judge Jefferies's house ('Walks in London,' ii., 296)." Mr. Hare, even at his best, is no very trustworthy guide. As it happens, this particular doorway is reinstated *in situ*, as Mr. Marks reminds us.\* But Jefferies's house, or rather what remains thereof, should be looked for at Chapel-place, Nos. 7 and 9, in the street, where the stone house with a circular dancing tower (*circa* 1870), occupies the site of Duke-street Chapel. The rest of Chapel-place is indubitably the house pre-figured as Judge Jefferies's in Shepherd's earlier drawing, of which we have a print. In his description of the Tennis Court, James-street, Haymarket, Mr. Marks speaks of it and of its timber-fronted neighbour, "The Barn," as though they are relics, probably, of Piccadilly Hall. Certainly Clarendon's quoted description gives us an idea that the Gaming-house grounds were of considerable extent. Yet there seems to be some confusion here as to the Gaming-house,—vulgarily known by the style of "Shaver's Hall," built by Lord Pembroke's valet,—which stood at the north-eastern corner of the Haymarket, just where, until the widening of Coventry-street, was Wishart's snuff and tobacco shop, a noted Jacobite rendezvous in its day. The Barn, by the way, was, about thirty-five years ago, Busher's coach factory, at which time the tablet, with date 1673, was affixed on the front wall of the house between the factory and the Tennis Court. It is now against the Tennis Court wall. Singularly enough, in Newcourt's map, engraved by Wm. Faithorne (1658), the Way to Piccadilly Hall is indicated (corresponding with the present Piccadilly), but whilst that hall is not marked by name the building at the corner of Coventry-street and Haymarket is designated as the Gaming-house. Piccadilly Hall, we rather lay on the northern side of Coventry-street, at the angle with Great Windmill-street, in St. Martin's-in-the-Fields parish, and on the ground which is now covered by Scott's supper-rooms. Timbs (1855) says the house was demolished about 1685, and adds that "a tennis court in the rear remained to our time, upon the site of the Argyll Rooms (the Trocadero), Great Windmill-street." The Tennis Court shown in the view was, we believe, built for King Charles II. It is that mentioned by Pepys (Jan. 4, 1663-4, and Sept. 2, 1667), wherein the King's play was extolled in such terms as are but fit in the case of a sovereign; though in no unmeasured phrase, almost worthy of Juvenal, Pepys in his instance marks his opinion of courtly vanity. Pity it is that the sums of money which were sunk in skating-rinks were not pent upon the revival of this right royal game. We are glad to see a picture of an old but little known friend,—the Bear in Lower Thames-street. He, of course, has nothing to do with the Royal Menagerie; but, with his collar and chain, he reminds us of his compeer, the Tower Bear, who, similarly secured, was allowed to disport himself and fish in the Thames. Perhaps the most interesting, though scarcely the most striking, photograph is that of London Stone. We are at one with Mr. Marks in his conjectures upon the origin and purport of that relic. Jack Cade, or "Mortimer," clearly went through no idle ceremony when he struck its stone with his sword, proclaiming himself

at last "lord of this city." Were it, indeed, a milliarium, as Camden thought, we should have had, doubtless, some tradition of its situation by the Roman forum near to where is now the Mansion House. Its venerable antiquity opens many questions which we cannot discuss here. On the score of age and its supreme significance as a mute but incontestable witness to contracts and the like, its history should be read along with that of the hweret-mound stone at St. Michael's le Querne, or ad Bladum, in Chepe. This latter is specified in a conveyance, A.D. 889, of the parcel of land whereon it stood by King Alfred to Werewit, bishop of Worcester, relatively to the corn-market at that spot.

## NOTES.

**T**HE second report of the Committee on the Ventilation of the House of Commons, just published, dealing chiefly with the causes of smells in the House, shows conclusively that the system of drainage, planned at a time previous to much of the modern sanitary gospel, requires a radical reform. The main sewer under the House is obviously far too large, and its invert at the junction with the public sewer is below the lowest level of the sewage in the latter, so that there must be always a standing pool at the lower end of it. The Committee propose to construct within the present large brick drain a smaller one, of a better section, about 3 ft. 8 in. high, by 2 ft. 4 in. wide in the clear, constructed of white glazed fire-bricks, in Portland cement; the remaining space in the existing sewer to be filled up with concrete. They propose that this new sewer should discharge into a vertical stand-pipe, whence the sewage should be pumped by Shone's pneumatic ejectors into the outside portion of the existing sewer, and run thence into the low-level main sewer, so as to cut the latter off from all connexion with the Houses of Parliament drainage system. They propose effectual means for ventilating the new drain by a fresh-air down-take pipe at the lower end, and a foul-air up-take pipe from its upper end into the shaft over the furnace in the Victoria Tower. This will be effectual. The Committee take the opportunity of making an attack on the state of the large low-level sewer adjoining, which the Chairman of the Board of Works, in answer to a question addressed to him in the House, said that his Board did not think it necessary to ventilate; "an opinion to which the Committee venture to think his Board will not long be able to adhere." The Committee, without echoing the groundless complaints that have been made about the ventilating system of the House (which, provided it has pure air to deal with, is really a very efficient one), point out quite rightly that where an extraction system is used there is a pull of air into the apartment, which facilitates the ingress of contaminated air escaping from pipes or waterclosets; and they recommend the substitution of propulsion, which we have repeatedly said is the true system to employ for large public buildings. There are propulsion fans and engines now in the basement of the House, for use when the state of the weather vitiates the action of the extraction system; so it is only necessary to substitute this for the extraction system. The report generally is a most sensible and practical document, which, we hope, will receive the attention it deserves.

**O**N the 31st ult. a banquet was given at the Hôtel Continental at Paris, by one hundred members of the Société Centrale des Architectes, to M. Charles Garnier, in honour of the decree of the presentation to him this year of the Royal Gold Medal of the Institute of British Architects. M. Achille Hermant, Vice-president of the Société Centrale, occupied the chair, the President, M. Baillly, being prevented by illness from attending. The chairman gave the history of the Royal Gold Medal, and proposed the health of M. Garnier, who, in replying, expressed in warm terms his sense of the kindness of his professional brethren on both sides of the

Channel. The delegates of the Society of Architects of Bordeaux congratulated M. Garnier also in the name of the provincial architects of France. M. Paul Sédille, after reading letters from Mr. W. H. White, Mr. R. P. Pullan, and Mr. Aitchison, regretting their inability to be present on the occasion, proposed the toast of "Nos confrères Anglais" and the Royal Institute of British Architects.

**T**HE Town Council of Bath have been occupied in considering the question of the proposed extension of the modern baths and its probable effect in destroying or obliterating part of the valuable and interesting remains of the ancient Roman bath. The report of the Baths and Pump-room Committee took the line that ancient remains should not be permitted to interfere with works of modern and public utility,—a line of reasoning which, in itself and in a general way, we should not be disposed to dispute; but, as we have already observed, the Roman remains at Bath are of very exceptional interest and value, and every effort ought to be made to avoid injuring or hiding them from view. As far as we can gather from the various very contradictory statements dropped at the meeting (as reported in the *Bath Journal*), it would appear that in the mind of the City Surveyor and his supporters utilitarian considerations have gained rather too much the upper hand. Alderman Murch, in a moderate and sensible speech, urged the importance of the ancient remains, and suggested that the basement of the proposed addition should be sacrificed, and that there should be fewer new baths. How far this would meet the case we cannot, of course, tell without knowing what is the actual demand for more bath accommodation. Alderman Gibbs proposed as an amendment that the report be referred back for fuller consideration, and that another architect should be called in to consult with the Surveyor (Mr. Davis) "as to the best mode of effecting the extension of the modern baths without any interference with the ancient remains." This would have been the best course to take, and we regret to observe that this amendment was lost by one vote (21 against 22). As the vote was such a near thing, we hope the matter will not be considered altogether settled. From the comments and correspondence in the local papers the result seems to be regarded in Bath with anything but satisfaction.

**T**HE rule that before an award of an arbitrator can be taken up, his fees must be paid, frequently is very unjust towards the successful party. This has just been illustrated by the case of Westwood & Co. v. The Government of the Cape Colony. A lengthy arbitration between these parties as to certain work done by the former was held before Sir James Brunlees. Messrs. Westwood took up the award and paid the arbitrator's fees, amounting to 1,200*l.* odd. The award was in their favour, and the Government were ordered to pay the cost of the reference. On taxation 800*l.* odd of Sir James Brunlees's fees were disallowed, the consequence being, of course, that Messrs. Westwood will have to pay this sum out of their own pockets. The decision of the Taxing Master was upheld by the Court. No doubt the Taxing Master acted perfectly correctly in reducing Sir J. Brunlees's fees to the ten guineas per day which would have been allowed a Queen's Counsel, but the matter shows how hardly the rule we have mentioned presses on a successful party if it happens that he does not receive all the costs from the other side on taxation. It is one of the extravagances of an arbitration that private individuals are paid for services for which the time of a judge can be had for nothing. But in those cases where an arbitration is actually necessary it seems to us that the proper rule would be for the arbitrator to fix his charges beforehand, and at the end of each day's hearing each party should pay half the fee for the day. If either side refused to pay the fee, it should be the duty of the arbitrator to continue the reference without him, and if on the next hearing the party was still of the same mind, judgment

\* Nos. 13 and 17, adjoining one to the other, seem to have replaced Nos. 13, 15, and 17.



should be given against him, as in an action by default. The case to which we have alluded shows that, under the operation of the present rule, a successful party may be actually out of pocket as regards costs.

LAST year the Postmaster-General obtained the authority of Parliament by a special Act to acquire land in Birmingham for the purpose of erecting thereon additions to the present head office. With extraordinary want of foresight,—perhaps, if it were a private individual of whom we were speaking, we should simply say with great carelessness,—the Department did not make sure that such additions would prove adequate for the wants of that great city. So a new Bill is now before the House of Commons. It is naively remarked in the preamble, after various recitals from the preliminary “whereas,” “but since the passing of the said Act [last year] it has been found that even if the said head post-office were so enlarged as aforesaid, it would in a very short time prove inadequate for the requirements of the public service”; therefore the Postmaster-General drops the Act of 1885, and wants powers to take other land for a new head office. But what can we think of the business capacities of a Department which in one year actually get an Act to enable them to add to existing buildings, and then, before the year is out, find that they must have new buildings? It is fortunate that the inadequacy of the additions to the present post-office at Birmingham has been discovered before they were erected; if this had not happened the country would have been put to a double expense, simply from a want of proper prudence in regard to the ascertaining of the required amount of space.

THE Post-Office Sites Bill, 1886, as the Bill above referred to is called, consists of fourteen clauses, most of them of a general nature, which would seem to be applicable to the purchase of sites in any place. Thus there is a power given to divert streets; it is to be enacted that the Postmaster-General shall not acquire ten or more houses occupied either wholly or partially by persons belonging to the labouring classes until the Local Government Board have sanctioned a scheme for providing new dwellings for such persons. It would be more satisfactory if a general Act were passed giving certain powers and rights to the Postmaster-General, and placing him under certain obligations when he has to purchase sites for post-offices. It seems to be altogether absurd to pass a Bill of this kind every time a site is required. It adds to the labour of Parliament, and it might be done once for all, so that all the world would know what was the law in case the Postmaster-General at any time desired to purchase a site for a post-office.

IN the last issue of the *Mittheilungen des Deutschen Archäologischen Instituts* (x. 3), Dr. Dörpfeld propounds an interesting, though rather startling theory. It has been universally accepted that the older Temple of Athene, on the Acropolis, which was destroyed by the Persians, occupied the site of the present Parthenon. The old temple was the work of the Peisistratidae, and it is supposed that Themistocles employed a good deal of the unfinished structure as building material for the repair of the fortifications of the north Acropolis wall. Fragments of pillars of marble and of an architrave of porous stone have been found built into this wall. The difference of material has inclined Dr. Dörpfeld to suspect that they did not belong to one and the same temple. His theory is that the architrave remains of porous stone belong to the old temple of the Peisistratidae, and that this was built, not where the present Parthenon is, but between the Parthenon and the Erechtheum, on a plateau 45 metres by 22 metres, where the remains of walls are still clearly to be seen. The whole of this temple was, he thinks, built of porous stone; it was of peripteral form, and he sees in its plan close resemblance to the old temple of Dionysos at Eleusis. Part of

the present Erechtheum is built on its site. The remains of marble pillars, he thinks, belong to a later temple, begun by Cimon, and this temple, he thinks, occupied the site of the present Parthenon. It was left unfinished on the banishment of Cimon, and eventually superseded by the final Parthenon of Pheidias. The theory, like some others of the enthusiastic German architect, seems to rest on rather slight grounds.

THE same number of the *Mittheilungen* also contains a paper by Dr. Köhler and Dr. Dörpfeld conjointly on the Choragic monument of Nikias. The Choragic monuments of Lysicrates and of Thrasyllos are well known, but though the remains of the monument of Nikias have been accessible since the excavation of the Beulé Gate, they have not till now been reconstructed into an intelligible whole; in fact, Beulé, their discoverer, thought the architrave with the victor's inscription, the triglyphs, and the cornice, all belonged to separate buildings. On Plate VII. of the *Mittheilungen* Dr. Dörpfeld reconstructs for us the front view of the building, which has special interest because it offers a third and wholly different type of Choragic monument. The Lysicrates monument, it will be remembered, was a circular building of the Corinthian order; the monument of Thrasyllos was a small Doric portico, forming the entrance to a natural cave; the monument of Nikias is in the form of a small Doric temple, with six columns in front supporting architrave and low pediment. Dr. Dörpfeld notes that the remains have further interest in connexion with the question of polychromy; the main portion of the building was of white marble, the triglyphs of the much cheaper “poros.” The triglyphs only bear traces of painting. Dr. Dörpfeld thinks that the triglyphs only were covered with a thick and opaque coating of paint,—hence the use of the cheaper material. For the special interest of the inscription on the architrave we refer our readers to Dr. Köhler's disquisition.

IN regard to the competition for the new facade for Milan Cathedral, of which we have already spoken, it is to be feared that the composition of the Jury will not inspire any greater degree of confidence than is usually felt in tribunals of this description. The competition is styled “international,” but foreign nations will be very imperfectly represented by the three architects to be chosen by the Milanese Academy of Fine Arts. The plan of allowing the competitors to elect four members of the Committee is a novel one, but it is very doubtful whether it will be found practicable; and, if practicable, it must almost of necessity result in an advantage to Italians. The preparation of a design for the preliminary competition need not involve a large expenditure of time or money, and perhaps some English architects may think it worth while to send in designs. The superintendence of the model is another matter, and would probably be a long and difficult task, and would involve a lengthy stay in Milan. The Italian architect selected by the Academy of Fine Arts at Milan to serve on the Committee is the Cavaliere Giacomo Franco, Professor of Architecture at the Academy of Fine Arts at Venice.

THE *Berliner Philologische Wochenschrift* (May 29) reports a paper read by Dr. Petersen at the last meeting of the Archaeological Society at Berlin. Dr. Petersen took part in both the expeditions recently made by Count Lanckoronski to Southern Asia Minor. He showed a number of plans and photographs which are to form part of the official report of the expedition shortly to be published. Special attention was drawn to the fortifications of Adalia. Seven plates are to be devoted to the detailed publication of the arch of Hadrian in that town, it being remarkably well preserved. On the site of the Greek colony of Sidè a richly-decorated fountain has been discovered, and the foundation of one of the gates of the town; the directions of the principal streets can be

clearly made out, and a great number of colonnades opening in the streets are still traceable. A plan has been made of the ancient harbour, close to which the remains of an exedra-shaped building have been found. Eleven plates will be devoted to reproducing the famous theatre of Aspendos. At Aspendos and Sytheion only have inscriptions in Pamphylian dialect been found. Time was when Southern Asia Minor was a field of exploration peculiarly English: witness our Lycian sculptures in the British Museum. But our mantle has now certainly fallen on Vienna.

ON the 27th ult. the last meeting for the season of the Société Centrale des Architectes took place at Paris, when a paper was read by M. Napoli, Chief Engineer of the Laboratory of Physics and Chemistry in connexion with the “Chemin de Fer de l'Est,” on “The Application of Electricity to Buildings.” He went through the subjects of electrical transmission of force, telephonic communication, electric lighting for dwellings, applications of electricity to lifts and to automatic fire-alarms, to the great interest of an audience of architects, among whom were present M. Garnier and M. Questel.

SINCE the publication in our last of Mr. Wild's letter about Christchurch, Brixton-hill, we have been to see what the churchwardens have done. They must, indeed, be penitently to have been obliged to cut a number of square holes in the aisle roofs, letting in the midday sun upon the heads of the congregation in the manner of a greenhouse. The effect upon the architecture is no less disastrous, the solemn tall columns being now seen in shade against these violent lights. The removal of St. Anne's Asylum has set at liberty a great deal of space formerly occupied by the steep gallery for the children, and it would seem an easy matter to re-arrange the organ so as to obtain room for increased light in the west wall; for the stained glass in the side windows, although evidently much darker than was intended by the architect, is very good of its kind, and must, no doubt, be left. As to the apse windows, one feels a delicacy in criticising what may have been memorial gifts to the church, but modern stained glass has been so much improved since they were executed that the substitution of paler glass to increase the light would be a welcome change.

OUR attention has been called to a trade circular which is being sent round by the “Providence Iron Works Company, Limited,” to architects and engineers, giving information as to their improved riveted girders, and concluding with this clause, to which special attention is called by a “Nota” :—

“A commission of 2 per cent. will be allowed to architects and engineers specifying our girders and brand. They are respectfully requested to send us as soon as possible, a copy of any specification to that effect.”

From the open and business-like manner in which this is done the only conclusion one can come to is that it is the result of sheer ignorance on the part of the Company issuing the circular. Do they know that every architect of respectability would regard that as an impertinence, and that those who entered into such an arrangement would be acting dishonourably towards their clients? Once more let us repeat what we have said before, that an architect has no business to consider any interests but those of his client in selecting the materials for use in a building, and a firm in doing a most improper thing in sending round such a notice to the profession. We charitably conclude that the “Providence Iron Works Company” are not aware that there is any impropriety in the matter, from the open way in which the offer is made, as offers of commissions of that kind are usually made *sub rosa* in diplomatic letters marked “private.” Architects who value the dignity of their profession ought to decline to do any business with firms sending such circulars until the obnoxious paragraph is removed; but we hope the company in question will have the good sense to cancel it themselves.



## ARCHITECTURE AT THE ROYAL ACADEMY.—VI.

THE first exhibit among domestic architecture, in the order of hanging, is

1,548, "A Country House in Hampshire," by Messrs. Wyatt & Spiers; what agents call a "bijou house," as appears from the plan, which the authors are to be commended for appending. The drawings consist of a small view of the drawing-room, with the bay-window stretching all across one side and giving a wide view of the prospect, and a perspective of the exterior, which latter is hardly architecture in the usual sense of the word; there is nothing that can well be called "design" in it, but it is entirely unobjectionable.

1,550, "A Mentone Villa," Mr. S. J. Newman. Another bijou house; a two-storied villa, in what may be called rural Italian style, with a plan appended, showing two sitting-rooms facing down the hill, and a "garden-room" on the ground floor of the short tower at the other end; a small open loggia between that and the porch.

1,553, "Old Falcon Inn, Chester," Messrs. Grayson & Ould. A "restoration" of a charming piece of half-timber work, shown in a neat perspective drawing. There is nothing to indicate how much is new and how much original.

1,555, "The Firs," Mr. C. Foster Hayward. A very nice water-colour drawing of a brick country-house of Queen Anne proclivities, with some good points about it. The doorway, set on diagonally at the angle, would probably seem to join the house rather awkwardly from some points of view. The bay-window and the gable flanked by chimneys on the left group well; the other front is rather fragmentary, and seems to want the details pulling together. No plan.

1,558, "Front in Terra-cotta, 17, Oxford-street," Messrs. Batterbury & Huxley. A pen elevation of a front partaking of Francis I. style, with Renaissance foliage decorations.

1,564, "House to be built near Guildford," Mr. W. S. Weatherley. A pleasant-looking country-house, shown in a pen drawing; lower story brick with stone dressings, upper story half-timber,—that is to say, we presume, the usual pretence of timber and plaster on a background of brick wall; the treatment of the entrance, with its carved panels over, is quietly picturesque, so also the projecting wings on the left, with the arcade connecting them. A plan is appended, showing that the sitting-rooms are pleasantly varied on plan, but the drawing-room would be rather deficient in light, considering that all the windows except that of the recessed bay are under verandahs.

1,566, "Dining-room, No. 3, Stanhope-place, Hyde Park," Mr. W. Flockhart. A pen drawing of a room, with plain panelled wainscot and decorated frieze over, rather sketchily shown. The general style of the drawing is effective in itself, but we may suggest that a tablecloth hanging over the edge of a table does not make a sharp black line at the angle, an incident in the drawing which jars on the eye.

1,568, "House at Ingatestone," Mr. G. Sherrin. "A rustic" house. The frequently-repeated scheme of wall below and black and white work above, rather overdone by now. No plan.

1,579, "Beauvale, Sunningdale," Mr. G. Vigers. An old English style of country-house, well carried out; brick below, plaster on first floor, and tiling between the main cornice and the higher roofs. A double-storied bay-window forms a feature, but there is no plan to show how it works in.

1,580, "The Briary, Cowes," Mr. Aston Webb. Is this an addition to an existing house? It looks rather like it, the left-hand part being the addition. In the right-hand portion the gables are cut off awkwardly from the main wall by the heavy cornice below, and seem to rise again out of the slope of the roof. The additions (?) at the left are in the same general style, but avoid this defect. A plan is appended. The house is of the practical order, and does not suggest "the briary"; it is too prim and proper for the title.

1,585, "Houses in Hans-place," Mr. C. W. Stephens. Heavy, and not picturesque. Would perhaps look better in a coloured drawing, showing the brick tones, &c., than in this rather weak pen drawing. No plan.

1,591, "Three Cups Hotel, Colchester," Messrs

E. P. Anson & Son. A rather heavy "country inn" design, with mullioned windows, semicircular projecting bays on corbels, gables with strap ornaments, and panels with sunflowers growing in them, as they grow in some recent city buildings. If, as we presume, this is the accepted design (there was a competition), there were some better ones, architecturally, submitted. It might look better in another drawing, this one being in a heavy style devoid of artistic touch. No plan is given, so we cannot judge what may be the practical merits of the building for its purpose.

1,592, "Saighen Grange, Cheshire, before Restoration," Mr. E. Hodgkinson. A very good sepia drawing of a delightful massive Late Gothic gatehouse, with later additions tacked on to it. The author knows how to handle the brush.

1,593, "Additions to the Park, Ledbury," Messrs. R. Coad and J. M. MacLaren. Nothing to show whether any of this is old or whether it is all addition. If the latter, there is too much affectation of antique style about it; if it were old one would say, what a nice old house; but, as new work, it is rather a masquerade, like some other modern housework. No plan is given, and we are left entirely in the dark as to what is the nature of the additions or how they combine with the old building.

1,594, "Design submitted for the Three Cups Hotel, Colchester," Mr. R. A. Briggs; hung high; a better drawing than the selected one for the same building, but not one of those which we remembered as superior to it in design.

1,596, "Study for an Italian Villa," Mr. R. Phené Spiers; a coloured elevation, savouring of the air of the Ecole des Beaux Arts,—correct, finished, cold. The author landably appends a plan, but the drawing is hung too high to see either that or the detail of the front.

1,597, "Holcombe Wood, Kent, Garden View," Mr. John Belcher. An eccentric sketch in coloured chalk on grey paper, apparently by Mr. A. B. Pite, showing the walls and the tiled roofs their natural red in the midst of a landscape of a ghastly grey. The house has picturesque points, especially the octagonal turret at the re-entering angle, with its chequer work upper story. No plan.

1,598, "Wrea Head, near Scarborough," Mr. E. Burgess. A cold, feelingless Gothic house shown in a neatly-finished, hard, uninteresting drawing, hung much better than it could rightly claim to be. The only good point in the design is the large mullioned hall and staircase window filling up the whole wall surface between two projections. The author has given a plan, which appears a good one.

1,602, "New Houses, Cadogan-square," Mr. J. J. Stevenson. Like many other houses in the same neighbourhood (many by the same hand). There have been better ones from Mr. Stevenson than these, or they look better in the carefully-executed water-colours he has generally sent; these, drawn in pen and ink, appear to us hard, wiry, and almost as uninteresting as domestic architecture by an architect could be made.

1,607, "Knighton Spinnies, Leicester," Messrs. Goddard and Paget. A beautifully-executed water-colour drawing, showing a picturesque house, brick, tile, half timber, many gables, and cottage and stable buildings beyond, in the midst of a sunlit flower-garden with thick clipped hedges dividing one lawn from another. The object of the drawing seems to have been to show an English home as Tennyson pictured it in the "Palace of Art,"

"A haunt of ancient Peace."

There is nothing specially to remark on in the architecture of the house. It is picturesque, and lends itself admirably to the kind of effect depicted in the drawing. No plan is given. The drawing is certainly one of the pleasantest to look at among the domestic architectural drawings.

1,608, "Design for a Town House," Mr. Gerald Horsley. This very original design was published in our pages. It is somewhat beyond the scale of what is usually spoken of as a town "house"; it is rather a mansion. The cornice is prodigious in projection, and on too large a scale altogether for the order under it; but there is a great deal of boldness in the design. No plan.

1,611, "Kensington Court," Mr. J. J. Stevenson. A pen drawing of a block of houses

surrounding three sides of a quadrangle, similar in general character to those in Cadogan-square, before mentioned, but with more variety and picturesqueness of detail. The interposition of a house of positively Gothic detail and feeling among the "Queen Anneries" is happily thought of as a bit of variety in the picture. No plan.

1,613, "Houses: Pont-street," Mr. C. W. Stephens. A pen drawing of brick houses, hung too high to be well seen; heavy, but solid looking; the projecting bays finishing with deep cornice and frieze. No plan.

1,617, "Chambers and Shops, Mount-street," Messrs. Ernest George & Peto. This very picturesque street-front we have already illustrated. The shop-windows are treated with bold arches, with adequate piers between; the shops are continuous in design, but the upper stories are pleasantly varied, the projecting bays in one portion being square, with mullioned windows, the others three-sided, with smaller windows. The pierced balconies and the open tracery finish to the square bays are picturesque points of detail. The whole form a building containing so much real character that it was quite unnecessary to give the design a factitious interest by a drawing studiously treated so as to give an old and weathered look to the buildings. This is affectation. A great deal of the best architecture in the world is unfortunately old, and more or less dilapidated; but it was once new, and there is nothing sinful or inartistic in a new building that there should be an effort to make it look old.

## LETTER FROM PARIS.

DEATH has been sadly busy among the ranks of the painters. Scarcely has Paul Baudry departed, than Isabey, Edouard Frère, and Karl Daubigny have followed. The two last have occupied an honourable place in art, but Isabey was incontestably a master of more than fifty years' renown, who had the good fortune to see himself placed, from his first appearance, among the great ornaments of his country.

Eugène Louis Gabriel Isabey was born at Paris in 1804. His teacher was his father, the celebrated miniature-painter, and his earliest pictures, "Un Ouragan devant Dieppe" and "La Plage de Honfleurs," both exhibited in 1827, as well as the "Port de Dunkerque" (Salon of 1831), and "Combat du Texel" (Salon of 1837), placed him in the first rank of painters. Among other admired works are "L'Arrivée de la Reine Victoria au Tréport" (1846), "Le Départ de la Reine d'Angleterre," "L'Embarquement de Bayet" (1851), "L'Alchimiste," &c. Isabey, who, during the Siege and the Commune had found a generous hospitality in London, occupied his last fifteen years in producing admirable water-colours; and it is only since the last year that he abandoned his pencil. In this painter, young almost to the last in his art, France loses one of the last and most brilliant representatives of the older French school of this century.

Edouard Frère, who died at the age of sixty-seven, had studied in the atelier of Paul Delaroche. He executed an immense number of genre pictures, popularised by engravings, and his work was as well known in England as in France. He had the gift of rendering the movement and expression of life in his figures, while attending at the same time very carefully to the execution of accessories.

Karl Daubigny died at the early age of forty. He was the son of the celebrated landscape painter, whose general manner he continued, though with a rather heavy touch, but with the same artistic conscientiousness. His picture, "La Vallée de la Seine," gained him a "Première Médaille," and the present Salon possesses one of his last and one of his best works, "Lever de Lune au Soleil couchant."

About the same time last year we mentioned the death of De Nittis, the clever and agreeable painter of Parisian fashionable society. His principal works have now been collected by the care of M. Bernheim, and the re-inspection of them confirms the impression they formerly produced.

Parliament is actively busied about the question of the Metropolitan railway, on which we have touched several times. The formation of the system of lines is getting into a practical stage, but it is of importance that its route should be laid out so as not to spoil the appear-



ance of the city or injure any of the buildings of historical interest. In regard to this view of the subject, the Society of "Amis des Monuments Parisiens" is disturbed by the projects of the municipal engineers, and M. Charles Garnier has been appointed the interpreter, to the "Ministère des Travaux Publics," of these artistic pre-occupations. It is hoped that the Government will take the application of the eminent architect into serious consideration, and that, while satisfying public requirements, it will respect the picturesque and archaeological claims of Old Paris.

The preliminary work has been commenced for the transformation of the old Halle aux Blés into the Bourse du Commerce, according to the design submitted to the Municipal Council by the architect, M. Blondel. According to this design three lofty central entrances flanked by columns, surmounted by a pediment crowned by allegorical sculpture, will give access to the edifice. All round the main cornice are to be statues representing the chief cities of France. The existing cupola is retained, but filled with glass in the upper portion; the lower part will be occupied by a decorative ceiling by an eminent artist; and lastly, in the three principal avenues facing the three entrances will be groups of sculpture, for which M. Blondel hopes to secure the co-operation of such eminent sculptors as MM. Chapu, Moret, Millet, or Falguère. We may add that the design leaves absolutely unaltered the curious fountain in the centre, the work of Jean Bullant.

We may announce also the speedy demolition of the Quadriga group which surmounts the Arc de l'Étoile, which has long disgraced this fine monument, besides threatening danger from its dilapidated condition.

The environs of Paris will soon boast of a new Hôtel de Ville, at Suresnes, the design for which has been chosen in a public competition recently decided. Three premiums have been decreed by the jury: the first to M. Bresson, who is commissioned to carry out the building; the second to M. Ronoyer; and the third to M. Loviot.

A great competition has been open, for some days past, at the Hôtel de Ville, for the buildings for the Exhibition of 1889. We must say at once that the programme, rather hastily drawn up in the Ministère du Commerce, leaves much to be desired in the way of perspicuity. However, in spite of obscurity of instructions and shortness of time, 107 architects have responded, and the designs were on public view up to the 31st of May. Ninety were thrown out on the preliminary examination, and at the final one three designs were selected as equal in merit, and obtained the three first premiums, each of 4,000 francs. The authors of these are MM. Dutert, Eiffel (in collaboration with M. Sauvestre), and Formigé.

Among other conditions, the official programme imposes on architects the obligation to show on plan, section, and elevation, an iron tower 300 mètres in height. This gigantic construction, the utility of which is very questionable, was not calculated to stimulate the artistic spirit of the competitors, who have struggled bravely to produce an artistic and well-balanced *ensemble* with this "tower of Damocles" hanging over their heads.

M. Dutert plants his tower on the Champ de Mars, isolated from the main exhibition building, in the midst of a great park, over which are scattered exotic architectural constructions half hidden among trees.

M. Eiffel, the initiator and first proposer of this abnormal tower, places it at the entry of the Champ de Mars. His design is a triumph of metallic construction; vast, commodious, exceedingly practical, but as ugly as an iron railway station; with immense iron galleries, in horse-shoe form, furnished with an aerial railway to take spectators all round the exhibition.

M. Formigé, whose design is much more decorative, leaves the famous tower nearly out of consideration, merely showing it formally, so as to satisfy his competitive conscience. Though a little heavy, his principal façade has a grand monumental aspect, with the central pavilion united to two angle pavilions by long lines of arched galleries decorated with frescoes. Each pavilion is surmounted by a cupola, adorned with statues and winged genii.

Three premiums of 2,000 francs each have also been awarded to MM. Cassien-Bernard and Nachon, M. Raulin, and M. Depertthes. In th

design of the first-named, the buildings on the Champ de Mars are not very remarkable, but the tower, planted boldly on the Seine as an immense bridge, serves as the entry to the Esplanade des Invalides transformed into a park, with the axis occupied by a vast avenue of foreign-looking constructions. Very remarkable also is the design of M. Raulin, who places along the banks of the Seine, from the Invalides to the Champ de Mars, a length of about two kilomètres, a line of various edifices, Egyptian houses, Turkish mosques, Chinese pagodas, Indian temples, whose minarets, domes, and colonnades would give to that part of Paris the illusory appearance of a city of the far East, reflecting, like Benares, its palaces in the waters of the sacred stream.

We give our preference, nevertheless, to the design of M. Albert Ballu, which has only obtained, however, a third premium of 1,000 fr., along with those of MM. Pierron, Hocherau, Vaudoyer, and Fouquiau. M. Ballu's tower, which rises above a gigantic portico ornamented with allegorical statues, is crowned with a sphere on which hovers the genius of France. The ensemble of the Champ de Mars buildings is less successful, but the interior of the Palais des Beaux Arts, which he proposes to erect on the Esplanade des Invalides, is remarkable for its architectural taste and elegance. M. Fouquiau has evidently aimed at reproducing the constructions built by him at Amsterdam for the International Exhibition of 1883. If the special character of that exhibition, and the colonial connexions of the Dutch Government, might have justified that pseudo-Asiatic luxuriance, this does not apply to Paris, and the design, commonplace enough otherwise, only recalls what we have seen in former exhibition buildings.

MM. Simil, Claris and Morel, Walwein and Proust, Gaston Héard, Blondel, and François Roux, have each obtained honourable mention, but there is nothing in their designs out of the common way or meriting special description.

It remains to be seen what the Government will do. Will it adopt one of the three first premiated projects, or combine ideas or parts from all of them as may seem to best suit the requirements of the situation? Or has the Government only wished to give the architects the platonic satisfaction of having the competition which they asked for? We shall soon know, for to secure the subvention of the City authorities it is a condition that the work should be commenced in September next, so that a prompt decision is imperative.

As to the tower of 300 mètres, although, according to M. Berger's lecture at the Société Centrale, it ought to mark "the apogee of the age of metallurgy, to which will soon succeed the age of electricity," we earnestly hope it will be abandoned. It is entering on an enormous and useless expense to end in a sham. Besides, it will be absolutely injurious to the picturesqueness of Paris, as it will destroy entirely the scale of the panorama as now seen from the rising grounds surrounding the city; this tremendous tower will dwarf the effect of the whole.

Contrary to all expectation, the sculptors have not secured the "Médaille d'honneur" of the Salon, after all; only seventeen votes went to average for poor Schonenwerk the neglect in which he lived, and of which he, in fact, died; and in architecture, M. Ballu obtained only seven votes; while among the painters, after two votings, M. Jules Lefebvre received 183 votes from among 367 voters, as against 79 given for M. Benjamin Constant and 38 for M. Humbert. Without questioning the great talent of the recipient of the medal, the result has caused some surprise, but no regret, for M. Lefebvre is a favorite in the artistic world, which feels a satisfaction in seeing this crowning of a long career of fine work.

**School of Art Wood-Carving.**—The students at this school (which, it will be remembered, is carried on at the City and Guilds of London Institute, Exhibition-road, South Kensington) have just finished a handsome carved mantel and over-mantel for H.R.H. the Rajah of Kooch Behar, from designs supplied by Mr. John Hungerford Pollen, M.A. The mantel-piece is executed in teak wood, and the whole is effectively carved, and may be seen at the School on application to the Manager for permission.

## FURTHER NOTES ON THE EDINBURGH EXHIBITION.\*

ENTRANCE is obtained to the Exhibition grounds at the north-east angle under a large archway of cast-iron. The archway is a very solid-looking affair, at least 50 ft. high, having a frieze decorated with wreaths in relief and a dentilled cornice, upon which is a trophy of flags (cast iron) and vases at each end; the spandrels have shields in relief and the uprights have moulded angles and laurel foliage in relief on the surface. The whole of this portion of the structure might reasonably have been constructed in stone, and then it would not have elicited admiration, but in cast iron it is simply detestable. The gates attached are fair specimens of their class, such as are usually found in price catalogues. The castings are sent by the Grahamstown Iron Company, Falkirk.

To the right of this entrance there is a model block of workmen's dwellings, designed by Mr. Gowans. They are only two stories high, but other stories might be added without affecting the internal arrangement. It has been the endeavour of the architect to show what can be done in this direction by the utilisation of cheap but durable material. The walls are constructed of the granite and Whinstone blocks used for street paving, backed by refuse stones from freestone quarries, and the dressings are formed of portions of freestone cut off when lintels, &c., are being dressed for superior structures. The entrance is ample, and the stair is in easy flights and well lighted, as are all rooms and passages. The sanitary appliances and internal fittings, which are excellent, are contributed by a number of tradesmen.

In connexion with this subject the Executive Committee intend to invite competitive designs for workmen's dwellings, which are to be exhibited in Mr. Gowans's block. A diploma is to be awarded to the author of the most approved design as regards plan, cost, and external effect.

Against the external east wall of the Exhibition Buildings, Mr. William Langlands, Myrton Quarry, near Dundee, exhibits a plat, steps, and flagstone of a fine, hard, durable, blue freestone, suitable for monumental purposes as well as for stairs, &c. The plat is 9 ft. square, and the steps (two) 19 ft. long each. One is shown with a plain machine-edge, and the other with a bottle and fillet, also machine-wrought. The edge of the plat and the pavement show the difference between the machine and finely-wrought handwork.

In Court 2, No. 25, Mr. Marcus Bain, the lessee of Ballochmyle Quarries, Ayrshire, shows an octagonal memorial cross, as a sample of the stone which constitutes one of the chief commodities of the Land of Burns. It is possessed of admirable qualities, and is of a deep red colour. Now that the desire is spreading for the introduction of coloured material in the exterior as well as the interior of buildings, this stone will be found well adapted for the purpose. Builders give it a good name as regards ease of working, and it seems to possess the elements of durability. The percentage of soluble matter is 1.8, and the pressure tests are stated to be high. It is extensively used in the West of Scotland, and is exported to Ireland, London, and the United States. Amongst buildings constructed of it may be mentioned the offices of the Glasgow Citizen, the Burns Monument and Museum at Kilmarnock, and the station and hotel recently opened at Ayr by the Glasgow and South-Western Railway Company.

In a separate pavilion Messrs. P. & R. Fleming & Co., of Glasgow, have a large display of agricultural implements and fittings. The place of honour is given to a model of a farm-steading on the estate of Rosneath, Dumbartonshire, erected to the order of His Grace the Duke of Argyll. The whole steading is covered in by a series of semicircular corrugated iron roofs. If Mr. Ruskin should visit the lovely Garsloch scenery the sight of this erection may drive him frantic. In good truth, it is with extreme regret we observe that in many parts of the Highlands the thatched or slated roofs are being superseded by corrugated iron ones, which no length of time appears to mellow into harmony with the surroundings.

An adjoining pavilion is devoted to the display of Willaden roofing. Willaden paper is stated to be water-proof, rot-proof, and to be a warmer covering than slate, and it is certified to have

\* See pp. 671, 703, ante.



"weathered the 2 35 in. rainfall and gale of September 3rd and 4th, 1884." It is formed of various thicknesses, and in different tints of green and brown. The sample shown on the pavilion roof is natural green in colour, and soft and pleasing in effect. If this material should prove equally serviceable as galvanised iron there can be little hesitation in giving it the preference, for besides its inoffensiveness as regards appearance it is easy of application and cheap, the prices being 1s. and 1s. 2d. per yard, 2 ft. 3 in. wide. It possesses also the quality of lightness, one ton covering 13,500 square feet, whereas one ton of galvanised iron covers 2,170 square feet only.

Red tiles are, to a considerable extent, superseding slates, and they are finding favour in Scotland as elsewhere, although not to the same extent as farther south. Scottish manufacturers are turning their attention in this direction, and we find admirable specimens of Roman, flat, and ridge tiles, finials, facing bricks, &c., produced by Messrs. W. R. & J. Carmichael, of Alloa, Court 6, No. 854.

A small model roof in Court 6, No. 831, has specimens of flat tiles, hip tiles, and ridge tiles, by H. J. and C. Major, of Bridgewater. The flat tiles have a roll moulding from ridge to eaves, which gives them a character somewhat different from those generally in use.

In Court 2, No. 7, Messrs. Stuart & Co., of Cliffe-on-Thames, and Torphichen-place, Edinburgh, have a "Granolithic Trophy." It is 20 ft. long and 18 ft. high. At each corner are fluted columns with Corinthian capitals, 16 ft. high, standing upon richly ornamented bases. Between these there is a dado, consisting of dies and balusters with female figures supporting an entablature. Within this there is a massive mantelpiece, 6 ft. wide and 8 ft. high. There are also stair-steps and window mullions dressed in different manners. They also show the materials from which Portland cement is manufactured and the granite as specially prepared for mixture therewith. The cement is passed through a sieve containing 2,500 meshes to the square inch, and stands a strain of 500 lb. on the square inch at seven days.

From Macdonald & Co., Aberdeen; D. H. & J. Newall, Dalbeattie; and the Ben Cruachan Granite Company, we have polished and incised crosses and tombstones in red, grey, and blue granite; and different monumental sculptors show examples of their designs in this material. Amongst these we note Mr. J. H. Kerr, Dalrymple, Edinburgh, "Mural Monument executed in the Italian style, with marble figure emblematical of Faith," &c.; Thomas McEwen, Lothian-road, Edinburgh, "Life-sized Statue of Hope, in Sicilian marble, on Peterhead granite pedestal, with Ratho whinstone under base," marble monument inlaid with lead, &c., Nos. 1-6, Court 2. Mr. J. A. Kennedy, Pitt-street, Edinburgh, sends a mantelpiece in Keene's cement, mirror frame in plaster above; very neat, but a misappropriation of the materials.

There is abundance of cast-iron productions of this description, including mantels and over-mantels, in imitation of oak and other woods, from the Mashet Ironworks, Dalkeith, Court 17, No. 982, but there is very little wrought-iron work. In Court 6, No. 825, are a pair of wrought-iron entrance-gates, by Hill & Smith, Brierly Hill Ironworks, Staffordshire, which do not appear to us remarkable either in the way of design or spirited treatment; and in Pavilion No. 2216, there are railings, &c., from Cockburn & Co., of Gowanbank Ironworks, Falkland, commonplace in design.

The slates produced in Scottish quarries are generally thick and heavy, but durable. Those exhibited by the Aberfoyle Slate Quarries, Limited, Class 1, No. 6, upon a small model, are of this description, and are of a quality to withstand the severe gales which visit the northern coast-line. The rock is also shown in different stages of its manufacture and of several classes. It does not appear to be readily obtained in slabs of extra size, and is more suitable for use than ornamental purposes.

Anderson & Sons, Marshall-street, Edinburgh, Class 1, No. 30, show rough and finished roofing slates from Craigie Quarries, of excellent quality. This slate is suitable for ornamental purposes and mantel-pieces, finished with a very high polish, which brings out the colour admirably. The enamelled table, with landscape, is not so much to our taste. Slate may indeed be enamelled so as to resemble marble in a manner highly deceptive; but it is liable to be chipped, and, when the enamelled colour is light, the

dark material beneath painfully betrays itself. We have seen enamelled slate applied to exterior decoration, but in the course of a year or two it loses lustre, and becomes dull.

Pavement flags are to some extent now superseded by cement for footpaths, but they have no advantage over that material, they can be lifted and relaid. The best Scottish quarries are situated in Forfarshire and Caithness-shire. Of the latter we have specimens from Castlehill quarries, near Thurso, Court 2, No. 29, and from Forss Caithness Pavement Company, Limited, Court 2, No. 41. Slabs can be procured of any size required that can readily be carried by ship or rail, special vessels being constructed for exportation. The material is remarkable for the wear and tear it will sustain, and for its non-porosity. For water-tanks, hearthstones, and fireproof flooring it is most useful. Currie & Co., Leith, Court 2, No. 27, exhibit fine specimens of Arbroath and Caithness pavement. Galloway & Co. show the same material, Court 2, No. 39, along with stone steps, bottles, &c., from the Gagie Quarries, near Dundee, and Arbroath steps, wrought by machinery, are exhibited in the grounds by Walters & Jackson, of Edinburgh.

#### THE SURVEYORS' INSTITUTION.

THE annual general meeting of this Institution was held in the Lecture Hall, 12, Great George-street, at three o'clock on Monday afternoon last, the retiring President (Mr. E. I'Anson) occupying the chair. The ballot for the election of the new Council having been declared open, the annual report on the affairs of the Institution was read to the meeting. We append a few passages:—

"During the past year 55 new Members have been elected, viz., 3 Honorary Members, 25 Fellows, 22 Professional Associates, and 5 Associates, making, with 34 new Students who passed the Preliminary Examination in January last, an addition of 89 new names to the roll. Against this, however, has to be placed a large deduction representing losses by death, retirement from the profession, or on account of inability to maintain the payment of subscriptions, leaving a net increase of 19 of all classes. There has been a slight increase in the income proper during the year, due in part to additional subscriptions, and in part to a slight increase in the amount of fees received for hire of arbitration rooms. On the capital side of the account a further sum of 2,000*l.* has been invested in New 2 1/2 per Cents.

The Institution investments stood at Christmas 1885 as follows, viz.:—2,541*l.* 8s. 6d. Consols, on Revenue Account; 5,550*l.* 15s. 10d. New 2 1/2 per Cents, on Capital Account; 539*l.* 11s. 2d. Reduced 3 per Cents, on Library Account; and 228*l.*, North British Railway Preference Stock, on account of the Crawter Bequest.

A sum of 1,000*l.* has been added to the investments in New 2 1/2 per Cents, during the present year.

The unabated interest in the proceedings of the ordinary general meetings is attested by the volume of 'Transactions' (the eighteenth of the series) now approaching completion. The Council have endeavoured, as far as possible, to consult the tastes and interests of the various classes of members in the order in which the papers have been taken, and this has necessitated the holding over of several excellent papers until next session. The welfare of the Institution is very largely dependent upon the character of the papers read and of the discussions that take place at the fortnightly meetings. The collection and dissemination of information was one of the principal purposes for which the Institution was established, and it may be claimed for the 'Transactions' that they have admirably served this purpose.

It appeared, however, to the Council that something further might be done in the same direction, without trenching in any way on the province of the 'Transactions,' by means of an occasional publication comprising short items of professional information of the nature and under the title of 'Professional Notes.' The two numbers of the new publication already in the hands of the members will enable them to form an opinion as to the nature of the experiment. Whether it will be justified by success will depend upon the support it receives from the members. The plan of the 'Professional Notes' is wide enough to embrace every kind of contribution, and, as members come to recognise their practical utility, the number of original contributions and items of interest communicated will, it is hoped, be largely multiplied.

The Examinations continue to attract an increasing number of Candidates, notwithstanding that proof is now required of previous practical experience in a surveyor's office. About the usual proportion have satisfied the Examiners, but the Council will look for a better knowledge in some of the more important subjects on future occasions.

The Council have carefully watched various measures recently introduced into the House of Commons affecting the interests with which surveyors are identified. It is impossible to regard some of these proposals as serious projects of legislation, or to look upon others as framed with a due sense of the consequences likely to result from their finding their way into the Statute-Book."

The report having been adopted and the ballot having been closed, the following was declared by the scrutineers to be the result of the voting:—

President.—Mr. William James Beadel, M.P.  
Vice-Presidents.—Messrs. E. P. Squarey, R. C. Driver, F. Vigers, and C. J. Shoppee.

Members of Council.—Messrs. T. Chatfield Clarke, D. Watney, J. Martin, W. Fowler, H. J. Castle, R. L. Cobb, A. M. Dunlop, C. Oakley, R. Vigers, T. M. Rickman, and R. G. Clutton (Members); Mr. E. Smyth (Professional Associate); and Mr. J. Wolfe Barry and Sir Richard E. Webster, Q.C., M.P. (Associates).

In the evening upwards of 100 members dined together in the Venetian Room of the Holborn Restaurant, the chair being occupied by the new President (Mr. W. J. Beadel, M.P.), supported by Mr. John Clutton (the senior past-President of the Institution), Sir Richard E. Webster, Q.C., M.P. (the newly-elected Associate of Council), Mr. T. Huskinson, Mr. W. Sturge, Mr. E. Ryde, Mr. T. Smith Woolley (past Presidents), and a large attendance of the Council.

#### ARCHITECTURAL SOCIETIES.

*Birmingham Architectural Association.*—On Saturday afternoon last this Association made an excursion to Fenny Compton and Burton Bassett Churches, Warwickshire, under the guidance of Mr. Jethro A. Cossins. On arriving at the station the party walked to Burton Bassett Church, which is picturesquely situated on the sloping ground, and contains good examples of Norman, Early English, Decorated, and Perpendicular work. A halt was here made for an hour to allow members an opportunity of taking away in their sketch-books, and with the aid of photographic apparatus, the many interesting details of the church. A walk over the hills brought the party back again to Fenny Compton, where a due inspection was made of the old village houses, church, and churchyard; notes were taken of all interesting details, and after sketching for another hour the party returned to Birmingham.

*Edinburgh Architectural Association.*—On Saturday last the members of this Association travelled to Carnock and Stirling on their annual excursion. Carnock House, over which the party were shown, is a most interesting and little-known specimen of Scottish architecture of the sixteenth century, exhibiting both the solid building and the picturesque grouping characteristic of that period. In the early part of the seventeenth century the windows of the south front were enlarged and dormer windows introduced into the roof, while of the same date there are some beautifully panelled and decorated ceilings in the dining-room and drawing-room. The party afterwards drove by Harnockburn and St. Ninian's to Stirling, where they were conducted over the Castle by Mr. David MacGibbon. The Sallyport, the old Parliament Hall, the chapel, the Douglas Garden, and the Palace were each visited in turn. The next place visited was Argyle's lodging, plans of which were exhibited by Mr. MacGibbon, who pointed out the portion built by the Earl of Stirling, as distinguished from the somewhat later portions added by Argyle. A feature not common in Scottish buildings of this period consists in a wooden staircase rising from the hall to the first floor, although this feature was common enough in English mansions of the same period. The east and west churches were examined under the guidance of Mr. Washington Browne, who read a short paper on their history. Time did not permit of the party visiting Cambuskenneth Abbey, so, after dining in the Golden Lion Hotel, they returned to Edinburgh.

*Manchester Society of Architects.*—The Manchester Society of Architects offers the following prizes, to be competed for by such draughtsmen as may be eligible, and by students serving their apprenticeship in the offices of architects in Manchester, or in the office of any member of the Society, viz.: a first prize of five guineas, given by the Society, and a second prize of three guineas, given by





Capitals from the Wall Arcade, "Angel Choir," Lincoln.

the President, Mr. Redmayne, for the best portfolio of Architectural Sketches, including figured sketches. Mr. James P. Holden's prize, of the value of five guineas, for the best set of not less than four sheets of drawings of a good example or examples of Classic architecture, made from the actual building or buildings, with a short description of each subject. Further particulars, and conditions, may be obtained of the Honorary Secretary of the Society.

#### CAPITALS, LINCOLN CATHEDRAL.

THESE drawings of four of the beautiful Early English capitals in the choir of Lincoln Cathedral are reproduced from sketches by Mr. W. H. Bidlake, made on his tour last year as "Pugin Student" of the Institute of Architects.

#### EXAMPLES OF JAPANESE WORK.

WE are enabled to illustrate a few of the objects in Mr. Ernest Hart's collection of Japanese art which was on view last month in the rooms of the Society of Arts. One great advantage this collection possesses over many others is that it is arranged in something like chronological order, with date and name of the artist or school attached, and the student

desirous of specific information stands some chance of having his desire satisfied. Too many collections of Japanese curios are simply a miscellaneous gathering of good and bad examples, ancient and modern reproductions made expressly for the English market, with little or no information about any of the objects. In fact, Japanese works too often are treated merely as curiosities, and it is only here and there that we find a collector who has gone to the trouble of classifying his collection. One great obstacle that has stood in the way of many collectors is the difficulty of reading Japanese characters, but Mr. Hart has been fortunate in securing the help of a Japanese expert, whose aid has been invaluable. Skilful workmanship is in part at least hereditary, and we find in Japan "schools" of work, or, in other words, families who have for generations devoted themselves to the production of one kind of work. Knowledge and skill are thus accumulative, and by this means a general proficiency is reached, whereas, with the individual system, we only get great excellence in specially-gifted persons, the general level of excellence being proportionately low, as in our own case. But the Japanese are breaking with all their old traditions and customs, and in the space of a few years have thrown their ancient civilisation to the winds, and in its place have taken a rather cheap "Brummagem" thing, and this means an end to their own beautiful

characteristic work. When they at first broke with the past the Japanese shipped their work over to Europe without a moment's hesitation, where they found a ready sale for "curios," as they were generically termed, and in those times collectors had a good opportunity of buying the best, cheaply; but the Japanese themselves have taken to collecting their old choice work, and it is now no longer possible to buy good work at a low price. The Japanese have taken to manufacturing sham old work for the European market; and collectors had best be wary and on their guard, for, like the "Heathen Chinee," the Japanese are a match for most Western people in "business." Of the objects illustrated here, fig. 1 is a bronze carp. This fish, which often occurs in Japanese work, is held by the Japs as typical of endurance. Fig. 2 is a bronze figure of religious character. Fig. 3 is a beaten war-mask of hard iron of ancient manufacture, and is consequently a most difficult class of work to produce. It is made so that the nose and mouth parts can be detached so that the warrior could feed. Fig. 4 is a fine specimen of old bronze casting; cheap reproductions of this are often seen. Fig. 5 is a serpent in the act of attacking a frog. The original is a very fine piece of casting. Figs. 6 to 11 are knife-handles. The subjects of the decoration are sometimes religious, sometimes humorous, and at other times mere quaint conceits.



Fig. 1.



Fig. 4.



Fig. 5.



Fig. 2.

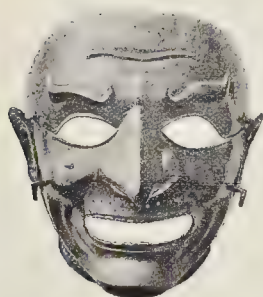


Fig. 3.



Fig. 6.



Fig. 7.



Fig. 8.



Fig. 9.

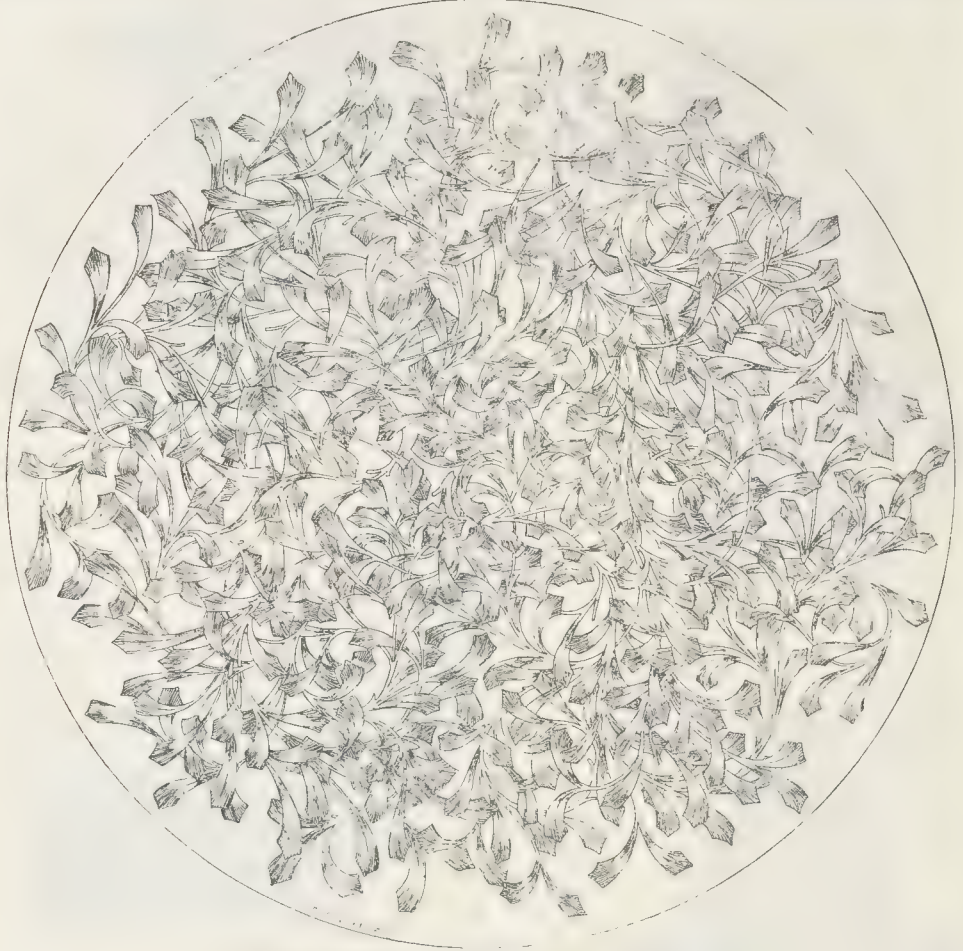


Fig. 10.



Fig. 11.





Decorative Panel: Conventional Treatment of Mistletoe. By Mr. F. T. Piggott.

#### DECORATIVE PANEL.

This panel represents a conventionalised treatment of mistletoe, the design of Mr. F. T. Piggott. It was exhibited some time since in the architectural room of the Royal Academy, when we noticed it as a very good example of decorative design founded on foliage forms. The original is in colour, with the stems of the leaves gilt.

#### Illustrations.

##### WINDOW IN THE BUTCHERS' HALL.

**F**IVE windows, by Messrs. Lavers & Westlake, — four representing the monarchs who have granted charters to the Butchers' Company, and one the arms of that corporation, — have been placed in their hall in Bartholomew-close. The monarchs represented are James I., Charles I., George II., and her present Majesty, — this latter window forming the subject of our illustration. These windows are the gifts of Messrs. Venables, Hart, Baker, and Kilby. The window is designed by Mr. Westlake.

##### STATUE OF BERLIOZ.

This statue is intended to be erected in the Square Vintimille at Paris, a few yards from the house where Berlioz died.

It is the work of Alfred Lenoir, grandson of the celebrated architect and antiquary. The statue is rather more than life-size, and has been cast in bronze at the foundry of MM. Thiebaut. The head, which is both very expressive and a remarkable likeness, has been cast,

with the hand, on the *cire perdue* system, while the remainder has been cast in the ordinary manner.

The statue, commissioned by a subscription committee presided over by Vicomte Delaborde, is to be erected on a stone pedestal of very simple character, designed by M. Boitte, architect, brother-in-law of the sculptor.

##### SHOPS AND OFFICES, NEW BROAD-STREET, CITY.

This block of buildings occupies a commanding position in New Broad-street, in close proximity to the termini of the Great Eastern and North London Railways, and opposite the Bishopsgate Station of the Metropolitan Railway.

The façades are constructed of Portland stone, with polished granite work on the ground story, and have a frontage to New Broad-street of about 220 ft.

The accommodation comprises six shops (some of which are sub-divided), with extensive basements.

The upper floors are arranged for offices, which will be divided to suit tenants, and, with very few exceptions, every office will overlook New Broad-street.

The entrance to the offices is planned to be quite distinct and apart from the shops, and comprises a boldly-treated arched opening, relieved with polished granite, conducting to a lobby and vestibule.

There are two stone staircases communicating with corridors on each floor, the walls being lined with tiles, and the floors laid with mosaic.

The whole of the works have been carried out for the Broad-street Syndicate, under the

superintendence of the architect, Mr. F. Adams Smith.

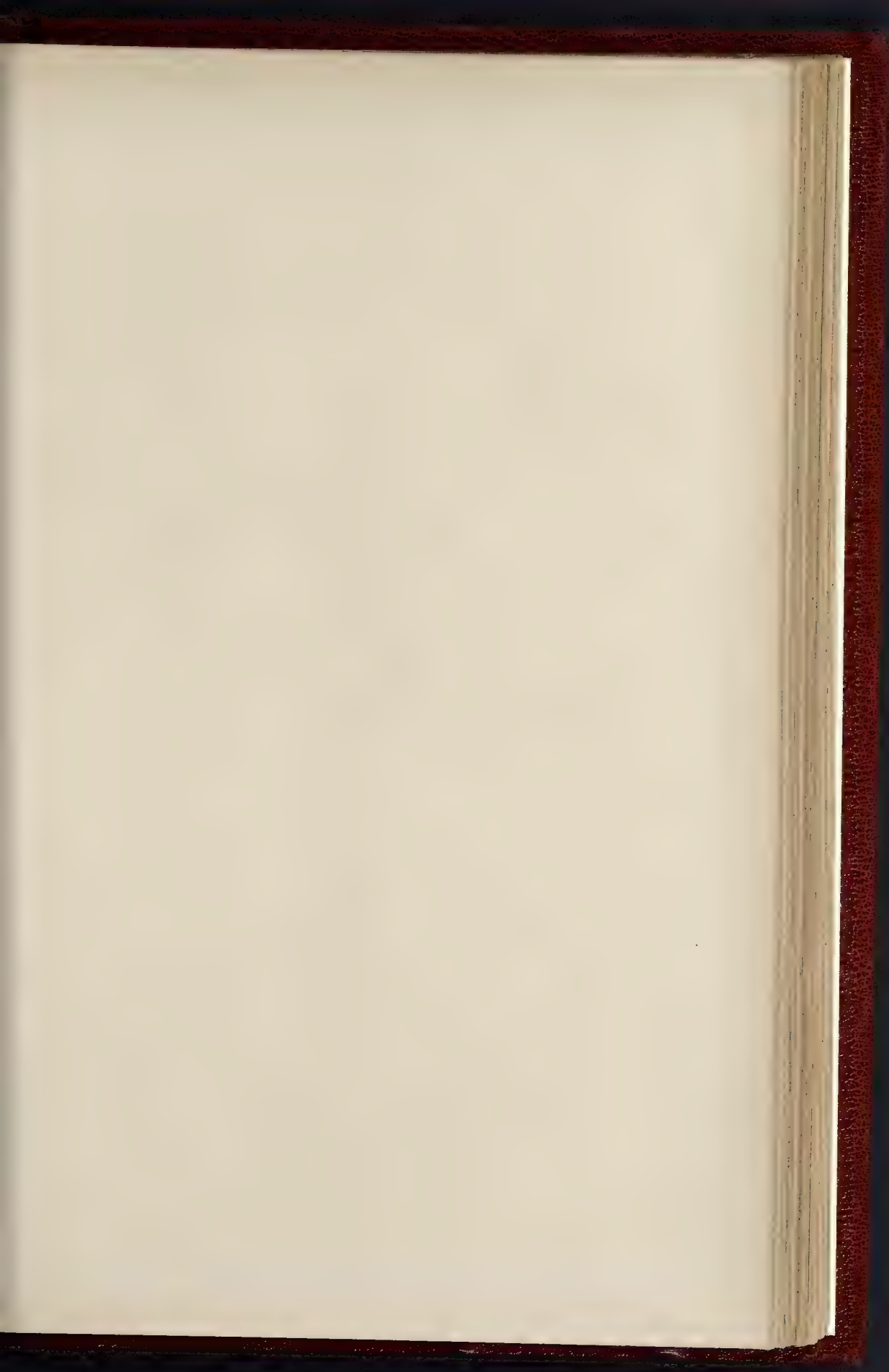
The contractors are Messrs. Wm. Brass & Son, and Mr. Thomas Bennett has acted as clerk of works.

##### ALL SAINTS' CHURCH, WALSOKE.

THE three pages of measured drawings of this fine church are reduced from larger drawings by Mr. A. G. Adams, who was awarded a Medal of Merit for the originals last year by the Royal Institute of British Architects. Some notes on the church will be found in our first article this week.

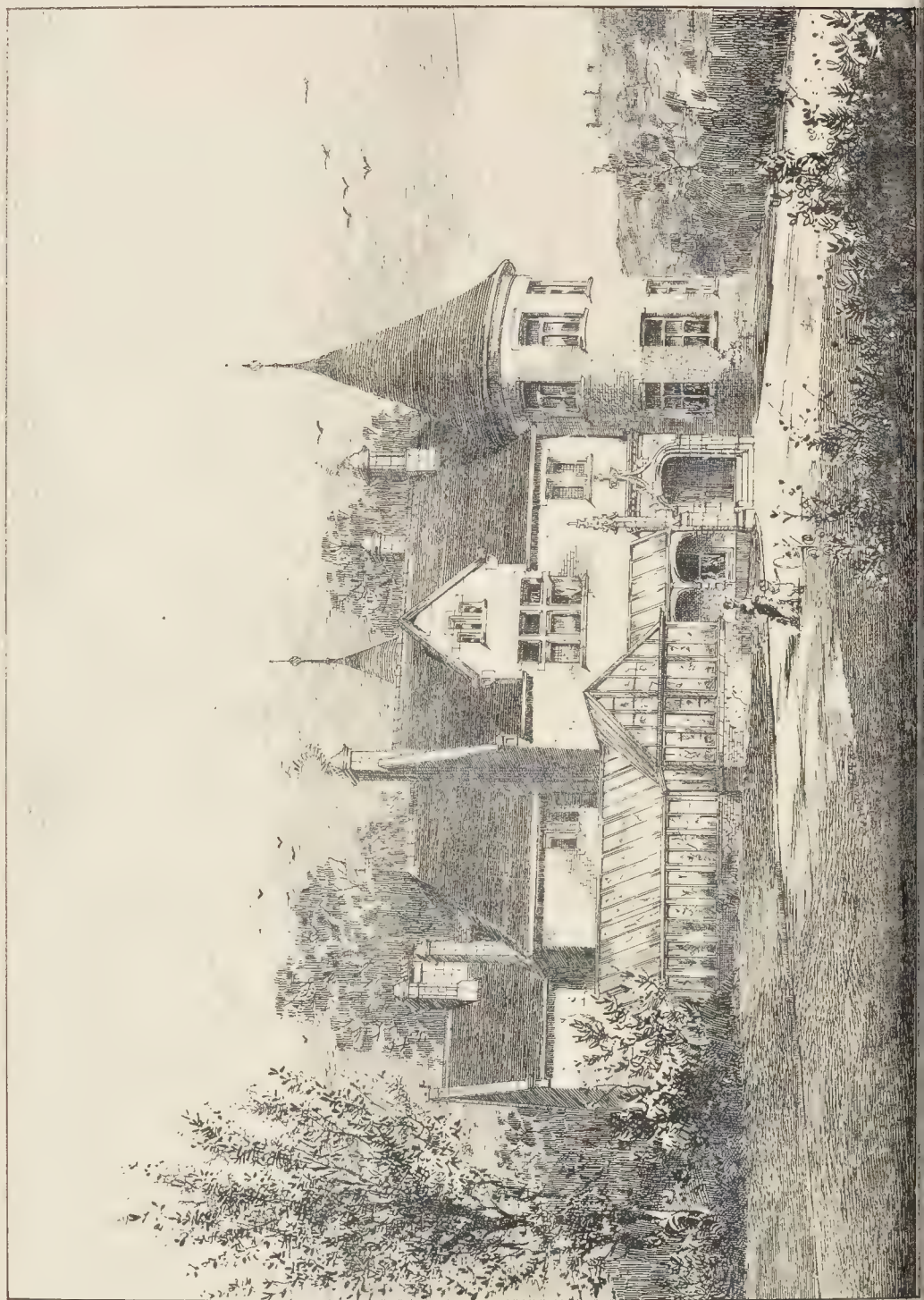
##### ANGLESEY HOUSE, CARSHALTON.

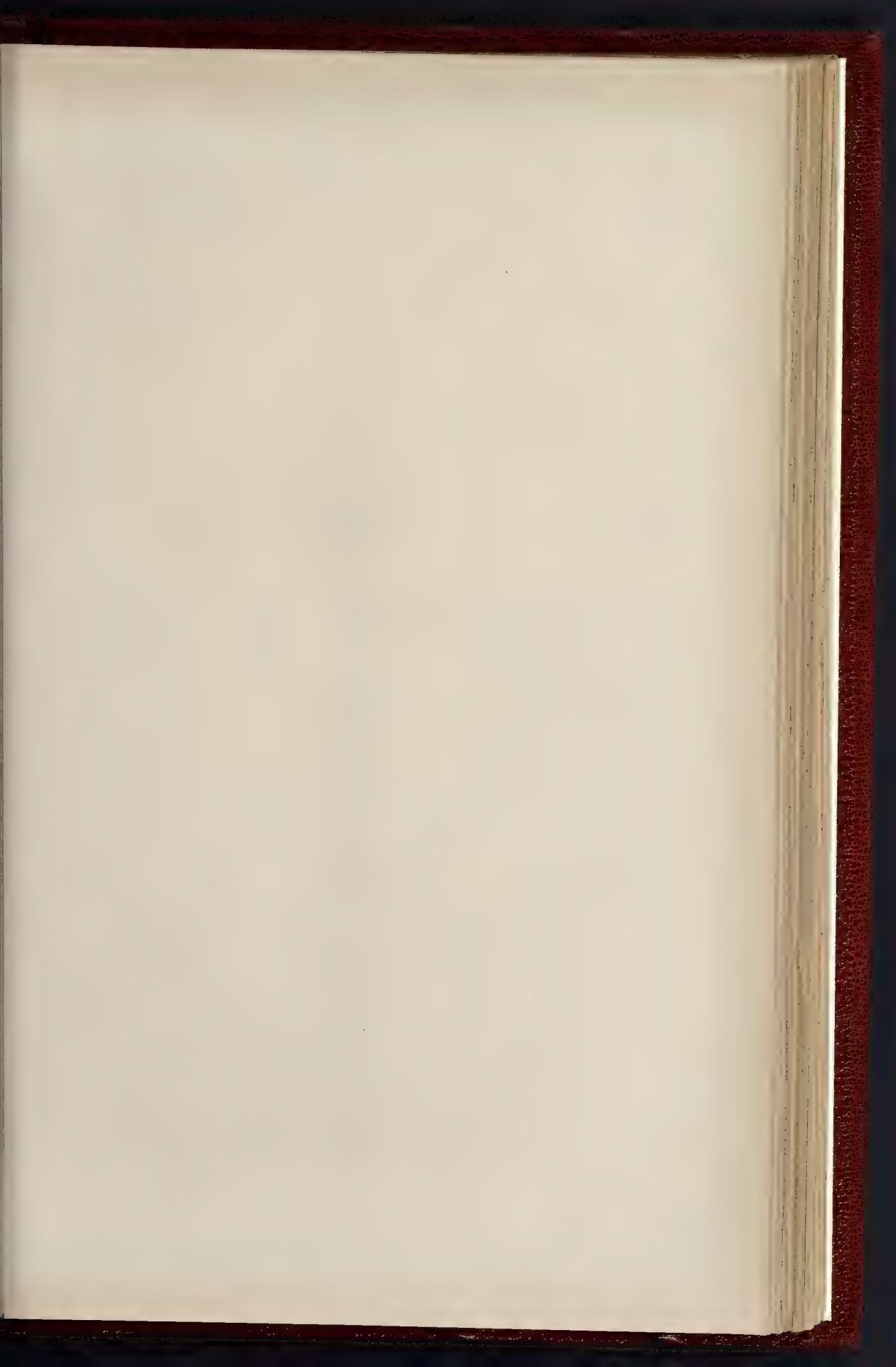
This house, now in course of erection for Mr. J. Gibbs, is situated on Bandon Hill, with good views of the surrounding country. There is nothing very special about the construction. The walls are faced with local stock bricks, with Ham Hill stone dressings. The roof is constructed on the plan suggested by Mr. Ralph Nevill at the Institute last session, the rafters being lathed and battened, and covered with silicate breeze concrete, 1½ in. thick and the slates, which are Eureka slate nailed to the concrete. It was found necessary to introduce the slating battens, as the slates were found to drop slightly without them when the nails touched a small grain of breeze in the concrete; but with the batten the point of the nail just catches and holds the slate in position till the concrete is quite set. It makes an excellent roof, and is especially good for circular work. The work has been carried out by the builder, Mr. E. J. Burnand, of Wallington, Surrey, from the designs of Mr. Herbert D. Appleton.



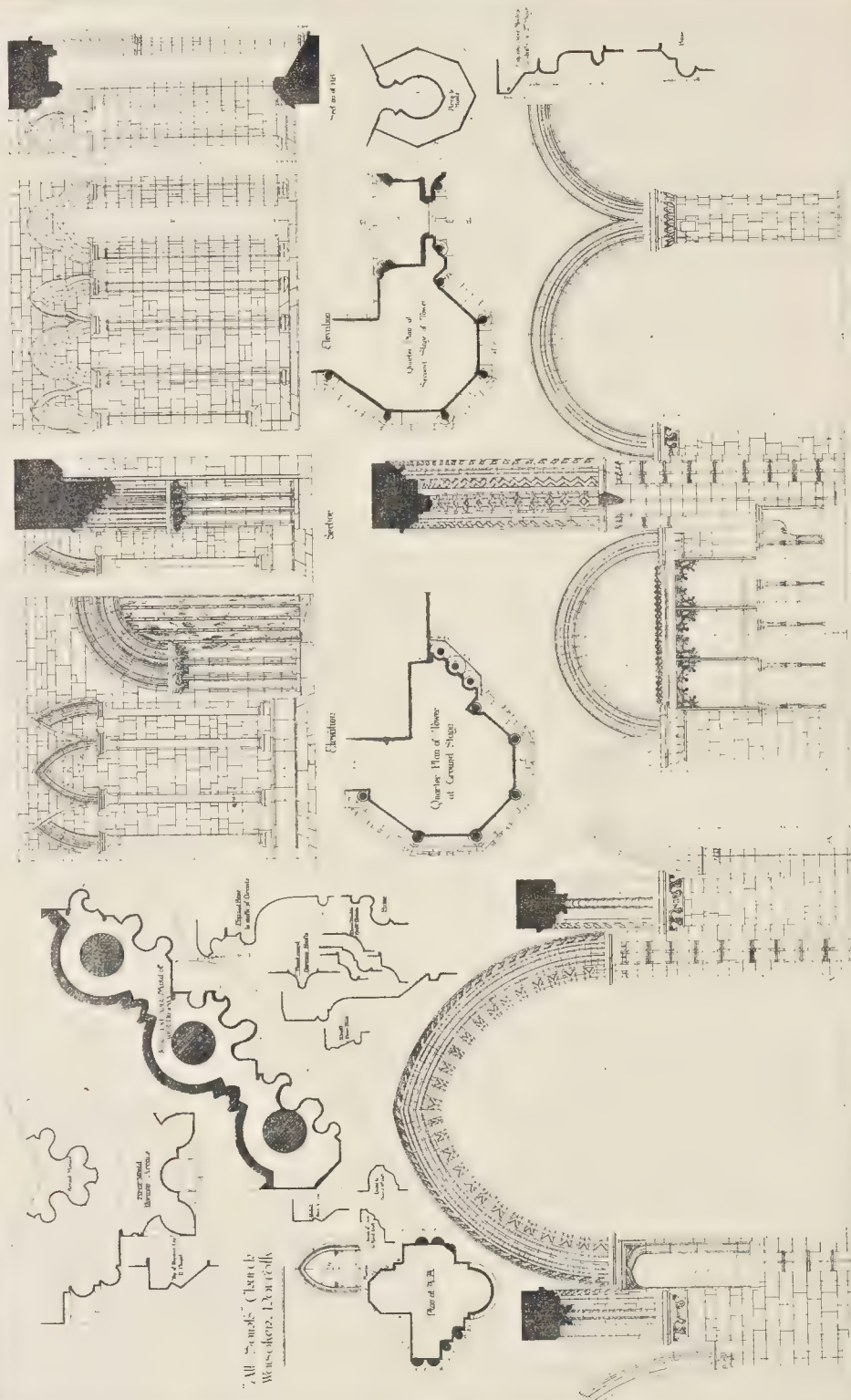


THE BUILDING, JUNE 5, 1886



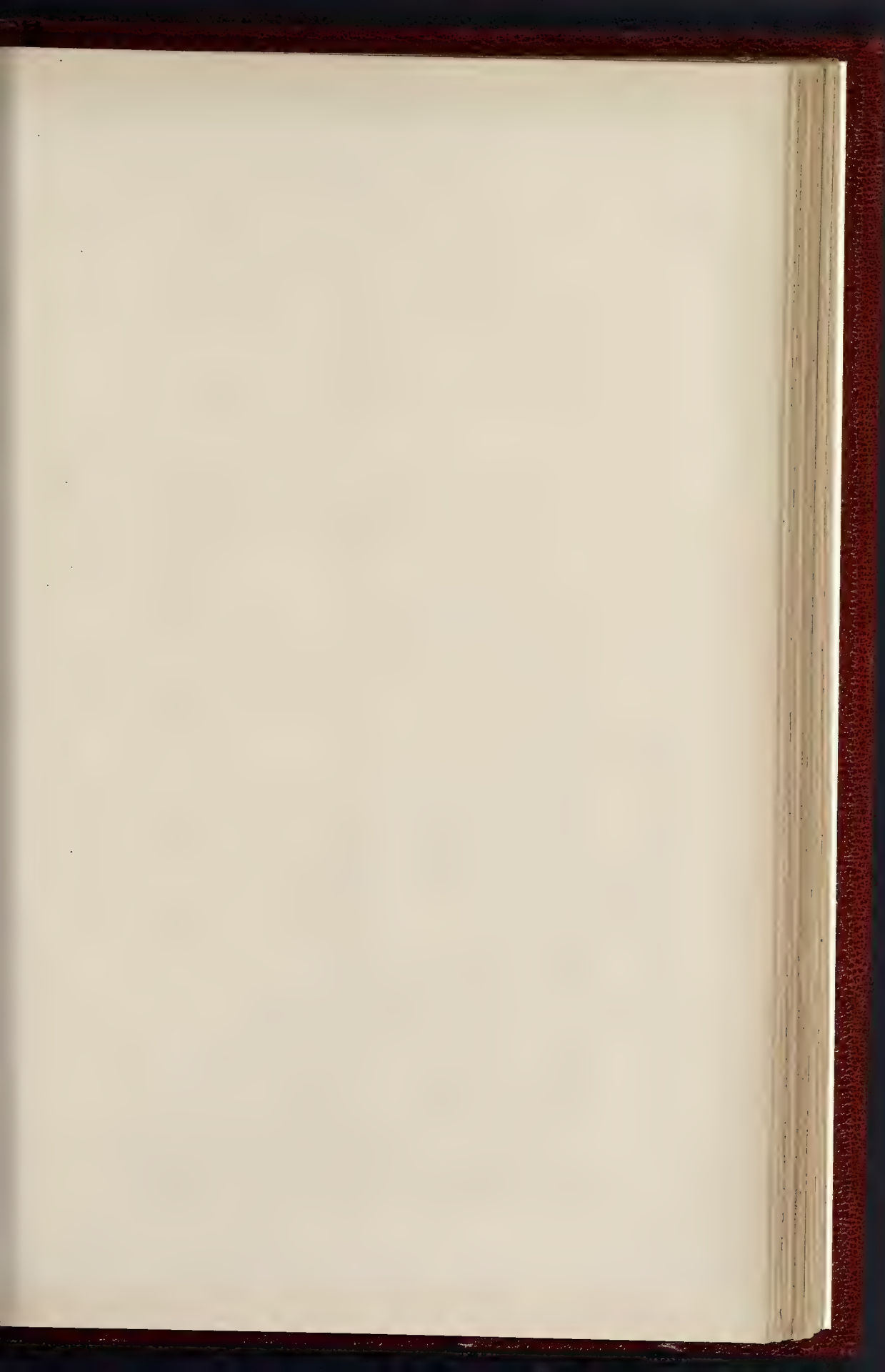






Section of Church North of Section of Church Avenue, Street, etc.

Section of Church North of Section of Church Avenue, Street, etc.

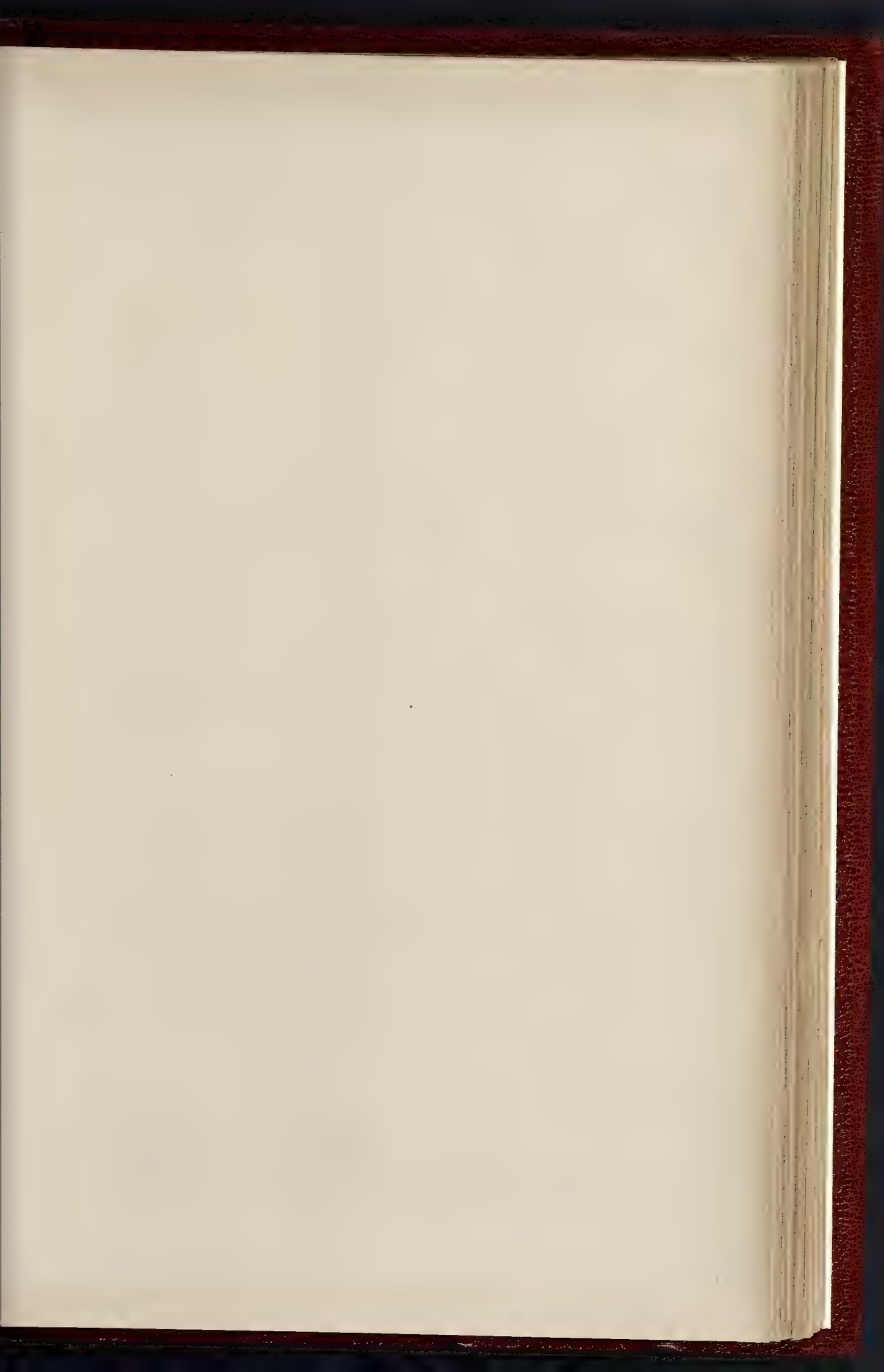






WINDOW IN THE HALL OF THE BUTCHERS' COMPANY, LONDON.

EXECUTED BY MESSRS. LAVERS & WESTLAKE







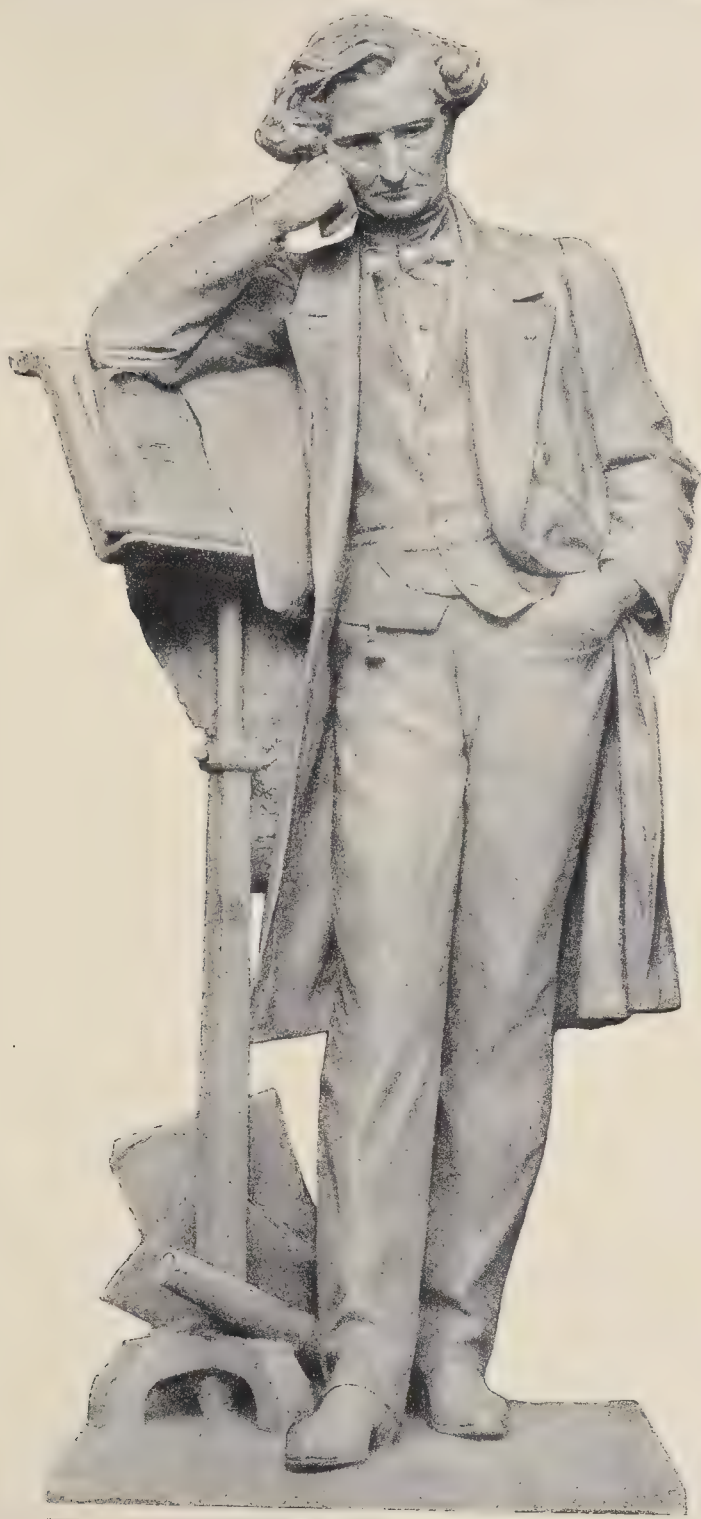


New Shops and Offices.  
New Broad St. City E.C.  
*Edwards Smith, ARCHT. Archt.*









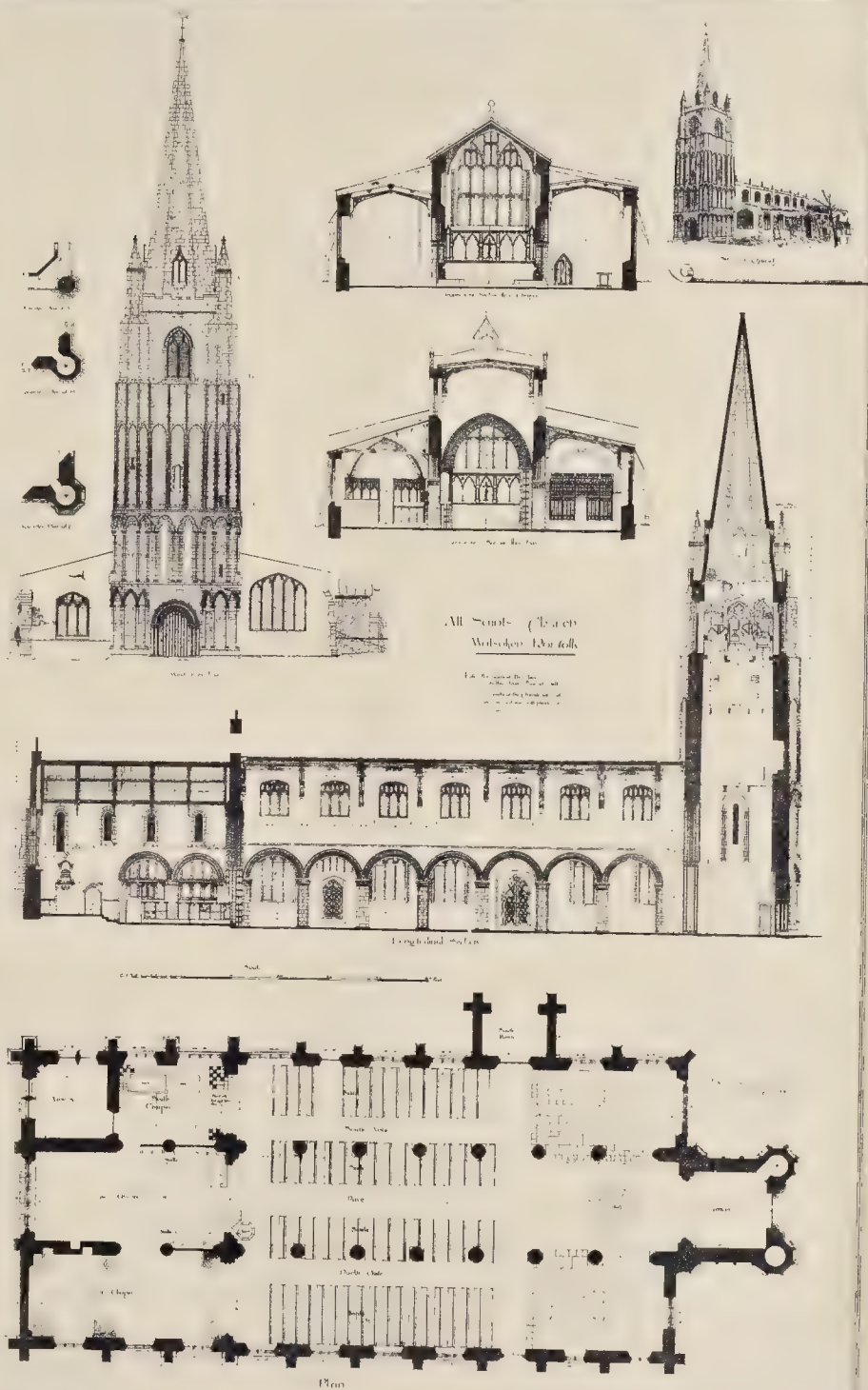
THE PHOTO. BRATTLE STREET 22 MARTIN LANE (FARROW ST. LONDON E

STATUE OF BERLIOZ: TO BE ERECTED IN PARIS.

M. ALFRED LENOIR, Sculptor.

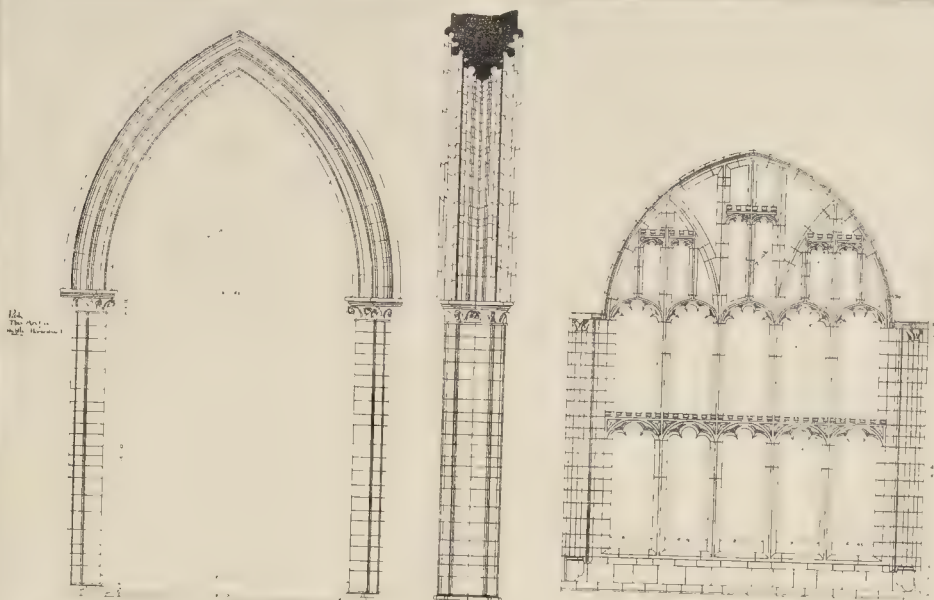










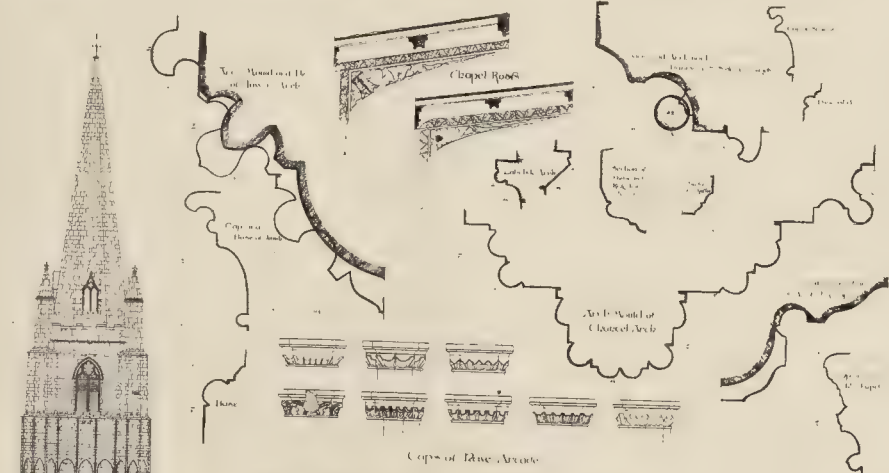


Plan of the lower Arch

Section

Plan

Plan and Section of East Window



Plan of Choir



South Elevation

For the architect  
For the builder  
For the contractor  
For the surveyor  
For the engineer  
For the architect  
For the builder  
For the contractor  
For the surveyor  
For the engineer





## ROYAL INSTITUTE OF BRITISH ARCHITECTS.

The tenth ordinary meeting of the present session was held on Monday last, Mr. Edward Tansor, F.G.S. (President), in the chair.

## The New President.

The President.—As this is the first time I have been able to preside at one of our ordinary meetings, since you did me the honour to elect me as your President, I take this, the first opportunity which has occurred, to offer to you, gentlemen, my warmest thanks for having placed me in this very distinguished position. And you will better be able to understand how very highly I appreciate this honour, when I tell you that I felt very uncertain whether you would concur in conferring it upon me, because I feared you might think the large amount of attention and time I have bestowed on that branch of our profession which appertains to surveying might have so far estranged my mind and thoughts from the study and consideration of the more noble art of architecture that you might have hardly felt I was the right man to represent you as President of the representative body of architects. Therefore, I do feel grateful and especially proud of being the President of the Royal Institute of British Architects; for my ambition,—my sole ambition,—throughout life has been to be an architect. From the time—since about 1830,—when I was admitted a student in the Antique School of the Royal Academy, through an exceptionally long and very arduous professional career, the study of our art has never been laid aside, and all my leisure time has been devoted to it. And as a proof, I may venture to remind you that in 1837 I was the first to call attention at one of our weekly meetings to the restoration of the Temple of Victory Apteros at Athens, to exhibit measured drawings of the same, and a perspective in the Royal Academy; that I have notably been the means of calling your attention to, and making generally known, the then almost, if not entirely, unknown remarkable Mediseval works erected during the time of the Lusignan dynasty in the Island of Cyprus; that I have also called more full attention to the architectural monuments in the Kremlin of Moscow and Central Russia; as also to the remarkable Cathedral of Trondjeim in the north of Norway, than had before been done; thereby convincing,—I trust you will feel,—that although I have largely practised as a surveyor, I have never ceased to be a student in that school to which I was admitted more than half a century ago. Again, gentlemen, I thank you very sincerely for the distinguished honour you have conferred on me. (The President's remarks were received with applause.)

## Miscellaneous Communications.

Mr. William H. White (Secretary) announced the death, on the 22nd of May, of Mr. Richard Kyrie Penston, Fellow, one of the elder members of the Institute.

The Secretary also announced that a dinner was being held that evening at the Hôtel Continental, Paris, by the French architects, in honour of M. Charles Garnier. The dinner, in the words of the communication he had received, was pour "fêter la grande médaille de Reine d'Angleterre."

Professor Kerr.—Perhaps you will allow me to say a word with regard to the decease of Mr. Penston, who was a singularly accomplished and amiable character. Very few members of our profession would suppose that a man hailing from a remote town in Wales could have been accomplished as Mr. Penston undoubtedly was. He was a gentleman in every possible sense of the term, being a country-gentleman may say, by birth, certainly by education, and manners most clearly so. I am sorry to hear of his decease, and I am sure you, gentlemen, will bear with me in paying this slight comment to his memory.

Mr. John Hebb.—I have been asked by Signor Boni, who was lately elected an honorary and Corresponding Member of the Institute, to thank the members for the honour they have done him, and at the same time to present some pamphlets which he has lately written on subjects connected with the history of Venice and its buildings, with a small piece of a pile which formed one of the foundations of the Arsenal. I may be allowed to say that Signor Boni is a man of exceptional ability and

of considerable erudition, and that not only has he a knowledge of the dead languages, but also a remarkable acquaintance with several living languages, speaking also very good English. He apologises for the length of time that has elapsed since receiving the notice of his election, but explains that he has been away. He sends only so many of his works as are in print, and promises that several others, which will probably be reprinted, shall be at the service of the Institute. He also says he has lately found two contracts for the building of the Ca'd'Oro at Venice, which he considers will be two of the most interesting documents illustrating the history of building in that city.

Mr. George Aitchison, A.R.A.—As I have had the honour of knowing Signor Boni for a good many years, I can endorse all that Mr. Hebb has said about him. I think we have been extremely fortunate in enrolling a man who is so devoted to his profession, who has so enlarged a knowledge of antiquities, and who takes such an immense interest in the particular features of the historical portion of the architecture of Venice. I may add that Signor Boni is one of the descendants of the builders of the Ducal Palace.

On the motion of the President, a cordial vote of thanks was passed to Signor Boni for the works he had sent.

## Japanese Architecture.

A paper, entitled "Further Notes on Japanese Architecture," by Mr. Josiah Conder, was then read by his brother, Mr. Roger T. Conder. The following is an abstract of the paper:—

The author, after referring to his previous paper on the same subject, communicated in March, 1878,—alluded to the curious mixture, in the buildings of the Rishi Shinto style (as shown by illustrations of the temple of Miyo-Jin, Kanda-Tokio), of the simplicity of the early Shinto faith with the ostentatious display of the ordinary Buddhist temples. The oldest existing Buddhist temples differ but little in style from the most recent structures. Historical records assert that the early wooden Buddhist temples of Japan were erected under the direction of Chinese priests, leaving us to suppose that their work was gradually modified to suit the tastes of the Japanese. The planning of the Japanese temples is remarkable for the importance given to their approaches and landscape surroundings, and for the isolated arrangement of the group of accessory buildings, as exemplified in the plan shown of the mausoleum of Iye-yasu, at Nikko. The author then proceeded to describe generally the construction and details of ornamentation of an ordinary temple, considering such a building as a model of Japanese architectural art. These buildings vary greatly in size. The temple at To-dai-ji, at Nara,—a two-storied building, containing a statue of Buddha, 63 ft. in height,—measures 290 ft. long by 170 ft. wide, by 156 ft. high; that at Miyo-Jin, Kanda-Tokio, measures 66 ft. by 27 ft., by 40 ft. high to the ridge. The standard of measurement employed by the Japanese builders is the "ken," which is divided into twenty-two minutes, each minute being divided into twenty-two seconds. The "ken" in common use is understood to be six Japanese feet, or "shaku," the "shaku" being 11.93 English inches. The mats with which the floors are covered are always one "ken" long, one half "ken" wide. The "ken" is taken as the standard of measurement of the detached pillars, and of the pillars and parts of the wall enclosures. The wall-posts are framed into a large horizontal sill, the wall space above being subdivided by horizontal timbers, halved on to them. Diagonal bracing or strutting is nowhere to be found. Detached pillars are square or circular, the circular ones being often reeded, and the square ones moulded on the edges; the lower ends rest upon flat stones or bronze moulded bases; the tops receive a square block of wood, generally consisting of a square and hollow. The principal facade is filled in one, two, or three compartments, with hinged doors, which are generally left open, and through these openings the light for the interior is principally obtained, windows, as we understand the term, being rare. An elaborate cornice of wooden bracketing crowns the walls, forming one of the principal ornaments of Japanese buildings. A very important feature of the facade is the portico covering the main entrance steps, covered by gable roofs of

various forms, having a considerable projection, and being often richly ornamented. The forms of roof used to cover the main building are various, but the general appearance of the ends is usually half hip and half gable. Heavy ribs of tile cresting, with large terminals, are carried along the ridge, hip, and along the slope of the gable, set some little distance back. The result of the treatment is very picturesque, and has the advantage of looking equally well from any point of view. A slight tilt is given to the corners of the roof, so that the eaves curl slightly upwards towards the ends. The interior arrangement of wall columns, horizontal beams, and cornice bracketing corresponds with that on the outside, the top beam of the bracketing supporting a panelled ceiling. The wood employed in these temple buildings is usually the native elm, called "keyaki," which is often left quite plain, without colour or paint of any sort. The ends of the timbers are protected by brass caps, and ornaments of the same material are added to the points where beams and pillars intersect, and to cover joints of timbers. Colour decoration, applied to the exterior of the building, has several grades or degrees of richness. The ruder kind of decoration consists of a coating of red (oxide of iron) or black (Indian ink), mixed with animal size. The common red is a raw, harsh colour inclining to orange, but the real vermilion red, made of vermilion mixed with size, or with lacquer, to be seen at Nikko and elsewhere,—is a deep, rich colour, slightly crimson in tint. For portions very much exposed to the weather, black lacquer is used. The application of colour decoration to exteriors commences generally with the intels or ties, near the top of the posts or pillars. From this height, the different beams and brackets, together with the flat spaces and raised carvings between, are diapered, arabesqued, and variously picked out in bright colouring and gilding. Such a treatment imparts a light elegance to the otherwise ponderous eaves of the Japanese buildings; and the deep sun shadows, beneath the massive projections, assist in subduing and harmonising the bold contrasts of colour employed. The interiors of the principal sanctuaries are also in most cases elaborately coloured, the columns and posts in such a way as shall not be detrimental to their appearance of vertical strength, the horizontal beams in light colours, or in deep colours relieved by an abundance of white and gilding. The recessed spaces between beams and intels, and between the cornice bracketing, are filled in with elaborate carvings, which are pierced if in internal divisions. The ribs of the oofered ceilings are generally lacquered black with gold lines on their edges, the enclosed panels being filled in with richly-coloured decorations. It is this decorative perfection, this application of the arts of painting and carving to the constructive arts, which imparts the great charm to Japanese structures, a charm of endless variety amidst perfect harmony. As the foster-mother of fine art, the Japanese style of building can lay special claim to rank as an important architectural style. The author then referred to the various accessory temple buildings, to the bishops' palaces, and the monasteries. The accessory buildings are usually the gateways, the font sheds used to cover the holy water basin, the belfries, the drum towers, the store-houses, and the pagodas; the latter, usually of five stories, contain shrines or wooden images in their lower stages, the upper serving no purpose but that of a belvedere; they average 150 ft. high, and are the only Japanese buildings which have sufficient height to assert themselves from any distance.

Mr. G. A. Audsley, in opening the discussion, expressed the pleasure he had experienced in listening to Mr. Conder's most interesting paper. The great glory of Japanese architecture was its marvellous system of carving. Prior to the sixteenth century he believed that little carving was applied to the temples or private buildings of Japan, but at the close of that century was born the famous Japanese left-handed sculptor who was practically the founder of the modern school of Buddhist architecture. Previously to that time there was little carving to the outside of the temples; but this carpenter,—for such he really was,—endowed with great genius and skill, apparently struck out the idea of employing carving for the beautification of the temples, and of applying it wholesale as a system of

\* See Builder for that year, pp. 238, 263, 368.



decoration. The photographs showed how marvellously skilful this carving was, and the only blunder he had been known to make was in a temple at Nikko, where two elephants were to be found carved with their legs jointed the wrong way. Probably he never saw an elephant. From the time of this great carver, till the decay of Buddhist architecture, Japan seemed to have poured forth one endless mass of carvings, marvellous not only for their dexterous manipulation, but also for their beauty of design and appreciation of the works of nature. Flowers, birds, fish, waves, and waterfalls, were all treated in a manner which was perfectly decorative, and seemed to have grown into their place rather than to have been carved. It was a system of decoration which obtained nowhere else, it was special to Japan, and it raised Japanese architecture to the dignity of being one of the great architectures of the world. The Japanese had never indulged in stone architecture, except for the basements of their buildings, on account of the frequency of earthquakes. Mr. Ainsley concluded by moving a vote of thanks to the writer of the paper.

Professor T. Roger Smith, in seconding the vote of thanks, remarked that he had the pleasure both of relationship and of intimate friendship with Mr. Conder. The paper was a very good illustration of the way in which a man who found himself in a foreign country, with objects of interest before him, might serve a great many of his countrymen at home. Mr. Conder's business in Japan was not to study the native architecture, but to teach the young Japanese something of the architecture of Europe, and to practise in styles very different to those they saw before them in the drawings on the screen. Mr. Conder appeared, however, to have taken the opportunity of minutely studying the buildings of the native architects, and the record of his work would be sufficient to show any of the members who might visit Japan what they should look for, and should render the works of Japanese architects much more intelligible. The architecture of Japan struck him as showing an extremely complete style. Mr. Conder had put before them the whole anatomy of the temples and their decorations, and had afforded a glimpse of a complete style entirely different from anything they had to deal with. As was pointed out by Mr. Ainsley, the architecture of Japan was essentially a timber architecture, but its decorative side had been carried much further than we in Western Europe had ventured. A great deal might therefore be learned from the success of Japanese architecture in the way of decoration. He could not but hope that a careful study of Japanese art in many ways might stimulate us, not to put these decorations into our own buildings, for that would not be learning the lesson of consistency, but to increase the amount of colour decoration and carving, so as to make our interiors far more splendid and rich than they hitherto had been.

Mr. R. Phené Spiers remarked that he had been asked to look through his collection, by Mr. Conder, to see if he could supply any further illustrations of architectural subjects. He had, therefore, looked out a few books, and it was interesting to note that one of the greatest artists of Japan had not considered it beneath his dignity to include in two of his works a number of drawings of architectural models. In the course of inquiry he found that in the ninth century there existed a celebrated man, called Hidano-Takuni, who laid down laws which had regulated Japanese architecture to the present day. Those laws were not laid down in writing, as were those of Vitruvius, but were handed down by tradition; and, although there were no works which represented the ideas of that celebrated man, still, temples which had been built from the instructions he gave, had, when in a bad state and ready to fall down, been re-built in exactly the same form and with the same decoration and details. It would appear that in the sixteenth century these temples were further enriched by carving and painting, but that would not alter their main form; and from the apparent regularity of disposition, and the scheme of setting out the number of feet between the different posts, all this must have been laid down by some great man at an early period, and the tradition might have descended to later times. One of the characteristic features of Japanese architecture

was the use of timbers which, through some freak of nature, were not straight. These, in England, would, generally speaking, be rejected, but the Japanese delighted to make use of an irregularity of nature. Consequently, in some of the buildings these twisted timbers were to be found turned to good account, and rendered most picturesque features. This Hidano-Takuni was also said to have invented a method to prevent lofty pagodas being overturned by earthquakes. He is said to have found that if from the top of a lofty pagoda a huge baulk of timber was suspended, its oscillation would keep the pagoda from being blown down. He understood, however, that Mr. Conder had never found the timber left free.

Mr. Aitchison, A.R.A., said that photographs and drawings of Japanese buildings showed that the work was often very beautiful, and a rather fine effect was produced by the number of successive roofs put on the pagodas. With regard to Japanese ornament, over one-half of the modern ornamentation of domestic articles was now founded on the Japanese principle, and it also afforded infinite means of study in regard to colour. He hoped that Mr. Conder, or some coadjutor, would be able to transmit to the Institute the drawings of some of these old temples, the interiors of which were said to be some of the most splendid specimens of colouring the world had ever seen. The Japanese Government might be induced to have diagrams made of some of their finest temples, which were said to be virtually going to decay, or her Majesty's Government might be memorialised to send out artists to make some kind of delineation of them, so that those triumphs of colouring might not be lost to England and the world.

The vote of thanks was then carried by acclamation.

Mr. Roger T. Conder, in returning thanks on behalf of his brother, referred to the question which had been raised as to the pagodas. He also read a letter on the subject addressed to his brother by a Japanese professor of architecture, who had examined a great many of these structures, and who stated that the assertion as to the central swinging post could not be invariably true; that there might be some examples of it, but that he had never been fortunate enough to meet with one; and that he believed it was never intended that the post should swing.

The proceedings then terminated.

#### THE ROYAL STAND, EPSOM.

The first new additional building has been erected at the west end of the old Grand Stand, and consists of a large saloon, 50 ft. by 36 ft., with arched ceiling, the cornice and frieze being carried by pilasters with carved Corinthian capitals, the total height of the room being 22 ft. At one side of the saloon there is a wide refreshment-bar; a portion of this room is partitioned off for the use of the Telegraph department, and a pneumatic tube is placed here, in connexion with the instrument-room, so that the general public using the Grand Stand can send their messages without going outside the building. The room is lighted by large windows at one side, in addition to a ceiling-light. Between the saloon and the course, lavatories and other conveniences have been erected for the use of the general public using the Grand Stand, thus adding greatly to the comfort of visitors. Running past the Grand Stand and the saloon, a wide passage has been made leading to the lawn, with a new staircase at the north-west corner of the Grand Stand. This staircase facilitates the gaining of the second balcony, which will mitigate the crush at the other entrance. Beyond the saloon, which may be considered as an integral part of the Grand Stand, is the vestibule and entrance to the Royal and Club Stand. The entrance-hall is 32 ft. by 24 ft., the approach to it from the vestibule at the entrance being cut off by an arched screen, constructed of buff terra-cotta; the two arched openings on either side are filled with stained glass. The walls of the entrance-hall are tiled, with a brown majolica dado, black tile skirting and capping. This is continued round the screen to form the base of arcade. Above, the walls are covered with cream-coloured tiling. The hall is partly lighted by two ceiling-lights, filled with stained glass, the design and colouring of which are Indian in style, the ceiling being panelled, with moulded cornice and

enriched frieze. From the entrance-hall a stone staircase runs up through the building, giving access to the balconies and standings. The staircase is lighted and ventilated by windows on the landings, and by a lofty lantern-light, rising to a height of 70 ft. from the ground, and surmounted by an iron grille, in the centre of which a lofty flag-post is erected. The dining-hall, a fine and spacious apartment, 50 ft. by 40 ft., and 18 ft. high, is to the right of the entrance-hall. The walls are relieved by fluted pilasters having Ionic caps carrying the frieze and enriched cornice, moulded panels being formed between the pilasters, with a dado carried round the room; the ceiling is panelled, with moulded ribs. Two refreshment buffets, with mahogany and walnut fronts and marble tops, are placed at the end of the room, and a doorway leads to the kitchen and large store-rooms. At the back, a dinner-lift runs from the basement, and communicates with the Jockey Club luncheon-room and the Prince of Wales's room.

The rooms for the use of their Royal Highnesses, the Prince and Princess of Wales consist of sitting-room, 20 ft. by 16 ft. and 11 ft. high, lighted by three windows, overlooking the course. The ceiling is enriched by a raised geometrical pattern in plaster, and a decorative frieze and cornice surround the room; the dado is formed of Lincrusta-Walton, with moulded capping. The mantel-piece is of wood, with carved over-mantel and tiled hearth. The lights to windows are filled with stained glass, designed in the Renaissance style. A private staircase, for the exclusive use of H.R.H. the Prince of Wales, leads to the Jockey Club room. The luncheon-room is 24 ft. by 16 ft., and adjoins the sitting-room; the decoration is similar in all respects, except that the general treatment is varied. A servery is placed at the back of the luncheon-room, and communicates therewith. The Princess's retiring-room is entered from the sitting-room. The walls are tiled, with a majolica dado, dark border and skirting, and French grey tiling above.

Adjoining the Club Stand, still to the west, come what may be called the rooms devoted to the actual business of racing, being the jockeys', press, telegraph, and weighing rooms, and the room for the clerk of the course. The press-room is a very comfortable apartment, 16 ft. by 30 ft., with a flight of stairs leading immediately from the room to the reporters' balcony. At the back of this balcony, which is about 36 ft. long, are the lavatories, cloak-rooms, and other conveniences set apart for the use of the press. Another great improvement upon the ordinary location of the telegraph will be a short passage leading from this balcony, and communicating directly with the large instrument-room behind. This room is 36 ft. by 36 ft. and 18 ft. high, with an open-timbered roof which is stained and varnished. Accommodation is provided for 100 telegraphic operators. On the ground-floor there are two telegraph rooms, one for the use of the Grand Stand public, the other for the use of the general public. The new Club Stand is a very commodious structure. Although it is not so high as its larger neighbour, the Grand Stand, it has the same length of frontage. The first balcony is partly reserved for the use of the members of the Jockey Club, and partly for those of the members of the New Club, which will be limited to about 700 members. Over this, again, is the second or royal balcony.

The whole of the work has been carried out by Messrs. Colls & Sons, builders, London, from the designs and under the superintendence of Mr. J. Hatchard Smith, architect, Moorgate Station Buildings. The stained glass is by Mr. F. A. Oldaker; the enriched ceilings are made of Messrs. Jackson's fibrous plaster; Messrs. M. T. Shaw & Co. supplied the ironwork; the terra-cotta screen is by Messrs. Doulton; Lascell's concrete has been used throughout for landings, pavings, &c. The buildings are enclosed by a flint wall with large stone gate-piers; the gate is of wrought iron with a shield. Mr. French has acted as clerk of the works. The building has cost about 11,000*l.*, and the work has been completed in six months, notwithstanding the severity of the winter.

**British Museum.**—Mr. John A. P. MacBrick delivered his third lecture (subject, "Early Greek Sculpture") on Tuesday last. The next, on Pheidias, will be given on Tuesday next, at half-past two precisely.







that of Mr. Woodhouse, of Bridgwater. Many advantages are claimed for this block, but the chief seems to be that dry walls are ensured by the air-passages formed in the centre of the wall. In speaking of concrete, to urge such an advantage as this is absurd; because, whether the inside of the wall be hollow or solid, no water can pass through the material on account of its impermeability; but if it is intended to show the advantage of the form for a block to be made in any material, it is a good point.\* The greatest advance, however, in the block system is the skeleton-block system; and as these blocks are rather of a doubtful classification, I prefer, for the sake of convenience, to put them under the heading of slabs. I therefore now refer to

**The Slab System.**—Hitherto the great difficulty in constructing walls of concrete slabs has been to prevent the slabs from being forced outwards, or from toppling over by the pressure of the plastic filling-in material from the time of its deposition between the slabs until it has become sufficiently hard to form with the slabs a solid wall. Several devices have been used to obviate this difficulty:—(1) Temporary ties or gauges connecting the slabs forming the two faces of the wall have been used, and these have been removed as soon as the plastic filling-in material has become hard. (2) Permanent ties or cramps, which, as their name implies, have been allowed to remain in the wall, and to be entirely buried in the plastic filling-in material. These permanent transverse ties have been of two kinds: those which were affixed as soon as the slabs were placed in position, and those which were made to form part of the slab during the period of its manufacture, as, for instance, slabs (really skeleton-blocks) of Z or H horizontal section. (3) Slabs of L section (these might also be called skeleton-blocks), vertical or horizontal, and some with a kind of buttress projecting from the back of the slab into the wall, have also been used, as well as slabs having a wide base, and when those have been bedded, or a thin layer of plastic concrete has been deposited between that on the inner and that on the outer face of the wall, and this layer of concrete has become hard, a transverse tie had thus been formed. Or these same slabs have been used, and a temporary tie has been placed across their upper edges during the time that the filling behind them has been in a plastic state; or else these same slabs have been shored up from the outside of the wall. (4) A casing has been formed by means of the slabs entirely of concrete, those slabs forming the faces of the wall in the unfilled courses being keyed to the slabs below that form the faces of the wall to the filled courses. In this system, therefore, any kind of transverse-tie to be used during the process of construction, or rather of extrusion, is entirely dispensed with, and the courses of slabs above depend solely upon the courses of slabs below them for their stability and rigidity up to the time that the filling-in material has been deposited and become hard behind them.

As the objects of all slab construction are:—(1) To retain and to mould the plastic concrete used in forming the wall; (2) to key or fix the slabs to the mass which they themselves have moulded; and (3) to form a facing to the wall,—it is seen that all the devices mentioned above are not of permanent utility, but are only temporarily required. For when the three objects have been attained there is no need of any transverse tie whatever beyond that which naturally obtains in a concrete wall. I will now illustrate these principles by some examples. The first I mentioned was slabs with temporary ties or gauges. These were generally placed across the upper edges of the slabs forming the inner and outer faces of the wall, and extended down the faces of the slabs to the next course. They could not be relied upon for building a wall plumb, as their angles might have been easily knocked out of square. The second was slabs with permanent ties or cramps. These were buried in the mass of

concrete filling, and remained there permanently, because they were placed in such a position that they could not be extricated after the setting of the concrete. Iron ties seem to have been first used, and these were hooked into eyes cast into the slabs, or also into holes formed in them. In Sidebotham's system metal ties are used, but he also uses a transverse tie of I horizontal section, formed of concrete, and each end of this tie fits into grooves in the back of the slab. Drake has a system somewhat similar in principle, but with a little alteration in the form of the ties, and, instead of a square edge to the slabs, has a tongue-and-groove joint. Lish's slabs (or rather skeleton blocks) may be of Z, L, T or H (Greek character) form; but his Z form, the only one shown in his specification, is not a happy one, as special slabs must be made for every thickness of wall. The form of the slab forbids its transport, and the awkwardness of moulding forbids its manufacture. It is the same, more or less, with all skeleton blocks. Before mentioning those under the next heading I will call attention to the slab or skeleton block of Lee and Beale. This is of L horizontal section, but as its return end extends right across the wall it must be classed with the permanent transverse ties. It has, no doubt, several good points, as, for instance, the saving of one transverse tie, and also the ensuring of accuracy in building a wall; but, if the cost of producing the slab be gone into, it is too expensive to compete with other systems. Under the third heading I class Lockwood's slab. This is a slab of L vertical section, the foot of the L extending for a short distance into the wall. Only one course at a time can be built up with this slab. It is no doubt a very simple form of slab, almost too simple, because no tie between it and the filling is obtained over a large part of its area, but it obeys the proper principle of slab construction, inasmuch as it can be used for any thickness of wall. It must, of course, be bedded upon each course, and a tie might have to be put here and there across its upper edge.\* Potter's is on somewhat similar principles, except that he does not get such a large bed surface, but he improves the key-hold of the slab by forming dovetailed projections, which extend down the slab at each end. These projections are further buttressed inwards, and therefore project farther into the heart of the wall at the lower edge of the slab than they do at the upper. Temporary ties are used with these slabs, and if necessary permanent transverse ties can be formed by simply depositing a thin layer of concrete between those on the inner and those on the outer faces of the wall and allowing it to become hard. In another system of Mr. Drake's the slabs have all been held together by a framework, which is shored up from the outside of the wall, and this has been removed when the slabs have become keyed to the wall. This latter, however, is really a casing system, but without the advantages possessed by that under heading 4; for in this of Drake we have expensive metal tie-rods and bars in addition to the slabs, and also the additional cost of fitting up the slabs to form a casing.

[The lecturer, in conclusion, described his own system of concrete construction, which was described and illustrated in the *Builder* for June 20, 1885.]

**Liverpool Exhibition.**—Messrs. Maw & Co ask us to mention that they have on view here a collection of specimens of their best work, including examples of "Anglo-Persian" tiles, which are reproductions of ancient examples found in Oriental mosques and palaces, both as regards design and execution, and "relief-enamel" tiles executed in raised enamels on terra-cotta grounds of various shades and colours; these are intended to meet a demand for fireplace tiles not uniformly glazed or enamelled. The same firm also exhibit examples of "Benthall-ware," in which designs, modelled in relief, in red terra-cotta, are enriched by the partial application of colour in enamels; and sgraffito tiles, which are entirely hand-work, and are used in fireplace and wall decoration where cost is not such a consideration as the production of an artistic result.

\* This slab of Lockwood is exactly similar to Taylor's brick which he used for concrete walling, with the exception, of course, that this brick was made of burned clay and of the size of a brick. (Illustrated in *Builder*, vol. xxvi., p. 658.)—F. W.

\* Messrs. Parr & Strong are the inventors of a cellular system, as it is called. The blocks are really hexagonal tubes of terra-cotta and other material, containing a filling of concrete. The hexagonal teeth into each other to form the bond, and the open ends of the pipes, which show the concrete filling, form the faces of the wall. This is very effective, but it is similar to the wall may be obtained by using the slab system of West, and at probably a quarter the cost. A wall outside Messrs. Oakley's, in Westminster Bridge-road, is built of Messrs. Parr & Strong's tubes (Illustrated in *Builder*, vol. xxvi., p. 354).—F. W.

## CASE UNDER THE METROPOLITAN BUILDING ACTS.

### NOTICE AS TO SHOP FRONT.

In the case of the District Surveyor of St. Giles's, Peck, heard at the Bow-street Police Court before Mr. Vaughan, the defendant had taken out an old shop-front at No. 96, Oxford-street, and had put in a new one without giving notice to the District Surveyor. The District Surveyor had requested the builder to give notice of alterations done to a shop-front, in fixing new sashes and stall-board, also altering the position of the entrance-door; the cornice and plaster remaining as before.

Defendant contended that the work was only a necessary repair, and as such not requiring notice to be given.

The Magistrate decided that the work done was more than could be considered as a necessary repair, being a new shop-front, and that, to the extent of such alteration, it was subject to the regulation of the Act. A penalty of 20s. and 12s. costs was imposed.

### "LIGHTS."

SIR,—Can any of your readers refer me to some reliable authority in dealing with such a case as the following?

A certain property consists of a public-house and a mews in the same ownership, but forming separate holdings. The mews is held on a lease, and a portion of the boundary between the two holdings consists of an imaginary line drawn between two fixed points and running parallel to one side of the public-house main building and about 10 ft. therefrom. The tenant of the public-house has received permission from the owner to extend his premises on that particular side by building up to the boundary line. There are several "lights" on the side referred to, and the question is whether these "lights" can be retained in the extension without the permission of my client, the lessee of the mews.

SURVEYOR.

\* \* If these lights have not been enjoyed without obstruction for twenty years the lessee of the mews can clearly obstruct them, that is assuming also that the lights in the addition are in fact the same as the former lights, though somewhat advanced.

### DUSTBINS.

SIR,—May I ask a little space in your influential paper to say a few words on a little (?) grievance that exists in this parish (Fulham)? On Sunday I inspected some houses in the locality of "Hurlingham," and was horrified to see the dustbins of a row of houses quite underneath the kitchen windows,—so near that the servant would only have to lift up the window and empty the ashes and refuse into it. Surely this is indeed an evil, and the result of such a nuisance on the health of the incoming tenants must be lamentable, especially to the poor servant who has to breathe this foul atmosphere. Who is answerable for this?

A WOULD-BE TENANT.

## THE NEW GOODS DEPOT FOR THE MIDLAND RAILWAY.

SIR,—In your account of the St. Pancras Goods Station [p. 777, ante] you state that the ironwork was entrusted to three firms, giving the names, but, as we were the makers of the whole of the wrought-iron screens and gates, and have more in hand, and our name is omitted, we shall be much obliged if you will supply the omission next week.

THOMAS POTTER & SONS.

South Molton-street.

## Sanitary Institute of Great Britain.

The annual general meeting was held at the Parkes Museum of Hygiene, on Thursday, May 27th, Captain Douglas Galton, R.E., C.B., F.R.S., in the chair. Report was made by the Council on the work accomplished during the past year, attention being especially called to the examinations for local surveyors and inspectors of nuisances. Sixty-four candidates presented themselves for examination during the year, and the Council are glad to see that local authorities are beginning to appreciate the importance of appointing properly qualified men to fill these offices. It was reported that the Council had accepted an invitation to hold its next congress and exhibition in the City of York.

An address of much interest with regard to sanitary science was given by the chairman, and the officers for the ensuing year were elected, the President being His Grace the Duke of Northumberland; Trustees, Sir J. Lubbock, bart., Dr. B. W. Richardson, F.R.S., and Mr. Thomas Salt.



## The Student's Column.

## OUR BUILDING STONES.—XIII.

THE SELECTION OF STONE (continued).

**W**E have frequently alluded to the action of the atmosphere in destroying stone in large cities and in the country, and pointed out both the principal causes and effects in connexion therewith. We have now to consider other destructive and preservative agents which affect certain districts only.

We will first consider rain. The amount of rainfall in some districts is much greater than in others. Now, we have seen that the action of rain and its impurities are the principal causes of the decay of stone, and it will, therefore, be quite evident that the rainy districts require more durable stones than those in which the annual rainfall is less. To reduce this to its minimum, we might show that in rainless countries no care whatever need be exercised in selecting stone, as far as durability is concerned, for in those countries very soft and bad stones will last for a considerable length of time. We will, however, confine our attention to this country.

In winter time the land on our western coasts is colder than the adjacent sea. Thus, when the warm and damp air of the Atlantic arrives on our shores it is chilled on contact with the colder surface of the ground, and rain is the result.

Moreover, the land being mountainous on that side of our country, the damp air is forced to ascend into the colder regions of the atmosphere. Thus another mode of condensation comes into play, helping to increase the humidity of the climate.

Being thus deprived of its moisture, the air, as it travels towards our eastern shores, is comparatively dry. Consequently the annual rainfall of our western counties is considerably higher than that of the eastern.

The annual rainfall at sea-level ranges from 40 or 80 in. on the west coasts of Ireland and Scotland, to about 20 in. on the east coast of England. In some localities, however, the fall is much greater, amounting to 154 in. on the average of six years, at Seathwaite, in Borrowdale, at the height of 422 ft. above the sea.\*

But even as far as our western coasts are concerned, local circumstances so much influence the amount of rainfall of a district, that it is necessary, in estimating the rate of decay of building stones in a certain town, to ascertain the annual fall. Matters of this nature must be continually borne in mind when selecting stone. If, for instance, a stone be selected from the observed rate of disintegration in a quarry, and this quarry be situated in a district where the average annual rainfall is 25 in., it will be seen that if the stone be carried away from that district and built in one having an average of 50 in. or other things being equal, the stone will decay there at rather more than double the observed rate at the quarry.

By attracting rain, as woods and thick forests, more particularly on elevated ground, are believed to do, the stones of mansions and other structures in their vicinity are also liable to decay more quickly than they might otherwise do.

The stone in edifices built in a position altogether sheltered from the sun soon rots, unless it is of very good quality, because after rain, there being no sun to quickly dry out the moisture, the acids and other destructive impurities in the rain have more time to act on the stone. On the other hand, those parts of a building exposed to the sun's rays stand a better chance of being preserved.

The direction of the prevailing winds in a district should be taken into account, for the side of a building exposed to their action is affected by the moisture, &c., they bring. Wind, nevertheless, is also a preserving agent (see note, p. 525).

It is evident from the foregoing that not only the position of an edifice with reference to the physical features of the surrounding country, but the position of a stone in a building may very much influence its durability.

The effect of the deleterious agents referred to may to a great extent be counteracted.

The best stones should be placed in the more exposed parts of the building. Interior decora-

tions may be constructed with freestones of moderate quality only, as they are not so liable to decay. Steps and other portions which are subjected to much wear and tear must be made of strong compact stones. Siliceous sandstone and granite are probably the best materials for these purposes.

The foundations of a building should be made with good, compact stone. Professor W. R. Johnson, speaking of the stone used in constructing the foundations of the extension of the United States Capitol, said that the foundations of the Capitol were intended to be embanked in such a manner that frost will never reach them, and that since the water falling on the building will be mostly carried away by pipes and drains, and the shielding of the surface by pavements or flaggings, the foundation walls will be kept comparatively dry.\* The inference is that under these conditions the progress of decomposition of the stone will be retarded.

In building walls, stone having a laminated structure should be placed with the planes of those laminae in a horizontal position. Considerable experience is required to find the bedding-planes, as they are called, in some stones, and if the structure of the stone is such that they cannot be otherwise distinguished, the mason usually knows them from the direction of the grain. But it is not necessary to be so careful in observing the bedding-planes in rocks that are not distinctly laminated.

If the bedding-planes of a clearly-laminated stone are placed in an upright position, parallel to the face of the wall, the layers peel off, one after another, under the action of the weather. If, however, these planes be placed at right angles to the exterior face of the wall, this peeling action cannot take place; but little fear may be formed, as some of the laminae are more susceptible to weathering than others.

"In arches, laminated stones should be placed with the natural bed as nearly as possible at right angles to the thrust upon the stone,—that is, with the "grain" or laminae parallel to the centre lines of the arch stones, and perpendicular to the face of the arch.

In cornices with undercut mouldings the natural bed is placed vertically and at right angles to the face; for if placed horizontally, layers of the overhanging portion would be liable to drop off. There are in elaborate work other exceptions to the general rule."†

There are sandstones fit for large edifices, the appearance of which might be considerably improved in the tooling and dressing. Thus Dr. Fage remarks that, whilst polishing will bring out the beauty of one variety, vertical dressing may be more suitable for a second, and parallel broaching, or pearing may mask the grain or spottings of a third.

We may observe, however, that these ornamental lines often help the decay of stones, by affording ledges for rainwater to rest on, especially if the broaching lines are built in a horizontal position.

As the majority of stratified rocks have a tendency to weather more rapidly along their planes of stratification than anywhere else, it will be seen that when sandstones have a flaggy or fissile structure they are not desirable for building purposes. When exposed edgewise to the action of frost, however, they often split up into capital paving stones.

There are certain rocks known as Stonesfield "slate," Collyweston "slate," &c. These are not metamorphic slates produced by heat and pressure, like the Welsh and Scotch rocks of the same name, but are, in fact, merely fissile limestones, which, by the aid of frost, are capable of being split up into slabs of sufficient thinness for roofing purposes.

## Electrical Transmission of Power.—

The Cannon Foundry at Bourges has two 20-ton cranes for the handling of very large ordnance. Each of these is worked by a special electrical motor, with current furnished by a single generator. The power is transmitted a distance of 120 metres, and is about 13 h.p. out of 25 h.p. The working has always been effected without accident. In the same establishment there has also been employed, since 1879, two gramme dynamos, one as a generator, the other as a receiver for the testing of metals by means of a traction machine.

\* See Dobson's "Radiments of Masonry and Stone-cutting" (1873), Appendix, p. 121.  
† Rivington's "Notes on Build. Const.," Part III. (Materials), p. 9.

## Books.

*Builder's Work and the Building Trades.* By Col. H. C. SEDDON, R.E., Superintending Engineer H.M. Dockyard, Portsmouth, &c. With illustrations. London: Rivingtons, 1886.

**T**HE facilities now afforded to students of both the engineering and the architectural professions for gaining information are enormously in advance of those which existed a few years ago. The numerous works which have been published, treating in detail the various operations connected with building from a practical point of view, and the admirable illustrations which add so largely to the value of these works, will enable a student to gain a very clear idea of what he has to learn, while the various technical schools and institutions which are springing up all over the country afford ample opportunities for supplementing the knowledge gained from books with a practical acquaintance with the subjects treated of. It must always be remembered that no amount of mere book-learning in the various branches of building construction can dispense with that practical familiarity which can only be gained from a close study of works in progress, but if a student has learned the reason why one method of doing a thing is right and another wrong, he will be able much better to appreciate the right way when he sees it.

In the work by Col. Seddon, under notice, it is stated in the preface that the details of construction are treated from the point of view of those who are actually engaged in the execution of builders' work, and it is precisely this fact which renders the work of great value to the architectural student, as he will find numerous small details noticed upon which he would in vain seek information elsewhere. The different building trades are separately treated, mainly from the point of view of the War Department contracts. The various operations and processes are carefully described, and the method of arriving at the value of finished work is explained. Excavators' work is discussed much more fully than is done in the majority of books, and useful details of carting, wheeling, &c., are given. As an instance of minute detail, we notice that attention is called to the fact that, as in laying concrete the joints are always weak parts, any joints in one layer should be covered by the succeeding one. This is a little matter too often neglected.

The subject of bond in brickwork is treated very fully, and the principles upon which bond really depends are elucidated, illustrations being given not only of what to do, but also of what to avoid, and sundry methods in which brickwork may be scamped are particularised. There is also an admirable illustration showing the different ways of jointing and pointing brickwork, and the abomination of tick-pointing is clearly demonstrated.

Masonry work is described in considerable detail, and the various modes of dressing stones are explained and illustrated. In the remarks upon bedding stones it is stated that "in projecting undercut mouldings and weathered copings the natural beds should be placed parallel to the side joints." Now surely this is rather too general a statement. No doubt, if one member of a cornice be deeply undercut it is not desirable to lay the course which comprises the member on its natural bed, but this is the only course which we should treat in this way, and we should certainly prefer to lay the stones of a weathered coping on their natural bed. The necessity of proportioning the bedding area of individual stones to their face area, and the danger likely to result from what are called flush joints, are clearly pointed out.

Some excellent information is given as to the various kinds of fir timber brought to the London market, and the shippers' and quality marks upon the baulks are illustrated and explained very clearly. This information must be of great value to architects, who, as a rule, have a very limited acquaintance with the brands on timber.

The different kinds of joints used in carpenters' work are fully described and well illustrated, and the absolute necessity of properly forming the joints connecting together the various parts of any framework is clearly pointed out. A capital illustration is given of what we do not remember noticing in other works of this kind, viz., the method

\* See Scott's "Elementary Meteorology" (1893), 137.



of securing a tenon by fox-tail wedging, and the different kinds of iron straps, bolts, &c., are described. We are also glad that the author calls attention to what we have always considered the very effective and simple method of roof-construction (on Philibert de l'Orme's principle) adopted in the Exhibition buildings at South Kensington. There is one little point in connexion with joiners' work on which we certainly cannot agree with the author. He says that in all cases of moulded panels, the moulding should be planted on, i.e., made on separate pieces of stuff, and not worked on the stiles and rails. We quite admit that the latter method requires more care, and is more expensive, but all the best and strongest Medival joinery was constructed in this way, and we should have thought there could not be two opinions as to its superiority to the modern process of planting on.

The other building trades are all carefully treated, the plasterers' work being very fully described, and a large amount of valuable information as to the pigments and other materials used by painters is given. The use of Griffith's white in place of white lead in recent Government works is alluded to, and it will be matter for general congratulation if this excellent invention proves to stand the test of time.

The most valuable information is often found in the appendices to a work of this kind, and this is certainly the case here. In Appendix I. we have the tabulated results of a number of experiments upon the strength of concrete slabs. This is the very information which has been most urgently wanted, and if further experiments should confirm those here given we shall have to modify the generally-received opinion that the admixture of sand with ballast or broken bricks increases the strength of cement concrete, as the reverse seems to be the case. A full specification for concrete floors and roofs is added. Useful tables for the strength and deflection of timber are also appended.

It might have been supposed that the three volumes on "Building Construction," published by Messrs. Rivingtons, had exhausted this subject, but, admirable as these volumes are, there are yet omissions in them, and many of these are admirably filled up in the work under notice, and we can, therefore, cordially recommend Col. Seddon's book as a supplement to the larger work.

**Ground Rents and Building Leases.** By C. H. SARGANT, Barrister-at-Law. London: Swan, Sonnenschein, & Co. 1886.

This is a small volume of 160 pages, which very clearly explains the nature and attributes of the subject with which the writer deals, and weighs the arguments for and against leasehold enfranchisement and the rating of ground-rents. It is the best of the passing works on this subject which has yet come under our notice, and is the one which will best give a reader a clear view of this matter. Mr. Sargent points out in regard to the taxation of ground-rents that the present system is, in the first place, most convenient in regard to payment and collection; and in the second, even if ground-rents were taxed, it would not in reality benefit the occupier. It is obvious that the landlord, if he has to pay some part of the taxation now borne by the tenant, will increase by this amount the rent in the future; for, if a tenant will pay, say 100*l.* rent and 25*l.* taxes, he will be willing to pay 105*l.* in rent and 20*l.* in taxes. It is extremely probable, in our opinion, that the Legislature will make this change, even though it produces no substantial benefit to the occupier, simply on the ground that there is an apparent injustice in the present custom, although there is none, in fact, and because it will prevent the idea that the occupier is touched by an increase in local taxation, and not the landlord. However, we are not now discussing this subject, but pointing out that Mr. Sargent's work should be read by any one who desires to become master of it.

**Les Céramiques de la Grèce Propre: Vases Peints et Terres Cuites.** Par ALBERT DUMONT et JULES CHAPLAIN. Première Partie (3<sup>e</sup> fascicule). Paris: Firmin Didot. 1885.

This third instalment of M. Dumont's great projected work on the Ceramics of Greece proper has a very melancholy interest. It has tarried long, owing to the death (in August,

1884) of the illustrious author. He left behind him, it seems, ample material for this third issue, and a detailed plan for its arrangement, the completion of which has been undertaken by M. Pottier, his pupil and friend. From internal evidence we should say M. Pottier has added little of his own. The volume takes up the thread of the historical narrative just at the point where the Geometric style begins to blend with the Oriental style, as seen in the Rhodian vases; then come the earlier and later Corinthian styles, with the predominance strongly marked of Oriental manner. It is enough to read these two chapters to see that all the old blemishes are perpetuated. Much that is valuable is gathered together, but there is no digest. M. Dumont's intellect was of the order that accumulates, but does not focus, information. We are also strongly conscious that the whole point of view is distinctly *arrêté*. It is quite right, in speaking of Corinthian vases, to point to the analogy of the Chest of Cypselus, but it is superfluous to give us a detailed description of the technique and contents of this monument, which every archaeologist knows by heart, and to point to analogies which are the commonplace of vase specialists, such as the Amphiaros vase. All this is well enough for the populariser, but quite unworthy of the scientific archaeologist. "Backwardness," the sin with which our German critics charge us, is, however, almost the invariable and indeed the inevitable concomitant of books planned on a large and sumptuous scale,—they tarry while time goes on. The best part of the book is undoubtedly the plates. They are published by anticipation, and have nothing whatever to do with the text. We are delighted to see a charming reproduction of a vase from Copenhagen, little known and of great beauty. It is the top of a pyxis, and the drawing is in the most exquisite manner. The design represents a "Judgment of Paris," but after a unique fashion. Instead of modestly walking to the "Judgment" the goddesses come in their chariots. Here is drawn along in sober human fashion by four goodly horses, but Athena has yoked to her chariot two fine, bearded snakes and Aphrodite's steeds are none other than two charming love-gods. We may note also an exquisite vase with red figures from Boeotia, which represents in quite novel fashion the Slaying of Busiris by Heracles; also a beautiful red-figured pyxis, with delicate designs, representing scenes of a Greek lady's toilet.

**Ornament und Form des Attischen Grabsteines.** Von ALFRED BRUECKNER. Straassburg: Struebner. 1886.

TREATISES on the subject, meaning, and sculptured decoration of Attic gravestones, already number legion, but, up to the publication of the present book, so far as we are aware, no systematic attempt has been made to catalogue and classify them on the basis of architectural form and ornamentation. It is manifest that this should be an important factor in any attempt to determine their chronology. For his material, Herr Brueckner has had access to the largest collection of photographs of grave reliefs at present in existence, that made by the Vienna Academy with a view to its projected Corpus of Attic tombstones. For this Corpus, it will be remembered that the grave reliefs, even of the British Museum (whose re-entombment Mr. Newton has recently so pathetically deplored) were for a while disinterred, so that Herr Brueckner's monograph will have special interest for English readers. We recommend the book for careful study, but we may note briefly that he divides all the stele into two main classes, the stele proper or simple slab, and its later development the naiskos or small shrine; that passing from form to decoration, he treats decoration under three heads, taking each in its historical development: vegetable motives, such as the palmette, the rosette; figure motives, the siren, the sphinx, lion, &c.; and the architectonic motives, pediment, ante, &c. The text is illustrated by two maps.

**The National Agricultural Hall.**—A party of members of the Civil and Mechanical Engineers' Society on Saturday last visited the roof now being erected over the central portion of this building, and which was described and illustrated in our last number. The party were shown over the works by Mr. am Ende and Mr. A. T. Walmisley, the engineers.

## RECENT PATENTS.

### ABSTRACTS OF SPECIFICATIONS.

7,552, Window-sash Fastenings. J. Sharp.

This invention relates to a safety, self-acting locking fastening for window-sashes, skylights, &c., and consists of an apparatus worked by means of a cord, chain, or lever. A locking bolt is fixed on the top sash, which slides into a catch when the window is shut. To open the window an arrangement of pulleys is so placed that on pulling a cord to raise the sash the bolt is pulled out of its catch and the window unfastened, enabling the sash to be raised.

9,021, Roofs. J. B. Spence.

The object of this invention is to provide a temporary transparent covering to recreation-grounds or pleasure-gardens in winter, so as to form a winter garden, without the necessity for taking down the covering in the summer. One half of the space forming the pleasure-ground is covered with a permanent roof. For the other half of the ground a movable roof, which may be slid over or under the permanent roof, is provided. The temporary roof is constructed of steel girders of lattice or such like form, and the sides rest on a track which is supported on suitably constructed masonry. In these tracks the roof slides and is moved backwards or forwards by suitable power as required.

8,662, Closet Pans and Seats. J. B. Weller.

In the upper part of the closet-pan, either solid therewith or connected thereto, is formed a nozzle, or branch, opening into the interior of the closet-pan above the water-line, on the outer end of which is attached a ventilating pipe, carried in any convenient way to the outer air, and fitted with a ventilating cowl. On the top edge of the pan rings of indiarubber are arranged to form an air-tight packing.

1,633, Window-fittings for Curtains. J. & H. A. K. Davis.

For affixing short curtains, instead of the ordinary nail or hook, a strip of brass carrying a tongue or blade spring is employed by the inventor. The cord suspending the blind is passed over the tongue, which grips it, and keeps it perfectly taut under the weight of the curtain suspended therefrom.

11,351, Ornamenting Glass and Vitreous Surfaces. John Slater.

Platinum sponge is ground with flux and turpentine, and then the glass coated with this is suspended in an electric bath and various metals deposited thereon in patterns. The copper, which is easiest in depositing, may be engraved or lacquered, and various patterns may be in this way fixed upon tiles, china, glass, or any vitreous surfaces.

### NEW APPLICATIONS FOR PATENTS.

May 21.—6,817, J. Partington, Metal Doors and Frames for Buildings.—6,825, C. Priestland, Improvements in Knobs.—6,827, T. Robinson, Horizontal Saw Frames.—6,831, P. Davies, Stench-Traps.—6,836, G. Nunn, Protection of Walls, Gates, &c.—6,850, G. Radfern, Preventing Concoction in Water Pipes.—6,865, J. Asbury, Traps for Sinks, Drains, Water-closets, &c.

May 22.—6,900, W. Sanday, Combined Lathe, Circular Saw, &c.—6,912, G. Butt, Wood Mouldings.—6,926, A. Clark, Sawing Machines.

May 24.—6,943, E. Wright, Ventilator.—6,945, J. Lamb, Flushing Tanks.—6,970, J. Pettor, Heating Stoves or Firegrates.

May 25.—6,991, L. Nelke, Incidence Windows or Vault Lights.—7,009, R. Strangman, Reflectors.—7,011, T. Morris, Household Signals or Bell Indicator.

May 26.—7,060, C. & F. Smith, Door-Checks.—7,067, W. Smeaton, sen., Flushing Water-closets, Lavatories, Urinals, &c.—7,068, W. Smeaton, sen., Flushing Water-closets, Urinals, Lavatories, &c., and Preventing Waste of Water.—7,069, W. Smeaton, sen., Flushing Water-closets, Urinals, Lavatories, &c., and Preventing Waste of Water.—7,078, S. Wilmot, Galvanised Iron Roofing.—7,079, H. Bridgen, Sash Fasteners.

May 27.—7,100, J. Rollason, Wedge for Securing Doors and Windows.—7,114, R. Stofert & T. Dykes, Girders.—7,146, W. Doehring, Watchman's Detector and Alarm Apparatus.

### PROVISIONAL SPECIFICATIONS ACCEPTED.

5,212, F. Nutter, Wooden Fencing.—4,055, E. Wharington, Sanitary Pan.—4,557, G. Rayner and H. Hughes, Retaining Doors, Windows, or Shutters, in Open or Closed Position.—4,901, T. Whitaker, Hinges for Folding Doors.—4,977, G. Spink, Mould and Accessories for Making Bricks.—5,031, R. Weaver, Water Closet Apparatus, &c.—5,045, T. Burns, Felted Wire Netting, a Waterproof Material for Covering Buildings, &c.—5,235, W. Jenkins, Treble Ladder.—5,321, M. Hussey, Roofing Tiles, &c.—5,975, A. Boulton, Manufacture of Cement.

### COMPLETE SPECIFICATIONS ACCEPTED.

Open to opposition for two months.

8,285, P. Davies, Apparatus for Burning Lead.—9,261, R. Boyle, Stoves, Furnaces, Firegrates, &c., for Heating and Ventilating Rooms.—9,478, J. Carter, Window Sashes to Fold Horizontally Inwards.—4,618, J. Anderson, Carriers for Dovetailing Machines.—5,445, H. Burson, Chimney Cows for Extracting Smoke.



## RECENT SALES OF PROPERTY.

## ESTATE EXCHANGE REPORT.

MAY 20.

By S. B. CLARK &amp; SON.

Portman-square—17, Portman-street, 77 years, ground-rent 95s. .... £6,100

MAY 21.

By THOMAS PIERCE &amp; SONS.

Folkestone, Tontine-street—The Imperial Brewery and sixteen public and beer houses, freehold ... 16,700  
The Globe Hotel, term 61 years, ground-rent 81, 8s. .... 1,910

By F. J. BISLEY.

Darling, King's-road—A plot of freehold land ..... 270  
1 to 4, Garden-cottages, freehold ..... 600  
38 and 40, King's-road, freehold ..... 226  
Southwark—380, Southwark Park-road, 64 years, ground-rent 51. .... 240  
King's-cross—14, Canal-terrace, 66 years, ground-rent 44. .... 285  
62 and 64, Muriel-street, 4 years, ground-rent 81. 385  
5, Regent's-terrace, 29 years, ground-rent 61. 12s. 100  
Horton—63, Allerton-street, 22 years, no ground-rent ..... 160

By J. C. PLATT.

Hammermith—127, King-street, 54 years, ground-rent 61, 6s. .... 760

MAY 25.

By ST. QUINTELL &amp; SON.

Fetter-lane—No. 47, freehold ..... 1,050  
City—64, Leadenhall-street, 13 years, ground-rent 103s. .... 1,900

By WOODS &amp; SWALES.

Holloway—25, Jackson-road, 76 years, ground-rent 71, 7s. .... 450  
Dalston—24, Marlborough-road, 58 years, no ground-rent ..... 330  
Camden-town—13 and 13, King-street, 3 years, ground-rent 101. .... 700  
21, Queen-street, 48, Clifton-road, ground-rent 41. 320  
Kentish-town—40, Haglan-street, 38 years, ground-rent 51. .... 820

By TURNER &amp; CO.

Brookley—61 and 63, St. Margaret's-road, 76 years, ground-rent 131, 6s. .... 1,100

By THURGOOD &amp; MARTIN.

Westgate-on-Sea—The freehold residence called Sea Tower ..... 2,550  
Forest-hill—The residence, Daresfield, 79 years, ground-rent 121, 10s. .... 1,300  
Portland Estate—28 and 28, Great Barlow-street, 36 years, ground-rent 141. .... 740

By ELLIS &amp; SONS.

City—28, Gracechurch-street, 11 years, ground-rent 2301. .... 2,500

By FARMER, BROTHERS, ELLIS, CLARK, &amp; CO.

St. John's-road—48, Clifton-road, freehold ..... 1,140  
Hampstead, Redington-avenue—A plot of freehold land ..... 1,775

MAY 27.

By C. C. &amp; T. MOORE.

Poplar—1, 2 and 3, Turner's-buildings, copyhold... 835  
65 and 69, Pennyfields, copyhold ..... 380  
St. George's-in-East—9, William-street, 15 years, ground-rent 21, 5s. .... 120  
420, Cable-street, 21 years, ground-rent 31. .... 150

By COLEMAN &amp; LEWIS.

South Hackney—55, Westchurch-road, 68 years, ground-rent 61, 6s. .... 350  
Old Kent-road—262, St. James's-road, 52 years, ground-rent 51. .... 300  
Walworth—30 and 32, East-street, 14 years, ground-rent 141. .... 3,000

By R. TIDY &amp; SON.

Kingsland—19 and 21, Baume-road, 40 years, ground-rent 71, 13s. 4d. .... 620

By G. LANGHDOKE.

Baywater—1, Coburg-place, and 1, 3, and 5, Queen's-road, 35 years, ground-rent 61, 15s. .... 260

By DALE &amp; SON.

Bethnal-green—9 to 15, Tavistock-street, freehold... 820  
13 and 15, Tavistock-street, freehold ..... 655  
11 and 12, Farmier-street, 43 years, ground-rent 21, 5s. .... 310

By WILKINSON &amp; SON.

Brighton—119 and 121, Western-road, freehold ... 1,100

By NEWBOLD &amp; HARDING.

Regent's Park—6, Longford-street, 36 years, ground-rent 11, 10s. .... 440

By WILKINSON &amp; SON.

Camden Town—Ground-rents of 481, a year, term 43 years ..... 820

By WILKINSON &amp; SON.

Improved Ground-rents of 321, 11s. a year, term 43 years ..... 820

By WILKINSON &amp; SON.

Improved Ground-rents of 191, 11s. a year, term 43 years ..... 820

By WILKINSON &amp; SON.

Kingsland—9 to 15, Tavistock-street, freehold... 820

By WILKINSON &amp; SON.

467 and 459, 40 years, ground-rent 61. .... 1,500

By WILKINSON &amp; SON.

475, 477, and 479, 40 years, ground-rent 51. .... 790

By WILKINSON &amp; SON.

An Improved Ground-rent of 61, a year, term 39 years ..... 1,310

By WILKINSON &amp; SON.

Brixton—241, 243, and 245, Coldharbour-lane, freehold ..... 105

By WILKINSON &amp; SON.

Sydenham—25 and 26, Bow-street, 78 years, ground-rent 11, 10s. .... 2,680

By WILKINSON &amp; SON.

41, Rowland-grove, freehold ..... 180

By WILKINSON &amp; SON.

Lambeth—174, Lambeth-road, freehold ..... 170

By WILKINSON &amp; SON.

Newington—46, Union-road, 47 years, ground-rent 41, 15s. .... 880

By WILKINSON &amp; SON.

Kenington—27, Methley-street, 46 years, ground-rent 51. .... 370

By WILKINSON &amp; SON.

Dover—73, Folkestone-road, freehold ..... 210

By WILKINSON &amp; SON.

8, Trevanion-street, freehold ..... 610  
Small Minnie—Two freehold cottages, freehold ..... 100  
Shepherdwell—1 to 6, Prospect-cottages, freehold ..... 440

MAY 28.

By J. HIBBERD.

Folkestone—17, Midway Park, freehold ..... 910

By J. HIBBERD.

Holloway—11, Midway Park, 66 years, ground-rent 111, 10s. .... 600

## MEETINGS.

SATURDAY, JUNE 5.

Colonial and Indian Exhibition.—Conference of the Geologists' Association. Paper by Professor Valentine Ball, F.R.S., on "The Mineral Resources of India." 3 p.m.

St. Paul's Ecclesiological Society.—Visit to Ongar, Greensted, &amp;c. Paper by Major Hoates, F.S.A. Train from Liverpool-street to Ongar at 3.30 p.m.

Association of Municipal and Sanitary Engineers and Surveyors.—Eastern Counties' District Meeting at Great Yarmouth. Town-hall, 1 p.m.

MONDAY, JUNE 7.

Society of Engineers.—Mr. R. P. Spice on "Some Model Improvements in the Manufacture of Coal Gas." 7.30 p.m.

Clerks of Works' Association.—Paper by Mr. F. A. Hocking. 8 p.m.

TUESDAY, JUNE 8.

British Museum.—Mr. J. A. P. MacBride on "The Sculpture of Phidias and his School."—2.30 p.m.

Colonial and Indian Exhibition.—Conference of the National Association for Promoting State-directed Colonisation. 2 p.m.

THURSDAY, JUNE 10.

Society for the Encouragement of the Fine Arts.—Conversations in the Galleries of the Institute of Painters in Water Colours. 8 p.m.

Society of Antiquaries.—8.30 p.m.

Colonial and Indian Exhibition.—Mr. F. W. Pennefather on "The Industries of New Zealand." 8.30 p.m.

FRIDAY, JUNE 11.

University College.—Professor C. T. Newton, C.B., on "Greek Myths Illustrated by Fictile Vases and other Monuments."—III. 4 p.m.

Colonial and Indian Exhibition.—Conference of the Royal Colonial Institute. Paper by Mr. F. Young on "Immigration to the Colonies." 3 p.m.

## Miscellaneous.

"Silchester in 1886."—Under this title,

Mr. Joseph Stevens, of Reading, contributed

to the Reading Observer of the 15th ult. an

interesting account of the present condition of

the Roman remains at Silchester. He says:—

"Any one who feels an interest in the antiquities

of the country, and who has from time to time

inspected the Roman vestigia at Silchester, will

be painfully reminded of the changes which

have taken place in the features of the

exposed foundations since they were laid bare

by the late Mr. Joyce in 1864-5. These observa-

tions are directed to the persistent, although

not always uniform or noiseless, workings of

Nature, which have certainly operated more

largely in sapping the foundations of this

ancient 'City of the Dead' during the twenty

years of their exposure to the light, than had

been effected in the 1,400 years of their entom-

ment underneath the soil. Man has also done

something as a wasting agent, inasmuch as the

tiles and tessellations, which have been loosened

by frost and scattered about by rain and wind,

have gradually disappeared in the pockets

probably of visitors. It appears evident that

unless some measures be adopted for the pro-

tection of the foundations, their destruction at

no distant date will be as thoroughly worked

out as if accomplished by the agencies of the

pick and spade."

Association of Municipal and Sanitary

Engineers and Surveyors.—An Eastern

Counties District Meeting is to be held at Great

Yarmouth this Saturday, June 5. Members

will assemble at 1 p.m. in the Town Hall (kindly

granted for the occasion by the Mayor), and

after the transaction of the usual routine

business, they will visit the following works, in

course of construction:—1. The sea-water

works for sewer flushing and street watering;

2. The concrete footways. On returning to the

Town Hall, the following papers will be read

and discussed:—(1) "Great Yarmouth, and

some of the Works of its Sanitary Authority."

By Mr. J. W. Cockrill, Borough Surveyor, Great

Yarmouth. (2) "The Sewerage, Surface Drain-

## A New Building Estate at Wandsworth.

For some months past the Down Lodge estate

at Wandsworth, the property of Dr. Watney,

has been in progress of conversion for building

purposes. The estate, which occupies an area

of upwards of 60 acres, is situated in the valley

of the river Wand, bounded on the east side by

Garrair-lane, and on the west by Merton-road,

and stretching northwards from a point near the

Royal Paper Mills to within a short distance of

High-street, Wandsworth. The works now

going forward embrace the construction of

several new roads intersecting the estate, and

include the erection of no fewer than five bridges

across the river Wand and its tributaries.

Two of these bridges are in connexion with a

new road through the estate between Garrair-

lane and Merton-road, running parallel, on the

east side, with the new aqueduct which forms a

portion of the storm-water sewer between Clap-

ham, Brixton, and Putney, just completed for

the Metropolitan Board of Works. Two other

bridges form a portion of a second road across

the estate, approached from South-street close

to its junction with High-street, about the centre

of Wandsworth Old Town. Altogether there

will be four main approaches to the estate, two

on the east side, in Garrair-lane and South-

street, one at the north side at the junction of

High-street with Merton-road, and a fourth

approach in Merton-road on the west side, near

the old mansion known as Down Lodge, which

is about to be removed. A park and recreation

ground, about 20 acres in extent, forms a special

feature in the undertaking. A considerable

portion of it has already been laid out and com-

pleted, and in addition to numerous winding

walks, mounds, and plantations, includes a lake.

The large area of the estate will admit of the

erection of several hundreds of houses. Mr.

Milner, C.E., has furnished the plans for laying

out the estate, and has also designed the several

girder bridges. Mr. Mackenzie is the general

contractor, the park and recreation ground

being formed under the superintendence of

Mr. Martin, landscape gardener. Mr. Huton

is clerk of the works and general superintend-

ent.

Recent Exploration.—The Director of the

Geological Survey of Ireland, Professor Hull,

F.R.S., delivered the annual address of the

Victoria (Philosophical) Institute on Friday,

on which occasion the Institute's new President,

Professor Stokes, President of the Royal

Society, took the chair. Professor Hull

sketched the course taken by the scientific

expedition of which he had charge (which, to

a considerable extent, took the route ascribed

to the Israelites), the physical features of the

country, evidences of old sea margins 200 ft.

above the present sea margins, showing that

at one time an arm of the Mediterranean had

occupied the valley of the Nile as far as the

first Cataract, at which time Africa was an

island (an opinion also arrived at by another of

the Institute's members, Sir W. Dawson), and

that, at the time of the Exodus, the Red Sea

ran up into the Bitter Lakes, and must have

formed a barrier to the traveller's progress at

that time. He then alluded to the great changes

of elevation in the land eastward of these lakes,

mentioning that the waters of the Jordan

valley once stood 1,292 ft. above their present

height, and that the waters of the Dead Sea,

which he found 1,050 ft. deep, were once on a

level with the present Mediterranean sea

margin, or 1,292 ft. above their present height.

The great physical changes which had taken

place in geological time were evidenced by the

fact that whilst the rocks in Western Palestine

were generally limestone, those of the

mountains of Sinai were amongst the most

ancient in the world.

The Iron, Hardware, and Metal Trades'

Fension Society.—The forty-third annual

festival dinner of this charity was held on the

27th ult., in the Hall of the Ironmongers'

Company, Fenchurch-street, Mr. Wm. G.

Ansell, M.P., presiding. During the evening,

subscriptions and donations to the amount of

437l. 19s. 6d. were announced by the Secretary,

Mr. T. Hodges Papworth.

Bryant, Fowis, &amp; Bryant (Limited).—

At the first annual meeting of this company,

well known in the timber trade, the report

(which was unanimously adopted, on the motion

of the Chairman, Mr. Wilberforce Bryant)

stated that the company had earned 23 per

cent. on its capital during the year, and recom-

mended the division of 15 per cent. to the share-

holders.



**The Newcastle Jubilee Exhibition.**—On Monday afternoon a meeting of the Building Committee in connection with this exhibition, of which we spoke a few weeks ago (see p. 696, *ante*), was held at the Mining Institute. Mr. W. Glover, architect, and vice-president of the Northern Architectural Association, submitted an amended plan showing the entrance on the east side, opposite the North-road, instead of the south-east corner, as in previous plans. The main entrance from the North-road has been set back to fifty feet, and additional exits have been provided. Provision is also made for connection with the Royal Show on its eastern side. Mr. Glover sees no practical difficulty in this arrangement, and he states that the whole scheme can be carried out without destroying a tree. He has also avoided destroying any of the existing Corporation buildings, and has worked the exhibition square with the North-road. This will leave an area of about 2,500 yards at the south end, which will be valuable space for open or private structural exhibits. He feels that the reservoir, containing 2,029 yards, should be preserved. A portion of the margin could be covered in, and the centre left for diving bell, marine-working models, life-saving, and fire-extinguishing apparatus; and, with a little rustic treatment and bridge, the spot might be rendered very effective. As now amended, the general scheme has extended to the north-east corner of the Royal Show land. This will leave nearly two acres of open space, and one and a-half acres at the north end for mining and uncovered exhibits. The covered area, as shown in the plan, occupies 209,650 ft. The amended plan was adopted, and the architect was instructed to prepare elevations, sections, and estimate of cost, to be submitted to a future meeting of the committee.

**New Water-supply for the City of Amsterdam.**—The Amsterdam Water Company are carrying out large new works near Weesp, a small town about seven miles from Amsterdam, so as to effect a dual supply to the city. Last week, the Burgomaster of Amsterdam laid the lintel stone of the tower. Mr. John Aird presented the Burgomaster with a silver trowel with which to spread the mortar. Messrs. Quick & Sons are the engineers, and Messrs. John Aird & Sons are the contractors. The works cover about thirty acres, and consist of two large subsiding reservoirs, four filter beds, one large covered reservoir, engine and boiler houses, with two covered reservoirs in connection, and a tower 260 ft. high; manager's house, and cottages for the workmen; and a line of railway about 800 yards long. They were commenced in August last, and are making very rapid progress. Messrs. John Aird & Sons have also the contract for the pipe-laying, which consists of about 140 miles of main and service laying. The supply of water is taken from the River Vecht, and runs by gravitation through a 48-inch main to the works. Mr. H. G. Huxley is the resident engineer, and Messrs. John Aird & Sons' agents are Mr. C. J. Willis for the works, and Mr. Jas. Eagle for the pipe-laying.

**New Buildings on Ludgate-hill.**—On the ground which was recently cleared between Pilgrim-street and Creed-lane for the widening of Ludgate-hill, two blocks of new buildings are at approaching completion. The western block near Pilgrim-street is the larger of the two. It has a frontage to Ludgate-hill 61 ft. in length, and is carried to a height of between 40 ft. and 70 ft. Besides a spacious basement it contains the ground and four upper stories, the ground-floor containing five shops divided by polished granite pilasters. At the west end of the frontage there is an entrance, also in granite, to the upper floors. The upper portion of the elevation is faced with Portland stone, with a profusion of carving. The fourth floor has pedimented dormers above the main cornice. The upper or eastern block, at the corner of Creed-lane, has a frontage to Ludgate-hill 44 ft. in length, with a return frontage in Creed-lane of 46 ft. This block contains five stories: the ground story comprising four shops, the upper floors being intended for offices. Like the adjoining block, it is faced with Portland stone, but is plainer in character. The west block contains thirty-six suites of offices, and the east block sixteen suites. Messrs. Joseph & Smith, of Finsbury-pavement, are the architects, and Mr. Cave is the builder and owner, the buildings having been erected under the superintendence of Mr. H. Hubbard as clerk of the works. The carving has been executed by Messrs. Seale & Son, of Walworth.

**Sanitary Re-organisation in Marylebone.**—An important step is being taken in Marylebone with a view to the re-organisation of the sanitary department. A committee was appointed to report on the subject, and, with one exception, all their recommendations are to be carried out. The first relates to the registration and supervision of sub-let houses. As an experiment, 150 of these houses were registered shortly after the outcry against the method in which the working-classes were housed in the metropolis, and the result is stated to have been so satisfactory that the number is now to be gradually increased up to 1,500. It is also at last admitted that the method of dust removal in force is a failure. The "Lump Contract" system is an unwise one, for the contractor's main object, when he arranges for the work for a specific period, must be to make as much as he can out of the transaction. Until March, 1887, the present system must be retained; but it is expected that before that time arrives the Sanitary Committee, with the aid of the medical officer of health, will have a better scheme to submit; and it is suggested that the contracts about to come into force shall be placed under the supervision of the sanitary department, and that an experiment should be made with the movable pail system for some portion of the district containing about 500 houses. Re-arrangement of the inspectors of nuisances is to be made, so that each shall be responsible, amongst other things, for dust removal and inspection of registered houses in a definite area; and two additional officers are to be appointed.—*Lancet*.

**A Day in the Country.**—We are asked to give publicity to the following appeal:—"The managers of the East London Mission earnestly appeal for funds to enable them to take 600 more of the very poorest children from courts and alleys of East London for a day in Epping Forest. This annual treat is eagerly anticipated by hundreds of destitute little ones. Contributions are urgently solicited, and should be sent to Mr. G. Hopkins, Superintendent, at the Mission Hall, 263, Cable-street, St. George's, E."

**The Royal Academy, 1886.**—Messrs. Boness, Valadon, & Co. are about to produce a series of 150 large reproductions of the principal works in the Exhibition, by their process of typo-gravure. The volume will be ready towards the end of June.

#### PRICES CURRENT OF MATERIALS.

TIMBER.	£.	s.	d.	£.	s.	d.
Greenheart, B.G. ....ton	6	5	0	7	0	0
Teak, E.I. ....load	12	10	0	15	0	0
Sequoia, U.S. ....foot cube	0	2	4	0	2	8
Ash, Canada ....load	3	0	0	0	10	0
Birch " " " " " "	3	0	0	0	10	0
Elm " " " " " "	3	10	0	4	15	0
Fir, Dantolo, &c. ....ton	1	10	0	4	0	0
" " " " " "	3	0	0	6	0	0
Oak " " " " " "	5	10	0	6	10	0
Pine, Canada red " " "	3	0	0	4	0	0
" " yellow " " "	3	0	0	6	0	0
Lath, Dautic " " " "	1	0	0	0	0	0
St. Petersburg " " "	4	0	0	6	0	0
Wainscot, Riga " " "	2	15	0	4	10	0
" " Odessa, crown " " "	3	12	6	3	15	0
Deal, Finland, 2nd and 1st, std. 100	7	10	0	8	10	0
" " 4th and 3rd " " "	6	0	0	7	10	0
" " " " " "	6	0	0	8	0	0
St. Petersburg, 1st yellow " " "	9	0	0	14	0	0
" " 2nd " " "	7	0	0	8	15	0
" " white " " "	7	0	0	10	0	0
Deals, Swedish " " "	6	0	0	15	0	0
White Sea " " "	7	0	0	17	0	0
Canada Pine, 1st " " "	17	0	0	30	0	0
" " 2nd " " "	12	0	0	17	0	0
" " 3rd, &c. " " "	8	0	0	10	0	0
" " Spruce 1st " " "	8	0	0	11	0	0
" " 3rd and 2nd " " "	6	0	0	7	10	0
New Brunswick, &c. ....ton	5	0	0	7	0	0
Battens, all kinds " " "	4	0	0	12	0	0
Flooring Boards, sq. 1 in. Fre-	0	9	0	0	13	0
pared, first " " "	0	7	6	0	8	6
Second " " "	0	5	0	0	7	0
Other qualities " " "	0	5	0	0	7	0
Cedar, Cuba " " "	0	0	3	4	0	0
Honduras, &c. " " "	0	0	0	0	0	0
Australian " " "	0	0	2	0	3	0
Mahogany, Cuba " " "	0	0	6	0	0	7
St. Domingo, cargo average " " "	0	0	5	0	0	4
Mexican " " "	0	0	5	0	0	4
Tobacco " " "	0	0	4	0	0	6
Honduras " " "	0	0	4	0	0	6
Maple, Bird's-eye " " "	0	0	6	0	0	8
Koa, Rio " " "	7	0	0	10	0	0
Balsa " " "	6	0	0	10	0	0
Box, Turkey " " "	5	0	0	18	0	0
Satin, St. Domingo " " "	0	0	7	0	0	11
Porto Rico " " "	0	0	8	0	1	3
Walnut, Italian " " "	0	0	4	0	0	5

#### METALS.

Iron—Pig in Scotland ....ton	0	0	0	0	0	0
Bar, Welsh, in London " " "	4	10	0	4	17	6
" " in Wales " " "	4	5	0	4	10	0
" " Staffordshire, London " " "	5	5	0	6	10	0

METALS (continued).		£.	s.	d.	£.	s.	d.
Sheets, single, in London.....	.....	6	15	0	8	10	0
Hoops " " " " " "	.....	8	0	0	7	0	0
Rail-roads " " " " " "	.....	5	10	0	6	10	0
COPPER.							
British, cake and ingot.....ton	.....	42	10	0	43	10	0
Best selected " " " " " "	.....	44	0	0	45	0	0
Sheets, strong " " " " " "	.....	45	0	0	0	0	0
" " India " " " " " "	.....	47	0	0	0	0	0
Australian " " " " " "	.....	47	0	0	47	10	0
Chili, bars " " " " " "	.....	59	10	0	40	0	0
YELLOW METAL.....lb.	.....	9	0	4	0	0	0
LEAD—Pig, Spanish.....	.....	12	10	0	0	0	0
English, common brands.....	.....	13	17	6	0	0	0
Sheet, English " " " " " "	.....	13	12	6	13	17	6
SPRITES—							
Silesian, special.....ton	.....	14	2	6	14	5	0
Ordinary brands " " " " " "	.....	13	17	6	14	0	0
TRY.							
Banca " " " " " "ton	.....	0	0	0	0	0	0
Billiton " " " " " "	.....	0	0	0	0	0	0
Straits " " " " " "	.....	86	2	6	98	12	6
Australian " " " " " "	.....	89	15	0	0	0	0
English ingots " " " " " "	.....	102	0	0	0	0	0
ZINC.							
English sheet.....ton	.....	18	0	0	18	5	0
OILS.							
Linseed " " " " " "ton	.....	20	5	0	20	10	0
Cocunut, Cochín.....	.....	31	0	0	0	0	0
Ceylon " " " " " "	.....	25	0	0	0	0	0
Copra " " " " " "	.....	0	0	0	0	0	0
Palm-nut Kernel " " " " " "	.....	22	0	0	23	0	0
Rapeseed, English pale.....	.....	22	10	0	0	0	0
" " brown " " " " " "	.....	20	15	0	21	0	0
Cottonseed, refined " " " " " "	.....	17	12	0	18	15	0
Tallow and Oleine " " " " " "	.....	25	0	0	45	0	0
Lubricating, U.S. " " " " " "	.....	6	0	0	10	0	0
" " Refined " " " " " "	.....	8	0	0	13	0	0
TURPENTINE.							
American, in casks.....cwt.	.....	1	3	6	1	4	0
Tar, Stockholm " " " " " "barrel	.....	0	17	0	0	17	6
Archangel " " " " " "	.....	0	10	6	0	11	3

#### TENDERS.

**ABERAYON.**—For erecting a building for the Mechanics' Institute, Aberavon. Mr. J. Buckley Wilson, architect, Swansea.

J. & S. Rees, Cwm-Aron (accepted). £1,280 0 0

**ASHTON-UNDER-LYNE.**—For building a residence at Ashton-under-Lyne, for Mr. J. C. Fell. Mr. J. H. Burton, architect, Ashton-under-Lyne.

Charles Genny, Manchester.....	£1,718	13	7
John Ross, Manchester.....	1,938	0	0
Garside, Barnes, & Co., Stalybridge.....	1,860	0	0
William Holt, Manchester.....	1,840	0	0
Castle Hall Saw Mills Co., Stalybridge.....	1,600	0	0
Zachariah Pike, Healey Hill.....	1,467	10	0
Thomas Dean, Ashton-under-Lyne.....	1,475	10	0
Joseph Clayton, Denton.....	1,475	0	0
Allen Holmes, Ashton-under-Lyne.....	1,468	0	0
H. Rowlands, Ashton-under-Lyne.....	1,458	0	0
R. H. Grason, Manchester.....	1,440	0	0
James Garside, Ashton-under-Lyne.....	1,435	0	0
Charles Morris, Ashton-under-Lyne.....	1,430	10	0
Jabez Gibson, Dukinfield.....	1,420	0	0
Isaac Cropper, Dukinfield.....	1,405	0	0
J. W. Williamson, Ashton-under-Lyne.....	1,400	0	0
John Robinson, Ashton-under-Lyne.....	1,398	0	0
William Underwood, Dukinfield.....	1,398	0	0
Walter Clough, Ashton-under-Lyne.....	1,370	0	0
Davison & Carr, Manchester.....	1,357	0	0
Wm. Storr, Sons, & Co., Limited, Stalybridge (accepted).....	1,330	0	0

**ASHTON-UNDER-LYNE.**—For erecting boundary walls, gates, and a pavilion to a Bowling-green, at Ashton-under-Lyne. Mr. J. H. Burton, architect, Ashton-under-Lyne.

John Ross, Manchester.....	£225	19	11
Charles Genny, Manchester.....	213	12	7
Davison & Carr, Manchester.....	210	0	0
Thomas Dean, Ashton-under-Lyne.....	188	0	0
Allen Holmes, Ashton-under-Lyne.....	198	0	0
John Robinson, Ashton-under-Lyne.....	185	0	0
Isaac Cropper, Dukinfield.....	193	0	0
Charles Morris, Ashton-under-Lyne.....	183	0	0
Walter Clough, Ashton-under-Lyne.....	180	0	0
Jabez Gibson, Dukinfield.....	182	0	0
J. W. Williamson, Ashton-under-Lyne.....	177	0	0
Z. Pike, Hooley Hill.....	174	0	0
H. Rowlands, Ashton-under-Lyne.....	171	0	0
R. H. Grayson, Bradford.....	170	0	0
Wm. Storr, Sons, & Co., Limited, Stalybridge (accepted).....	170	0	0
W. Underwood, Dukinfield.....	134	14	0

**BROMLEY (Kent).**—For building first portion of Church of St. Luke, Bromley-by-Common, Kent. Arthur Cawston, architect, Spring-gardens. Quantities by Messrs. Sandall, Corderoy, & Selby, Queen Anne's-gate.

	Whole Scheme.	Subsidary Scheme.
Hitcheck.....	£6,050 0 0	£4,040 0 0
Langley.....	4,050 0 0	2,759 0 0
Ambridge.....	3,945 0 0	2,684 0 0
Sabey & Son.....	3,830 0 0	2,520 0 0
Taylor & Son.....	3,615 0 0	2,388 0 0
Staines & Son.....	3,582 0 0	2,483 0 0
Low.....	3,559 0 0	2,339 0 0
Holt.....	3,550 0 0	2,350 0 0
Smith.....	3,524 0 0	2,357 0 0
J. & C. Bowyer.....	3,490 0 0	2,336 0 0
F. Hyges.....	3,470 0 0	2,340 0 0
Maudslayi & Harper.....	3,450 0 0	2,320 0 0
Parker.....	3,450 0 0	2,262 0 0
Grubb.....	3,450 0 0	2,207 0 0
Arnand & Son.....	3,417 0 0	2,289 0 0
Holloway.....	3,410 0 0	2,269 0 0
Dobson.....	3,375 0 0	2,286 0 0
Priestley & Gurney.....	3,370 0 0	2,286 0 0
Lay.....	3,350 0 0	2,250 0 0
Marshall.....	3,288 0 0	2,456 0 0
Smith & Son.....	3,245 0 0	2,210 0 0
Howell & Son.....	3,240 0 0	2,240 0 0
Crosley.....	3,234 0 0	2,319 0 0
Woodhouse.....	3,189 0 0	2,119 0 0

\* Mr. Crosley's Tender for the "whole scheme" accepted.

† Error.



## COMPETITIONS, CONTRACTS, &amp; PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

## COMPETITIONS.

Nature of Work.	By whom required.	Premium.	Designs to be delivered.	Page.
Hospital, Merthyr Tydfil	.....	Not stated	Not stated	i.

## CONTRACTS.

Nature of Work, or Materials.	By whom required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Taking down Buildings and Clearing Site, &c.	St. Mary Abbott's (Kensington) Vestry	W. Weaver	June 8th	xiv.
Making-up Roads	Wandsworth Bd. of Wks	Official	do.	xiv.
Painting, &c., Wood Blocks and Asphalting	Chelsea Vestry	G. R. Strachan	do.	ii.
Broken Guernsey Granite	West Ham Local Bd.	Lewis Angell	do.	ii.
Making-up Roads	do.	do.	do.	ii.
Road Making and Paving	Hammer-smith Vestry	Official	June 24th	xiv.
Blue Guernsey Granite	St. Luke's Vestry	do.	do.	ii.
Paving and Repairing Carriageways, &c.	Hackney Board of Wks	J. Lovegrove	do.	xiv.
Extensions and Alterations to Hall	St. Martin-in-the-Fields	H. Bradley	June 10th	ii.
Execution of Smith's Work, &c.	Hackney Workmen's Club	H. Bradley	do.	xiv.
Clocks, Window-Blinds, and Chairs	Laubeth Vestry	H. McIntosh	do.	ii.
Painting, Cleaning, and Repairing	School Bld for London	Official	June 11th	ii.
Red Baltic Deals	do.	do.	do.	ii.
Completion of St. John's Church, Macclesfield	Burntwood Asylum, Staffs	R. Griffiths	June 14th	xiv.
Forming Roads and Footpaths, Cambridge	Norwich Corporation	Official	do.	xiv.
Making-up Roads	Rev. R. Hurst	do.	June 16th	xiv.
Sewerage Works, Buckhurst Hill	Chickwell Local Board	A. Ramsden	do.	xiv.
Making-up Road	Epping E.S.A.	E. Egan	June 17th	ii.
Work, Repairs, and Building Materials	Dartford Local Board	do.	do.	ii.
Enlargement, Post-Office, Bath	War Department	do.	June 18th	ii.
Main Drainage Works	Action of H.M. Works	do.	do.	i.
Pipe-Sewers, &c.	Action Local Board	C. N. Lacey	June 22nd	ii.
Work, Repairs, and Building Materials	Lambeth Vestry	H. McIntosh	June 24th	ii.
Erection of Houses, Angle	Hendon U. R. S. A.	T. Henry	do.	xiv.
Engines, Boilers, and Pumping Machinery	do.	Official	June 25th	i.
Work, Repairs, and Building Materials	Acton Local Board	C. N. Lacey	do.	ii.
Sewerage Works, Sea Wall, Seining Hall	H. Cheston	H. Cheston	Not stated	ii.
Block of Buildings, Pricedilly	Lynton Local Board	D. Watson & Watson	do.	xiv.
	R. H. Ld. Walsingham	W. O. Miles	do.	xiv.

## PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page.
Surveyor and Inspector of Nuisances	Dartford Local Board	200l.	June 16th	xviii.

BETHNAL GREEN.—For alterations to premises known as the Flying Horse, Unk-street, Bethnal-green.  
Mr. Fredk. C. Kettle, architect.  
J. W. Heep ..... 2,172 0 0  
J. Walker ..... 150 0 0  
J. W. Walker ..... 143 0 0  
M. Calman & Co. .... 147 10 0  
W. Cleaver ..... 143 0 0  
M. Palmer & Co. (accepted) 120 0 0  
J. Healy & Son (withdrawn) 85 0 0

CARDIFF.—For hotel and two dwelling-houses, Splott-lane, Cardiff. Messrs. W. G. Habersham & Fawcett, architects.  
Shepton & Son ..... 2,325 0 0  
F. Gough ..... 3,062 0 0  
E. Beattie ..... 2,840 0 0  
D. J. Davies (accepted) ..... 2,800 0 0  
[All of Cardiff.]

CHATHAM.—For re-seating, new gallery front, windows, decorations, &c., at the Ebenezer Congregational Church, Mr. George E. Bond, architect, Rochester.  
Dartford, Rochester ..... 2,133 0 0  
Edgar & Bookham, Chatham ..... 1,120 0 0  
Skinner, Chatham ..... 1,068 0 0  
Calland & Son, Rochester ..... 1,067 0 0  
Sampson, Chatham ..... 1,018 0 0  
Naylor & Son, Rochester ..... 887 0 0  
Gates, Rochester ..... 931 0 0  
Seager, Rochester (accepted) ..... 885 0 0

CLETHORPES (Lincolnshire).—For the erection of new stabling, for Mr. Joseph Chapman, Mr. W. F. Warebrother, architect.  
Guy Bros. (accepted) ..... 2,681 10 0

COBHAM.—For the erection of a pair of villa residences, at Cobham, Surrey, for Mr. Chas. Woodbury.  
Mr. H. A. Whitburn, architect, Woking.  
A. Newland, Cobham ..... 2,980 0 0  
H. Wood, Cobham (accepted) ..... 857 10 0

FULHAM.—For new hot-water supply apparatus, at the Western Hospital, Seagrave-road, Fulham, for the Managers of the Metropolitan Asylum District. Messrs. A. & C. Harston, architects. Quantities not supplied.  
J. & F. May ..... 2,130 0 0  
Comyns, Chas. & Co. .... 1,097 0 0  
Colburn & Co. .... 1,089 0 0  
Wilkinson & Co. .... 894 0 0  
Vaughan & Brown ..... 870 0 0  
Rogers ..... 790 0 0  
Jeske & Co. .... 774 7 0  
Knight ..... 733 0 0  
Wentham & Walters ..... 724 0 0  
Sudler & Co. .... 695 0 0  
R. Crane, \* Stockwell Park-road  
\* Accepted. 650 0 0

FULHAM.—For alterations and additions to the sewerage, and other work, at the Western Hospital, Seagrave-road, Fulham, for the Managers of the Metropolitan Asylum District. Messrs. A. & C. Harston, architects. Quantities not supplied.  
W. Johnson ..... 2,265 0 0  
Haynes ..... 2,603 0 0  
C. Lyford, Uxbridge-road (accepted) 2,265 0 0

FULHAM.—For St. Peter's Vicarage House, for the Rev. R. Cordwell, Mr. J. E. K. Catta, architect.  
Martin Wells & Co. .... 22,435 0 0  
Brass & Son ..... 2,391 0 0  
Dove Bros. .... 2,345 0 0  
Goddard & Sons ..... 2,280 0 0  
Chamberlain Bros. .... 2,240 0 0  
L. H. & R. Roberts ..... 2,230 0 0  
Lathby Bros. .... 2,220 0 0  
J. Tierman ..... 2,165 0 0  
J. Holloway ..... 2,075 0 0

GRIMSBY.—For the erection of the Prince of Wales Theatre, for Mr. H. J. Curry, Freeman-street, Grimsby.  
Mr. E. W. Farebrother, architect, Grimsby.  
Regall & Hewins (accepted) ..... 25,000 0 0

GRIMSBY.—For the erection of a pair of villa residences facing the People's Park, Grimsby, for Messrs. A. Road & W. H. Alcock. Mr. E. W. Farebrother, architect.  
Regall & Hewins (accepted) ..... 21,600 0 0

GRIMSBY.—For the erection of house, for Mr. A. Batten, Grimsby.  
Mr. E. W. Farebrother, architect.  
Willows & Roebuck ..... 2,865 0 0  
C. B. Topham ..... 810 0 0  
Gray Bros. (accepted) ..... 807 0 0  
Regall & Hewins ..... 795 0 0  
T. Simonsen ..... 794 0 0

HACKNEY.—For additions to 44, Pembury-road, Hackney Downs, for Mr. J. Edell. Messrs. J. & W. Stone, architects, Great Winchester-street, E.C.  
Beale ..... 2,262 0 0  
Godfrey & Son ..... 219 0 0  
Peppiat ..... 220 0 0

ISLINGTON.—For additions and alterations to premises, 219, Upper-street, Islington, for Mr. T. R. Roberts. Mr. J. Kingwell Cole, architect. Messrs. Bateman & Co., surveyors, Mount-street, Grosvenor-square, W.  
Sage & Co. .... 21,699 10 0  
Dore Bros. .... 1,405 0 0  
Petman & Pollock ..... 1,361 0 0  
G. S. Williams & Son ..... 1,376 0 0  
Macey & Sons ..... 1,361 0 0  
Wall Bros. .... 1,170 0 0

KENSINGTON.—For the erection of male staff quarters at the Infirmary, Marlowe-road, Kensington, for the Guardians of Kensington. Messrs. A. & C. Harston, architects, Leadenhall-street. Quantities supplied.  
Camplin & Son ..... 22,076 0 0  
Ebbes & Son ..... 1,980 0 0  
Ward & Lamb ..... 1,877 0 0  
Staines & Son ..... 1,844 0 0  
Leslie & Knight ..... 1,723 0 0  
Geo. Roberts ..... 1,694 0 0  
Deacon & Co. .... 1,683 0 0  
W. J. Hack ..... 1,684 0 0  
W. Johnson ..... 1,615 0 0  
D. Brown & Co. .... 1,615 0 0  
H. Haynes, \* Alport, Harrow  
\* Accepted. 1,607 0 0

LONDON.—For new Infants' School, Chickland-street, Tower Hamlets Division, for the School Board for London.  
Mr. T. J. Bailey, architect. Quantities by Mr. Earl, Outer Temple, W.C.

F. & F. J. Wood ..... 27,194 0 0  
J. Holland ..... 6,788 0 0  
W. J. Hack ..... 6,671 0 0  
C. Cox ..... 6,642 0 0  
T. L. Green ..... 6,270 0 0  
S. Sabey & Son ..... 6,177 0 0  
Atherton & Latta ..... 6,150 0 0  
W. Oldrey ..... 6,090 0 0  
J. Hollo-way ..... 6,000 0 0  
Stimpson & Co. .... 5,977 0 0  
H. L. Holloway ..... 5,890 0 0  
H. Hart ..... 5,870 0 0  
W. Johnson ..... 5,873 0 0  
S. J. Jerrard ..... 5,583 0 0

LONDON.—For new cell accommodation at Bow-road Police Station, for the Commissioners and Receiver for the Metropolitan Police District. Mr. John Butler, surveyor for Metropolitan Police.

Lathby Bros. .... 2,998 0 0  
W. H. Smith ..... 881 0 0  
C. Barnes ..... 936 0 0  
J. Holland ..... 830 0 0  
J. H. Ford ..... 828 0 0  
W. V. Thack ..... 803 0 0  
J. Grover & Sons ..... 877 0 0  
C. Ansell ..... 878 0 0

LONDON.—For Artisans' Dwellings, in Cleveland-street, Mortimer-street, W. Mr. E. C. Robins, architect, Borne-street.

Extra if done in Sections.  
Conway ..... £10,232  
Bray ..... 6,384 ..... £290  
Wall Bros. .... 6,374  
Ansell ..... 6,100  
Manley ..... 5,987 ..... 300  
Stevens & Baskov ..... 5,993  
Bywaters ..... 5,873 ..... 180  
Thaw ..... 5,789 ..... 100

LONDON.—For alterations and additions at the Metropolitan, Farringdon-road, E.C., for Messrs. G. Warman & Co. Mr. W. T. Farling, architect.

S. Godden ..... 21,187 0 0  
H. Pickersgill & Co. .... 1,145 0 0  
R. W. Edley ..... 1,162 0 0  
W. Royal & Co. .... 1,080 0 0  
S. R. Lambie ..... 1,060 0 0  
Spence & Co. .... 1,021 0 0  
Lewis & Knight ..... 984 0 0  
W. Scriveners & Co. (accepted) 971 0 0

LONDON.—For constructing new road, paving, kerbing, and drainage, Madron-road, S.E., for the Trustees of Mrs. Beckhouse, Mr. W. C. Reed, surveyor, Adelaide-place.

Mays ..... 2,975 15 0  
Pennack ..... 795 0 0  
Fizzev (accepted) ..... 790 0 0  
Additional Macadamised Work  
Fizzev (accepted) ..... 100 0 0

LONDON.—For paving a portion of Bett-street for the Vestry of St. George-in-the-East. Mr. G. Wilson, Surveyor.  
W. H. Wheeler, 11, Queen Victoria-street (accepted) ..... 2102

LONDON.—For building two shops at 254 and 255, Old Kent-road, for Messrs. James Sprunt & Son. Mr. W. C. Reed, architect, Adelaide-place, London Bridge.  
Batty ..... 2,747 0 0  
Jerrard Bros. .... 693 0 0  
Balcan ..... 642 0 0  
Greenwood Bros. (accepted) ..... 599 0 0  
Kennard Bros. (withdrawn) ..... 562 0 0

Repairs to House and Shop Fittings.  
Greenwood (accepted) ..... 100 0 0

LONDON.—For alterations to 44 and 45, Lombard-street, E.C., for Messrs. Fielding Bros. Messrs. T. & W. Stone, architects, Great Winchester-street, E.C.  
Col's ..... 2,237 0 0  
Jefferys ..... 224 12 0  
Trent Bros. .... 207 10 0  
Jewellery Supply Co. .... 198 8 0

LONDON.—For the erection of warehouses in Farringdon-street and Bear-alley, E.C., for Messrs. Harrell & Sons, Messrs. Theodore A. Green & Son, architects, Finsbury-pavement, E.C.

Dore Bros. .... 47,355 0 0  
W. Brass & Son ..... 7,433 0 0  
L. H. & B. Roberts ..... 7,258 0 0  
Scriveners & Co. .... 7,176 0 0  
Grover & Son ..... 7,182 0 0  
Mark Manley ..... 6,115 0 0  
R. Avis & Co. .... 6,970 0 0  
J. Woodward, Wilson-street, Finsbury (accepted) ..... 6,834 0 0

LONDON.—For taking down and rebuilding 11, Harley-street, Cavendish-square, for Mr. W. Morrant Baker. Messrs. Alexander Payne & F. M. Elgood, architects. Quantities by Mr. E. J. Zain, Buckingham-street.

Charles Cox ..... 23,778 0 0  
H. Baylis ..... 3,597 0 0  
Thomas Boyce ..... 3,590 0 0  
Longmire & Budge ..... 3,512 0 0  
Adamson & Sons ..... 3,479 0 0  
John Woodward ..... 3,400 0 0  
G. H. & A. Bywaters ..... 3,363 0 0  
Perry & Co. .... 3,358 0 0  
T. L. Green ..... 3,345 0 0  
Stimpson & Co. (accepted) ..... 3,221 0 0

LONDON.—For alterations to 59, Pall-mall. Mr. C. R. Baker, architect.  
Love & Co. .... 2,884 0 0  
Hermion & Co. .... 798 0 0  
Laing & Son (accepted) ..... 664 0 0



**LONDON.**—For alterations, repairs, and decorations, Hyde Park-gate, W., for Mr. C. E. Lewis, M.P. Mr. T. Pearson, architect. Quantities supplied:—  
Battam & Heywood, Oxford-street... £1,244 0 0  
Sendall & Son, Brighton... 1,210 19 6  
W. & H. Castle, Southwark-street... 1,174 0 0  
[Architect's estimate, 1,194]  
\* Accepted.

**REDHILL (Surrey).**—For stables at the Hawthorns, for Mr. E. F. Hubbank. Mr. F. Edwards, architect, John-street, Adelphi:—  
Patrick & Sons, Lambeth... £1,473 0 0  
Jervard, Lewisham... 1,229 0 0  
C. Ansell, Lambeth... 1,288 0 0

**SPITALFIELDS.**—For the erection of the superstructure of a block of model dwellings, in Flower and Dean-street, Spitalfields, for the Four Per Cent. Industrial Dwellings Company, Limited. Messrs. N. S. Joseph & Smith, architects. Mr. S. B. Wilson, surveyor:—  
E. Conder... £25,948 0 0  
Kilby & Gayford... 25,785 0 0  
Outhwaite & Son... 25,660 0 0  
Scrivenor & Son... 24,984 0 0  
G. S. Williams & Son... 24,870 0 0  
W. Shepherd... 24,837 0 0  
Ashby Bros... 24,570 0 0  
J. T. Chappell... 24,383 0 0  
Colls & Son... 24,270 0 0  
Patrick & Son... 24,070 0 0  
Patman & Fotheringham... 24,073 0 0  
M. Gentry... 22,970 0 0  
Brass & Son... 22,335 0 0  
Ashby & Horner... 22,240 0 0

**SUTTON (Surrey).**—For stabling to North Chesham House, for Mr. J. Proctor. Mr. Herbert D. Appleton, architect, Wool Exchange:—  
H. Hillman... £146 0 0  
E. J. Burnand... 838 0 0  
G. Hards... 446 0 0

**TOTTERIDGE (Herts).**—For the erection of an orphanage. Mr. G. Hall, architect, Hammersmith. Quantities by Mr. Wm. Henry Strudwick:—  
Joseph Brown & Son, Margate... £7,990 0 0  
\* Accepted.

**VENTNOR (I.W.).**—For the erection of residence, stables, &c., at St. Lawrence, I.W., for Captain C. B. Fisher. Mr. Theodore R. Saunders, architect. Quantities by the architect:—  
J. Newham, Ventnor... £8,150 0 0  
J. Earl, West Cowes... 5,293 0 0  
Jolliffe & Son, Bournemouth... 5,187 0 0  
Logram & Son, Ventnor (accepted)... 5,094 0 0

**WALWORTH.**—For pulling down and rebuilding the Prince Alfred public-house, Walworth-road, for Mr. J. Dyke. Messrs. J. & J. S. Edmonson, architects, Old Broad-street. Quantities supplied:—  
Frost... £1,870 0 0  
Hayworth... 2,405 0 0  
Lunden... 2,389 0 0  
Huthwaite... 2,389 0 0  
Steel Bros... 2,348 0 0  
Marland... 2,345 0 0  
Holloway... 2,298 0 0  
Smith & Sons... 2,256 0 0  
Jackson & Todd... 2,213 0 0  
Kynoch & Co... 2,210 0 0  
Beale... 2,228 0 0  
Croaker... 2,070 0 0

**WALWORTH.**—For alterations, &c., at the King's Arms, Walworth-road. Messrs. G. Warman & Co. Mr. W. T. Farthing, architect:—  
W. Joselyns... £2,100 0 0  
Canning & Mullins... 1,897 0 0  
R. W. Edgley... 1,857 0 0  
H. Pickering & Co... 1,830 0 0  
J. Beale... 1,798 0 0  
Spencer & Co... 1,765 0 0  
W. Scrivenor & Co... 1,718 0 0  
Leslie & Knight... 1,700 0 0  
Ben. Cook (accepted)... 1,657 0 0

**WALWORTH.**—For additional room at 18, and repairs externally and painting at 67, and nine private houses adjoining, in Villa-street, for Mr. W. Lywood. Mr. Edward Crooke, architect and surveyor, Bermondsey-square. No quantities:—  
T. Laphorne & Co., Lambeth... £184 0 0  
J. Appleby, Lambeth... 144 10 0  
A. Waite & Co., Rotherhithe... 129 0 0  
P. Lidston, Deptford (accepted)... 107 0 0  
J. F. Seipoe, Peckham... 99 12 0

**WATFORD (Herts).**—For erecting new house in the Bushey Hall-road, for Mr. G. Ellingham (all bricks found by employer). Mr. C. P. Ayres, architect, Watford:—  
T. Turner... £898 0 0  
C. Brightman... 845 0 0  
Clifford & Gough... 825 0 0  
W. B. Neal... 825 0 0  
Andrews & Sons... 823 0 0  
F. Bonnett... 789 0 0  
G. & J. Waterman... 789 0 0  
A. W. Chadwick (accepted)... 780 0 0  
[All of Watford.]

**WATFORD (Herts).**—For additions to the West Herts Liberal Club. Mr. C. P. Ayres, architect:—  
G. & J. Waterman... £721 0 0  
Judge & Eames... 704 10 0  
Andrews & Sons... 698 10 0  
C. Brightman... 633 0 0  
A. W. Chadwick... 618 0 0  
T. Bonnett... 608 0 0  
[All of Watford.]

**WATFORD (Herts).**—For alterations and additions to Ashwellthorpe, Clarendon-road, for Mr. F. Kuyvet. Mr. C. P. Ayres, architect:—  
A. W. Chadwick, Watford... £771 0 0

**WESTMINSTER.**—For rebuilding the Two Brewers public-house, James-street, Buckingham-gate, for Mr. Samuel Raven. Quantities by Mr. Fredk. Thomson. Mr. H. I. Newt, architect, Queen Anne's-gate:—  
Heath... £2,800 0 0  
Cook... 2,790 0 0  
Haylock... 2,712 0 0  
Spencer & Co... 2,684 0 0  
Lambie... 2,687 0 0  
Chappell & Co... 2,614 0 0  
Walker... 2,438 0 0  
Goddan... 2,300 0 0  
Steel Bros... 2,295 0 0  
Burman & Sons, Kensington Park... 2,275 0 0  
\* Accepted.

**WINCHESTER.**—For repairs and exterior painting at the Hartley Wintney Workhouse. Mr. W. H. Turner, architect:—  
J. A. Sims, Basingstoke... £285 0 0  
Liming Bros, Farnham... 272 0 0  
H. Martin, Hartley-wine (accepted)... 199 0 0  
[Architect's estimate, 195.]

**SPECIAL NOTICE.**—Lists of Tenders frequently reach us too late for insertion. They should be delivered at our office, 46, Catherine-street, W.C., not later than Four p.m. on THURSDAYS.

## PUBLISHER'S NOTICES.

Registered Telegraphic Address, "THE BUILDER, LONDON."

**CHARGES FOR ADVERTISEMENTS.**

**SITUATIONS VACANT, PARTNERSHIPS, TRADES, AND GENERAL ADVERTISEMENTS.**  
Six lines (about fifty words) or under... 4s. 6d.  
Each additional line (about ten words)... 6s. 6d.  
Terms for Series of Trade Advertisements, also for special Advertisements on front page, Competitive, 3s. per line by Auction, &c. may be obtained on application to the Publisher.

**SITUATIONS WANTED.**  
Four Lines (about thirty words) or under... 2s. 6d.  
Each additional line (about ten words)... 6s. 6d.

**PREPAYMENT IS ABSOLUTELY NECESSARY.**  
\* Stamps must not be sent, but all small sums should be remitted by Cash in Registered Letter or by Money Order, payable at the Post-office, Covent Garden, W.C. to DOUGLAS FOURDRINIER, Publisher.

Advertisements for the current week's issue must reach the Office before THREE o'clock p.m. on THURSDAY.  
The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c. left at the Office in reply to Advertisements, and strictly recommends that of the latter COPIES ONLY should be sent.

**SPECIAL ALTERATIONS IN STANDING ADVERTISEMENTS OR ORDERS TO DISCONTINUE same.**  
must reach the Office before TEN o'clock on WEDNESDAY morning.

**PERSONS Advertising in "The Builder," may have Reprints addressed to the Office, 46, Catherine-street, Covent Garden, W.C. free of charge. Letters and Reprints will be forwarded if addressed to the Office, and sent, together with sufficient stamps to cover the postage.**

## TERMS OF SUBSCRIPTION.

"THE BUILDER" is supplied direct from the Office to residents in any part of the United Kingdom at the rate of 19s. per annum. Foreign, to all parts of Europe, America, Australia, and New Zealand, 25s. per annum. To India, China, Ceylon, &c. 30s. per annum. Remittances payable to DOUGLAS FOURDRINIER, Publisher, No. 46, Catherine-street, W.C.

## TO CORRESPONDENTS.

Registered Telegraphic Address, "THE BUILDER, LONDON."

M. & Co.—G. L. Paris.—O. & Son (drawings received).—A. M.—"Albana"—H. & F.—W. H. T.—V. B.—J. L.—H. T. L. (a word, it is what would be called "yellow"; and it is certainly not "white").—B. A. E.—P. D. Paris.—G. R. D.—T. R. H. All statements of facts, lists of tenders, &c. must be accompanied by the name and address of the sender, not necessarily for publication. We are compelled to decline pointing out books and giving addresses.

Note.—The responsibility of signed articles, and papers read at public meetings, rests of course, with the authors. We cannot undertake to return rejected communications. Letters or communications (beyond mere news-items) which have been inserted for other persons, are NOT DELETED. All communications regarding literary and artistic matters should be addressed to THE EDITOR; all communications relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

## Best Bath Stone.

**WESTWOOD GROUND,**  
Box Ground, Combe Down,  
Corsham Down, And Farleigh Down,

**RANDELL, SAUNDERS, & CO., Limited,**  
Corsham, Wilts. [ADVT.]

## Bath Stone.

## BEST QUALITY OF ALL KINDS.

## PICTOR & SONS,

Box, WILTS. [ADVT.]

## Doubling Freestone.

**THE CHELYNCH STONE.**  
The stone from these quarries is known as the "Weather Beds," and is of a very crystalline nature, and undoubtedly one of the most durable stones in England.

**THE BRAMBLEDITCH STONE.**  
Is of the same crystalline nature as the Chelych Stone, but finer in texture, and more suitable for fine moulded work.

## HAM HILL STONE.

Greater facilities have been provided for working these quarries, and the stone can be supplied in large quantities at short notice.

Prices, and every information given, on application to **CHARLES TRASK & SONS,** Norton-sub-Hamdon, near Ilminster, Somerset.

London Agent—Mr. E. WILLIAMS,  
16, Craven-street, Strand, W.C. [ADVT.]

## Doubling Free Stone

For prices, &c., address S. & J. STAPLE, **HAM HILL STONE,** Quarry Owners, Stone and Lime Merchants, Stoke - under - Ham, (Ground or Lump), Ilminster. [ADVT.]

**Ham Hill Stone!** **Ham Hill Stone!!!**  
For Ham Hill Stone of best quality and workmanship, apply to **JOHN HANN & SON,** Quarry Owners, Montacute, Ilminster. Established 1837. Agents, **MATTHEWS & GEARD,** Albany Wharf, Regent's Park Basin, N.W. [ADVT.]

**Asphalts.**—The Seyssel and Metallic Lava Asphalte Company (Mr. H. Glenn), Office, 38, Poultry, E.C.—The best and cheapest materials for damp courses, railway arches, warehouse floors, flat roofs, stables, cow-sheds, and milk-rooms, granaries, tan-rooms, and terraces. [ADVT.]

**Asphalte.**  
Seyssel, Patent Metallic Lava, and White Asphalts.

**M. STODART & CO.**  
Office:  
No. 90, Cannon-street, E.C. [ADVT.]

# BANNER VENTILATORS.

The Strongest Exhaust Ventilators for all Buildings, Public Halls, Churches, Billiard-Rooms, &c.

HIGHEST PRIZES at all the most important Exhibitions.

## BANNER SYSTEM OF SANITATION AND SANITARY APPLIANCES

WERE AWARDED AT THE

International Health Exhibition, 1884, One Gold Medal, Three Silver Medals, and One Bronze.

For further Particulars and Prices apply to

# BANNER SANITATION COMPANY,

Wessex House, Northumberland Avenue, Charing Cross, London, W.C.



# The Builder.

Vol. L. No. 2262.

SATURDAY, JUNE 12, 1896.

## ILLUSTRATIONS.

New Oratory of the Sacred Heart, Liverpool: Interior and Exterior Views.—Messrs. Goldie, Child, & Goldie, Architects .....	850, 851
School Board for London: Berner-street and Blackford-road Schools.—Mr. T. J. Bailey, Architect .....	854, 855
Hatton House, Westgate-on-Sea.—Mr. J. T. Wimpey, Architect .....	858
The Park, Leilbury.—Messrs. R. Coad and J. M. Maclaren, Architects .....	859
Tomb of Bishop William De La Marchis, Wells Cathedral.—Drawn by Mr. R. W. Paul .....	862, 863

## CONTENTS.

Building Stones at the Colonial and Indian Exhibition .....	830	Church of the Sacred Heart, Liverpool .....	848	Tubney Docks Arbitration .....	867
New Theory on the Sculptured "Thanatos" Drum of the Ephesus Column in the British Museum .....	836	New Board Schools for London .....	848	Association of Public Sanitary Inspectors .....	867
Stones .....	840	Additions to "The Park," Leilbury .....	848	Weather Stains on Walls .....	867
Wood-Carving, Pottery, and Glass exhibited in Indian Courts .....	841	"Hatton House," Westgate-on-Sea .....	848	The Student's Column: Our Building Stones.—XIV. .....	868
Architecture at the Royal Academy.—VII. .....	842	Tomb of Bishop Wm. de la Marchis .....	848	Recent Patents .....	869
The Annual Report of the Metropolitan Board of Works .....	843	Society for the Protection of Ancient Buildings .....	848	Recent Sales of Property .....	869
Competitions .....	847	Association of Municipal and Sanitary Engineers and Surveyors .....	848	Meetings .....	869
Electron of Two District Surveyors .....	847	The Chemical Treatment of Sewage .....	848	Prices Current of Building Materials .....	870
	848				

### Building Stones at the Colonial and Indian Exhibition.



THE authorities of the Colonial and Indian Exhibition appear to have paid considerable attention to the representation of building stones, in their respective departments, almost with-

out exception. Some of these exhibits are intended to induce us to purchase some of our stones,—especially those of an ornamental nature,—from the colonies, whilst others are merely to show the kinds of stone used locally.

The stones from the Indian Empire are arranged under the walls of the Economic Court. The Archaean rocks are of vast extent in India, granitoid gneiss being the prevailing type, and this, together with granite, has been employed on a grand scale in the temples of Southern India. Nos. 7, 8, 9, and 32 are examples. No. 8 is a grey granite, of a rather coarse texture, the felspar being large, and is the principal building stone at Hyderabad, in the Deccan. Crystalline limestones in India, as elsewhere, are amongst the most beautiful ornamental stones. No. 25 is the white "Makrana Marble" so extensively used in the Great Mogul monuments of Delhi and Agra, from the Makrana quarries in Jodhpur, Rajputana. This is the material also employed in the construction of the famous Taj Mahal at Agra. No. 26 is a dolomite polished as white marble.

The Deccan traps, which are a series of lavas and tuffs of the Cretaceous period, appear to furnish some of the best building stones in the Bombay district, nine kinds being exhibited. No. 12, "Sewri blue trap or basalt," Bombay Island, is stated to be the best class of building stone in Bombay. Nos. 13 and 14, traps from the Coorla quarries, Salsette, twelve miles north of Bombay, are much used in that city for coping, bases, columns, arches, large steps, &c.

The sandstones from the Gondwana formation are generally too porous and friable to form sound building materials. No. 17, "Hem-nagar sandstone," Guzerat, and No. 18, "Seoni stone," from Hoshangabad, Central Provinces, are in good repute, now largely used in Bombay for fine and plain carved and moulded work. The former is grey, with light violet streaks, and the latter of a light brown colour. The upper Vindhyan sandstones afford everywhere building stones of the best description, with many shades of texture and colour, from

nearly pure white to bright red. They have been very extensively used by the natives wherever within reach, for temples and palatial edifices, and by the British for railway viaducts. No. 20 is the "Chunar stone," Mirzapore district, North-West Provinces. It is of a grey colour, and much used in Calcutta, though terra-cotta mouldings are often substituted for it in architectural ornamentation. Nos. 35 and 36, "Agra stone," and "Agra red," are very fine salmon-coloured sandstones, and form the main material in the great buildings of Agra and Delhi.

In Sind, tertiary rocks afford numerous fine building stones, especially the nummulitic limestones, but there are no examples of them exhibited. The "Porebunder stone," No. 24, is principally made of foraminiferal remains, and is of recent origin. It is said to be an admirable building material, working like the finest oolite or Bath stone, and is extensively used in Bombay.

Three kinds of slate are exhibited. No. 1, Kangra slate, from the quarries of that name in the flanks of the Dhauladhar range, north of the Kangra valley. It is as fine and even as could be desired, but is more siliceous and crystalline than our Welsh roofing slate.

Considerable care has been taken to show, by means of maps, the extent of the various formations, and the fact of the whole having been under the supervision of Mr. H. B. Medlicott, M.A., Director of the Geological Survey of India, is a sufficient guarantee for the completeness of the work.

Amongst the few building stones from Ceylon, we may mention a gneiss from Mahara, used in making the Colombo breakwater; red granite from Veyangoda, and Cabook (or Laterite) from Colombo, extensively used for building in lieu of brick. A specimen of stone carving in a block of granite is exhibited by the Stone Guild of Hong Kong; and in the section allotted to Canada a large collection of rocks and minerals is shown, which apparently are not yet quite arranged.

The Geological Survey of the Dominion Government have sent several things, amongst which we notice a fine series of small cubes of sandstones, limestones, marbles, dolomites, granites, and porphyries. These represent the chief building stones of the colony. The sandstones and limestones are of various shades of colour and texture. Some of the granites are bluish (like Rubislaw); others are red, the felspar containing much iron. The lighter-coloured granites have sometimes a rough resemblance to that called "graphic" in this country. These specimens are placed above a large slab of "New Rockland" (near Quebec) slate, about 10 ft. by 4 ft. A fine piece of ornamentally-worked marble from

Arnprior, Ont., is exhibited by Messrs. Hurd & Roberts, of Hamilton, Ont. The calcite in this limestone is of a light bluish colour, and presents a curious granular appearance. Thick dark streaks run here and there through the stone, which is beautifully polished. Three other marbles are from Barrie, Ont. All are more or less white, with oblique streaks of a light blue and dark slate colour running down them. Another marble from Hull, Quebec, has a laminated structure of a slaty-brown colour; others have white and black streaks. A conglomeratic-looking marble, with large vivid vermillion and dark-brown patches, attracts considerable attention.

There are two specimens of New Brunswick granite. One is similar to our light blue Aberdeen, but slightly yellow; the other has large crystals, the predominating felspar (orthoclase) being red. A granite from Gananoque, Ontario, is of a brilliant red colour; whilst another from Stanstead, Quebec, is white, with black mica, the felspar having a granular appearance. A cross on a pedestal is made of Halifax granite. It is of a whitish yellow colour, with very large crystals. Flags, serpentines, and many ornamental stones are also exhibited. It would be better, perhaps, if the stones were more grouped together.

The building stones from Queensland are well represented by about sixty large blocks, slabs, and cubes. Sandstones appear prominently, and amongst them we may notice two specimens of a brown colour, from Stanwell Rockhampton. This stone is said to get very hard on exposure, and stand the weather well, the angles remaining sharp for a considerable length of time. It has been used for many public buildings in Rockhampton.

There are five blocks of sandstone from three quarries near Helidon. These show the kind of materials which have been certified by the Colonial Architect to be used in the construction of the Brisbane Public Offices. The white varieties from No. 1 quarry will be used in the upper stories; the brown rather dark kind from No. 2 quarry, in the basement; and the bluish from No. 3 quarry (which takes a high polish) for the inner embellishments. Some specimens of sandstone are shown from Moggill Ferry. The rocks from these quarries have been examined by the Hon. A. C. Gregory, in selecting stone for the construction of the South Brisbane Dry Dock, and the result of his investigations will be published in the descriptive catalogue of the department. The white and brown sandstones from Grantham, Toowoomba, are said to be exceedingly good freestones, and have been used in the Government House, the Houses of Parliament, and the Town Hall in Brisbane.

Several limestones and some beautifully-



polished marbles, together with samples of granites, syenitic granites, and syenites, are also exhibited, but do not call for any special comment. We may, however, notice two specimens of porphyry from O'Connell Town, Brisbane. It is a compact rock of a light reddish-brown colour, consisting of felspar base, with a few quartz crystals scattered about. The Roman Catholic Cathedral is built of this porphyry, as well as the basement of the New Government Printing Offices, and various other public and private buildings in Brisbane.

We cannot close the remarks on the exhibit of stones from this colony without expressing our gratification not only as regards the manner in which the stones have been arranged, but the amount of useful and practical information which will be given to the public in the catalogue. The Hon. A. C. Gregory's private notebook has furnished the latter with the amount of absorption of water, specific gravity, weight per cubic foot, &c., of many of the stones represented.

From New South Wales there is only a small collection of stones. Light-yellow freestones from Pyrmont show us the material with which the principal edifices in Sydney are built, and o'her blue and white varieties come from West Maitland and Manly. A broad, tall obelisk-shaped object has some beautifully-polished slabs of marble from Marulan, Cow Flat, and near Tamworth, let in a wooden frame, covered with cloth. That from near Tamworth is a red encrinital marble, and in structure is precisely similar to our Derbyshire marble of the same name, being almost wholly made up of the stalks of fossil crinoids.

The group of stones from the colony of Victoria is arranged just outside the court. The most prominent object is a tall obelisk of "Stanwell" or "Grampian stone," from the Grampian Quarries, Victoria. It is a light-yellow colour, and is now being used for the Parliament Houses, Melbourne. Several blocks of sandstone, limestone, marble, and a few slates are shown. A beautifully-polished fountain is made of coarse grey Harcourt (Mount Alexander) granite, and there is a small block of rather coarse red granite, in which the orthoclase felspar is conspicuous.

Building stones from South Australia are well represented by about forty-five specimens, mostly cubes, arranged in tiers. We may notice the Finnis freestone of a light yellow colour, which is reported by some of the leading architects and others to be the best freestone yet discovered in the colony.

The main public buildings in Adelaide are constructed of Teatree Gully freestone. Three samples of this are exhibited: one is a light yellow colour; the others, white. One of the latter is moulded to show its effect. "Red Dolomite" from Mount Gambier, and several marbles, some blocks of which are moulded, are exhibited. The Willunga stone has been extensively used for paving, but the Mintaro flag-stone has now taken its place, not being quite so laminated. Of the granite, that from West Island, near Port Victor, has been used in the basement of the new Parliament buildings. It is of a greyish colour, and very coarse, having large felspar crystals.

In the department of Western Australia there is a fine, almost white, granite pedestal, out in the neighbourhood of York Green Mount; together with a block of light brown coarse sandstone.

There are also six small 6-in. cubes in a case representing the stone obtained from Kellamscott, Freemantle, and Champion Bay. Surmounting these is a small limestone ornament, moulded to show facility of working.

The majority of the stones from New Zealand, in the West Annexe, are exhibited by the Public Works Department, Wellington. Some of them are very similar in appearance to our oolitic freestones; and one cube is almost wholly made of fossil shells, in such a manner that we might imagine it to be a block of Portland. The object calling for special attention, however, is a finely-carved and moulded white limestone column exhibited by the Totara Freestone Co., Oamaru, Otago. It stands on a rough block apparently of the same kind of stone, and shows at once the skill of the mason, and the

homogeneous character of a freestone of first-rate quality. It has, unfortunately, been chipped here and there at the corners (in transit probably), but this is only noticeable on a close inspection, as it has since been mended. Other freestones are of light green, slate, and salmon colours, and there is a cube of crystalline white marble having a fine polish. Two blocks of "Timaru blue stone," and one block of dressed "Raglan," are examples of stones much used. The igneous rocks are represented by a block of fine white granite, with large felspars; white mica and little black micaceous-looking specks are found all over the stone. A little iron, as shown by brown markings, is also present. One block, probably a lava, is of a dirty slate colour and full of small holes: it might do very well for rough work when stone of better appearance is not at hand.

There are several blocks of building stone from the Cape of Good Hope in the Queen's Gate Annexe. Unlike those of some of the other departments they are not arranged in a group, but are scattered about here and there. Some blocks, too, stand by themselves with nothing printed on them to show where or for what purposes they are used. The exhibit would be much more useful if this were attended to.

We may notice a large cube of granite from Paarl, exhibited by the Table Bay Harbour Board. It is of a light grey colour, rather coarse, the crystals not being well defined, very much resembling some of the white Irish granites when dressed; but polishing reveals a slight light-brown tinge of a peculiar nature. It has been used in the construction of the Graving Dock, Cape Town.

There is a white freestone from Grahamstown, one from Maraisburg, Cradock district; two specimens of marble from Troe Troe, Clanwilliam division, and sandstone from Mossel Bay. The marble has a white ground with small irregular light-blue veins running over it, and, being finely crystalline, takes a good polish.

The stones sent from Natal appear to be still under arrangement. A noticeable object in the collection is a moulded column and pedestal executed in a fine grained sandstone of a light greenish colour. The stone appears to be easily worked and the angles are sharp. Several freestones of a grey colour come from Umginto, Weenen, Pietermaritzburg, and Greytown. In such a climate as that of Natal they are, no doubt, very durable. There are specimens of crystalline limestone (marble) streaked with blue veins, and some beautiful white marbles. The latter are exhibited by Messrs. Marcus Moxham & Co., of Swansea. The Natal Commission show, amongst other things, a sample of building stone from Mount Moriah, Victoria, and four blocks of unpolished granite from Inchanga. A specimen of granite, partly polished, has large white felspar crystals, being very coarse.

The small but important dependency of Malta has sent a very large series of building stones, the majority of which are arranged in a stack outside the door facing the south-east basin. They form one of its prominent exhibits and include marbles, sandstones, and granites. The façade outside the main entrance to the Court was made in Malta under M. Galizia, Superintendent of Public Works, from an original design, based upon German Renaissance met with at Heidelberg, sent out to Malta and there executed, and sent back to this country in numbered blocks, so that it was re-erected here in a very short space of time. We can strongly recommend those interested to pay a visit to the Maltese Court to see the beautiful and elaborate carvings in stone, which are not equalled by those of any other department in the exhibition.

We are not altogether surprised that ornamental stone-work is so well represented, because it is, in fact, one of the chief specialties of the island, and the official catalogue, p. 461, invites us to purchase some of our stone carving from Malta, or to get it done there; but this can hardly be convenient or practicable.

From Cyprus we have several crystalline marbles and some sandstones, from quarries

near Larnaca, Nicosia, and Limassol. In conformity with the general care taken in the arrangement, which characterises the exhibits from this island, we find that the building stones each have the weight per cubic foot given on neat labels, with the name of the quarry; an example which might with advantage be copied in some of the other sections of the exhibition.

#### NEW THEORY ON THE SCULPTURED "THANATOS" DRUM OF THE EPHEBUS COLUMN IN THE BRITISH MUSEUM.

THE *Buletino della Commissione Archeologica Comunale di Roma*, published by the Accademia dei Lincei, enters this year on a new series. The first issue is marked by a paper from Dr. Benndorf, which, offering as it does a new interpretation of the famous "Thanatos" drum in the Ephesus room of the British Museum, cannot fail to be of interest to English readers. The drum in question, it will be remembered (of which we published an illustration at the time of its discovery), has upon it five figures in good preservation,\* and to one of



these, the figure of a youth with wings and a sword in its scabbard, the current interpretation,—that of Dr. Robert,—is due. He sees in the group a representation of the return of Alcestis to the upper world. Heracles has fought with Thanatos and wrested from him his prize. Thanatos, the youth with wings and sword, softened in face and gesture, motions to the woman next him, Alcestis, to depart. Hermes, with face upturned, already looks away from the lower world. Persephone, to the right, stands in front of the seated Pluto, from whom she has just obtained consent for the release of Alcestis. When we say at the outset that instead of this scene of the conquest over death, solemn and yet triumphant, Dr. Benndorf asks us to read a tale whose import is light and cheerful, the "Judgment of Paris," we feel that to the uninitiated the faith of the archaeologist must seem, indeed, a reed shaken by the wind.

Dr. Benndorf shall, however, make good his own case. He was brought, as so often happens, to reconsider the Thanatos interpretation by certain reflections arising from the study of quite another monument. This monument was the figure of a youth, a photograph of which he publishes in the *Buletino*, tav. I. and II., side by side with the so-called "Thanatos." This statue was found in 1876 at Rome, in the spot where formerly the Rospi Ghiosi Gardens were, now destroyed by the Via Nazionale; it is life-sized, of Pentelic marble, and bears evident traces of having been painted, specially about the eyebrows, pupils of the eye, and hair. It has fortunately escaped restoration, and it can be clearly made out that it was worked in several pieces, afterwards put together. It now stands in the beautiful octagon room of the Conservatori Museum on

\* We give a small sketch of it here again, as a memorandum of the arrangement of the figures here referred to.



the Capitoline Hill. Placed side by side with the "Thanatos," the resemblance between the two is obvious; there is the same melancholy inclination of the head, approximately the same pose of body, the same belt across the body and right shoulder. Further, Dr. Benndorf thinks it certain, from the holes at the back of the Capitoline figure, that it was originally winged, like the Thanatos. The execution of the figure points to the days of Greco-Roman work, but Dr. Benndorf thinks the conception is of good Greek times. Accepting the analogy of the two figures, the statue in the round would certainly not be a copy of a decorative work in relief; the work in relief is of prior date to the statue in the round; if, therefore, any connexion is to be established between them they are not, either of them, a copy of the other, but rather both must have borrowed their motive from a third great original. The question is what was this original?

Unless there is a strong reason to the contrary, we should naturally interpret a youthful male figure with wings as Eros. How, then, has the Thanatos interpretation come about for the Ephesus figure? Obviously in order to account for the apparently strange conjunction of the wings and sword; what had the gentle Eros to do with so warlike a weapon? Why does he lay aside his accustomed bow and arrows? We must add that Dr. Robert, the author of the Thanatos theory, had his mind full of this conception of the winged and sword-bearing Thanatos, he had long devoted himself to the interpretation of that peculiar series of white Attic lekythoi, on which is represented the laying of the dead man in the grave, by the four-winged figures, Death and Sleep. He had, therefore, naturally, a predisposition to see this figure of Thanatos wherever possible. Given Thanatos, he set himself to find a fitting myth where Thanatos should be the principal figure; hence the Alcestis interpretation. If we can take away the necessity of the Thanatos interpretation (based entirely on the attributes, not on the character of the figure), the Alcestis theory falls away with it.


As we have noted, but for the attribute of the sword, the figure, soft and youthful, tinged with reflective melancholy as it is, would naturally be regarded as Eros. Is this attribute of the sword really incongruous? A moment's consideration will show that, on the contrary, it is absolutely appropriate and expressive. We are too apt, Dr. Benndorf points out, to regard Eros from the Roman point of view, to think of him as the mischievous schoolboy with bow and arrows, always in mischief, but never a serious divinity. But this is not the conception of Sophocles or Plato, or even of Euripides, nor is it the conception embodied in plastic art until Alexandrian days. For Sophocles (Trach., 441), Eros is the strong boxer (*πικρὸς*) with whom a man does ill to contend. He is the warrior unconquered in battle (*ἀνίκητος μέγας*); he comes not to bring peace, but a sword; for Anacreon is the smith who smites with ponderous blow. These passages alone would amply justify the attribute of the sword; but, turning to the far more apposite evidence of the traditions of art itself, we remember that Alcibiades bore on his shield the device of Eros armed with a thunderbolt. On vase-paintings he appears wielding a goad, with which he compels Zeus himself to love; often he carries a lance, and on one archaic vase he flies through the air bearing both shield and spear. Such is the Eros of the fifth and fourth centuries B.C.—robust, virile,—a warrior, beautiful, indeed, but also terrible, never frivolous; a warrior who might wield on occasion any weapon from the arsenal of Zeus. So far we are with Dr. Benndorf entirely. We believe that he has satisfactorily disposed of Thanatos, and the winged deity bearing the sword will henceforward be acknowledged as Eros.

Having established Eros, Dr. Benndorf has now to cast about for a myth which shall give prominence to Eros and shall admit Hermes; for about the explanation of the youth carrying the caduceus there is, of course, not the shadow of a doubt. Dr. Benndorf, at the suggestion, he says, of Dr. E. Petersen, proposes the myth of the Judgment of Paris. In justice to

him we must say that he regards this theory as a mere conjecture (*simpliciter congettura*). The seated figure he proposes as Zeus, the standing female figure next as Hera; then follows Hermes, looking upward; then Aphrodite; then Eros; the rest of the column not preserved must, on this hypothesis, have been filled up by the figures of Athene and Paris. We cannot say we feel any inward conviction of the truth of this hypothesis; though there is no objection to the presence of Zeus. The judgment took place by his decree, and he is present on red-figured vase-paintings contemporary with the drum. It is noticeable also that the Hermes of these vase-paintings, e.g., the famous vase at Berlin, has just the upward gaze of the Ephesus Hermes; but in the vase-painting there is a reason,—Paris is seated on a rock above Hermes. The principal point that we feel to be unsatisfactory is the scattered arrangement of the figures; naturally on a column they would be arranged in a frieze-like procession,—Paris, Hermes, the three goddesses,—whereas in the Ephesus drum we have Zeus and Hera, then Hermes, then Aphrodite, Eros, Paris, and Athene. This objection is not, however, fatal, but the theory wants confirmation.

Dr. Benndorf has more to say on the Eros figure. He believes that the Capitoline and the Eros figures are both copies of one and the same great original, the Thespian Eros of Praxiteles. As the details of this argument are largely philological, we do not reproduce them here. The Thespian Eros was the one for which Praxiteles found the suggestion in his own love for Phryne. Eros is represented there as himself love-smitten as well as smiting. This is the thought at the bottom of that art type which certainly appears in both the figures in question, the type which represents Eros plunged in melancholy, gazing intently (*ἀντι-ζήγων*), lost in thought. It was a conception thoroughly in the manner of Praxiteles, and this intent, wrapt, love-smitten gaze we undoubtedly see in the Ephesus figure. Taken as Eros it helps us to a conception of his idea of the love-god, whether or not we take the figure for an actual copy of his Thespian Eros.

#### NOTES.

OCE more we have before us that pathetically amusing document, the Annual Report of the Society for the Protection of Ancient Buildings, recounting the few successes of the Society and the numerous snubs they have received, their own queer ideas on the relation of modern buildings to ancient remains, and the equally queer ones, in another direction, of some of their antagonistic correspondents. In the present Report the absurdities are, perhaps, pretty evenly divided on the two sides; at all events, more evenly than usual. The letter from some one concerned in the matter of Saltfleetby Church, Lincolnshire (no clue is given as to whether the writer is architectural or clerical, probably the latter), in which the Society are assured that the most reverential attention has been paid to the conservation of the ancient church, by pulling it down with the view of using the whole of the materials in the new church, is unquestionably very pretty reading for archaeologists of a cynical turn of mind. The society have scored a quite unexpected success in obtaining consent of the Benchers of Lincoln's Inn to retain the old gateway into Chancery-lane,—a success the more marked as the work is known to have been in the hands of a certain too notorious legal architectural cobbler, who would probably have delighted to pull down the gateway if only to cause annoyance to the Society. Archaeological sentiment seems, however, to have penetrated the legal minds of the Benchers to this extent, and the gateway remains. Its value is exaggerated by the Society, but seeing how unlikely it was under present circumstances that anything tolerable would have been put in its place, its retention may be considered a clear gain. The fine design for the re-building of the east end of St. Bartholomew's Church, of course, is

stamped with obloquy by the Society, who would prefer, we gather, to leave the bare wall and the iron columns, which we presume they would consider as interesting examples of the taste of a former generation. The best thing in the Report is, perhaps, to be found in the letter about Pucknoll Church, Dorsetshire, where the Society, after taking upon themselves to explain to the Rector that, as his church will seat one-fifth of the population of the parish, it is impossible he can reasonably want it enlarged, add, "the addition of an organ-chamber and a vestry would go still further to spoil the church as a Medieval building." So that, according to the views of the Society, a church in regular use for modern worship is not to have an organ or a new vestry, because the rest of the church is old. Is it any wonder that some architects refuse to give any attention or reply to the views of such silly and impracticable doctrinaires? The tone of what may be called polite impertinence which pervades the correspondence of the Society is enough in itself to put up the back of any man of spirit and possessed of a healthy contempt for humbug.

**T**HE rejection by a Select Committee of the House of Commons of a part of the Salford Corporation Bill forms another incident in the history of the Manchester Ship Canal. The Salford Corporation desired to contribute 250,000*l.* towards the capital required for the construction of the canal, and the matter occupied the attention of the Select Committee for two days, resulting in a refusal to grant the powers sought for. This is a victory for the railway companies, who have, of course, persistently opposed the whole scheme as calculated to endanger their interests. They are large ratepayers to the Salford Corporation, and naturally objected to being compelled to contribute towards a competitive concern. This is another hitch in the progress of the scheme, the preliminaries of which are proving very costly, and it is to be hoped that when carried out it will justify the expectations which have been formed respecting it. The railway companies evidently regard it as a dangerous rival, and it seems probable that were the existing waterways of the country less under the direct and indirect control of the railways they would be of more advantage to the trading community than they are now.

**A**MONG the Bills which a General Election would put an end to for the present session is that for the better prevention of fires within the metropolis, which was set down for the second reading on June 25th. It is probable that, though it may be temporarily shelved, it will sooner or later become law. It must be confessed that its title is not altogether appropriate, for it does not seem necessarily to be a measure which will prevent fires. Stated in half a dozen words, it is a Bill to authorise inquiries into fires when damage to the extent of 500*l.* has been done, and the origin of the fire is unknown, or when the Chief Officer of the Fire Brigade shall report that the circumstances of a fire are proper to be investigated. The inquiry is to be held by a Commissioner to be appointed for the purposes of each particular inquiry. As most fires in the metropolis are caused by some trifling and common piece of carelessness, the results of inquiries are scarcely likely to lessen the number of fires, unless it be by a constant recommendation of certain structural arrangements of buildings. On the other hand, it is certainly advisable that these accidents should be carefully investigated, just as much as railway accidents or explosions in mines.

**R**EFERENCES have once or twice been made in our columns to the Sanitary Registration of Buildings Bill, which was read a first time in the House of Commons on the 2nd inst. The Bill, which is backed by Dr. Farquharson, Sir H. E. Roscoe, Sir Guyer Hunter, and Dr. Camron, was originally drafted by Mr. Mark H. Judge, and was brought in at the instance of the Sanitary Assurance Association, who, while desiring that legislation should take place with the



view "of affording some guarantee that every dwelling-house shall be reasonably fit for habitation," do not, we are pleased to note, desire the establishment of a central authority for the stereotyping of even the best system of sanitation, but they wish, as they say in a petition which they have presented to the House of Commons in favour of the Bill, "to see a law enacted which shall empower the Local Authorities to demand the certificate of some competent person or corporation that the sanitary arrangements of any building are satisfactory before it shall be lawful for such building to be occupied."

A REPORT has recently been made to the Town Council of Antwerp which contains matter of interest in regard to the questions of water-supply and sanitation. The long-continued drought of the summer of last year, and the sudden increase in the consumption of water caused by the Exhibition at Antwerp, prevented the water-purifying apparatus used in that city from completely destroying the marshy taste and smell which characterise the water of the Nethe. The fear of cholera, then raging in Spain, caused additional anxiety, and a Commission of five chemists was appointed to examine into the matter. The report in question was made by this body, and after dealing with matters of local interest, it discusses the process of purification and its theory, the general arrangement of the waterworks, the cause of the marshy taste and smell, and finally the result of the examination of the water with reference to microbes and bacteria. The conclusions arrived at were,—that the water was never unwholesome, in spite of the unpleasant taste and smell, and that all doubts about the efficacy of the purification of water by means of iron applied through the instrumentality of revolving purifiers must fall before the researches of the English scientific men who have investigated the subject, and before the labours of the Commission itself, which confirmed their conclusions to the fullest extent. Particulars of the investigations on this subject referred to will be found in the Minutes of the Proceedings of the Institution of Civil Engineers, vol. lxxii., p. 24, and vol. lxxxi., pp. 279 and 285.

A CORRESPONDENT writes:—"Some of your readers may be interested to hear that at an auction held the other day in Old Bond-street several well-authenticated relics of ancient Carthage, collected by Count D'Hérissou, from recent excavations, were exposed for sale. Among these were two mosaics, in excellent preservation, each about 3 square feet in size. The one represents a nude youth sitting beside a woman dressed in a peplos and wearing a crown of rushes; the other a youth, also nude, on whose shoulders is an eagle. They were discovered near Tunis, in a garden at Danar-el-Sciati, situated in the midst of the ruins of ancient Carthage. The subjects of the two mosaics have been arbitrarily entitled 'Peace' and 'War,' but they are probably mythological rather than allegorical representations. The first might possibly be intended for Paris and Helen, the second for the Abduction of Ganymede. They are evidently Greek and not Roman in character, while the superior excellence of their design shows them to have belonged to an earlier and more artistic age than the mosaics discovered at Pompeii. These mosaics seem to point to Carthage as the originator of mosaic art. Ancient Greece has left no traces of it, while its development in Italy is much later. Carthage, with her wonderful variety of coloured marbles and the world-famed skill of her craftsmen,\* may well have originated the idea. Whether she possessed indigenous artists of any merit is a question, but her skilled craftsmen may have worked from Greek designs, or even made copies in tesserae of Greek paintings. Roman mosaics have also been discovered on the site of Carthage, but

these are evidently later than the Carthaginian, not only because they are less deeply imbedded in the soil,\* but also because they are inferior in design and execution, and not even so well cemented. The two above-mentioned specimens, besides some superb pieces of Carthaginian pavement, were purchased for Mr. Edwin Long, R.A."

ALL lovers of the picturesque will regret to hear that the scene of the market at Siena is shortly to be transferred from the Piazza del Campo to the open field behind the Palazzo Pubblico, in the centre of which a common-place open erection, consisting of a roof of red tiles, supported by a series of red brick piers, has just been completed. This is the more to be regretted, when it is known that the chief reason for the change is not sanitary, or for extra convenience of buyers or sellers, but because, forsooth, of the untidy appearance it gives to the historic piazza. It is true that one of the most romantic sights in Italy is this piazza at night, when there is a full moon, the Palazzo Pubblico and the Mangia tower casting their great sprawling shadows even upon the houses opposite. Then the feeling of desolation and want of life is the great charm; but in broad daylight one will sadly miss the busy crowds of *contadine*, with their enormous-brimmed straw hats, seated at their awning-covered stalls, bargaining *altissima voce* with the matrons of Siena. This so-called improvement was initiated by the same member of the municipality who advocated the removal of the Early Renaissance chapel at the foot of the Mangia tower, in order to restore the symmetry of the Palazzo Pubblico. Fortunately, he did not carry the day in this suggestion, and now,—rest his soul,—he is removed from the affairs of Siena to another sphere, where it is to be hoped his Vandalisms may be forgiven him.

ANOTHER, and perhaps more famous market-place of Italy, has also suffered, viz., the Mercato Vecchio at Florence, the scene of many an exciting gossip in Medieval times, and once overlooked by the workshops of many world-renowned artificers, in particular the honest independent curt old smith, Niccolò Grasso, or Caparra as he was usually called, who executed, among many other well-known works, the spirited *bracciotti* at the angles of the Strozzi Palace. This piazza is now enclosed with a tall hoarding, behind which the myrmidons of the Florentine Hengler display their feats of horsemanship to the gaping public. Of yore it was certainly a very untidy and dirty quarter; but it was "picturesque dirt." Now, however, even that cannot be said for it,—even the delightful view of Giotto's Campanile and Brunelleschi's dome has been cut off by this hoarding. Surely the Florentines could find some open space on the outskirts of the town more appropriate for the site of a circus than a historical piazza in its very centre.

OF all things in the world to get into Chancery the last one would expect would be the ancient boat of Brigg. However there it is, and the dispute will probably give rise to some interesting legal question as to its ownership. Meanwhile it seems clear that it should become the property of the nation and be shown, without charge, to any one, and not, as at present, be the means of putting shillings into the pockets of some one. The proper resting-place would be somewhere near where it was found, for it is a mistake to carry off local relics to the British Museum or to London, instead of adding to their interest by the local characteristics with which they are connected.

WHATEVER may be the advantages, or disadvantages, of a building "boom," there can be no doubt that archaeologists should feel indebted to it for much valuable information, and for the discovery of many archaic treasures. There are few cities which

cannot show examples of this kind at some time or other, Rome being the latest, and, perhaps, the most fertile of any. On various occasions we have chronicled the finding of many specimens of statuary or mosaic pavement, not the least important of these being the bronze figures dug up during the excavations for the new Opera House in the Via Nazionale. Mr. Newton considers that one of these, which represents a boxer waiting his turn to be called into action, is of the school of Lysippus, and of a date between 300 and 200 B.C. Some day or other, when there is more money to spare in the coffers of the Roman municipality than there is now, a noble museum will be added to the interesting sights of Rome, filled with the discoveries of the last few years, but which are now, for want of room, stowed away under the care of Professor Lanciani.

EVEN in these poverty-stricken days it appears that money can be found for *bric-a-brac*, especially if the articles on sale can be proved to be of undoubted parentage and pedigree. At a sale the other day at the Hôtel Drouot in Paris, some astonishing prices were realised. Amongst them were a couple of vases of Urbino faience, which went for 67,000 francs; while a cup of the same date (at the commencement of the sixteenth century), with decorations attributed to Andreoli, was sold for 11,000 francs. Amongst other "unconsidered trifles" were an ovoid glass with painting in *grisaille* by Pierre Raymond, which went for 10,000 francs; a glass of Venetian blue for 13,000 francs; and a small copper with plaques of enamel for 8,600 francs.

THE *Allgemeine Zeitung* quotes a letter from M. Maspero reporting his progress in the great work of excavating the buried sphinx of Gizeh. The workmen have got down as far as the paws of the creature; on her right hand are a number of Greek inscriptions (*προσκυφήματα*) of imperial date. It seems that the paws were hewn out of a kernel of living stone, and built round with stone work; the surface of the stonework was painted red with articulations in yellow. The excavators have now got down below the level formerly reached by Mariette and Carglia, and they are now at work in layers of sand, which have lain undisturbed since the first centuries of our era. This sand has become exceedingly hard, and, in fact, has coagulated into a material more like stone. The face of the sphinx has always been exposed to about 15 metres, but we are glad to learn from M. Maspero that on laying bare the lower part the expression of the Sphinx has greatly gained in "serenity and cheerfulness." She has borne her long imprisonment well. M. Maspero still needs an additional 10,000 fr. completely to free this captive of the ages.

THE last number of the "*Notizie degli Scavi di Antichità*" reports the discovery of a mosaic of considerable importance at Chiusi. Some workmen came unexpectedly on the pavement in digging a watercourse at the foot of a hill near Monte Venero, on the property of Cav. Giovanni Paolozzi. The mosaic is in all 6 by 4 metres in size. The centre part represents a double hunting scene; in the top row are three stags pursued by one hunter armed with a spear, below is a boar pursued by two hunters armed respectively with axe and lance. The centre design is excellently preserved,—perfect, in fact, but for a few scratches made by the pickaxes of the workmen at the moment of discovery. It has been carefully taken up by the owner and removed to his private museum. The rest of the pavement is left *in situ*. It is the first piece of mosaic that has been found in the neighbourhood of Chiusi.

AT Messrs. Boussod & Valadon's rooms in New Bond-street there is, in addition to the collection of Dutch paintings we mentioned the other day, a collection of oil and water-colour drawings by Miss E. M. Osborn, illustrating the scenery of the Norfolk Broads. These show much artistic power and feeling,

\* Homer calls them *πολυδαίδαλοι*.

\* Roman remains at Carthage are found at depths of 3 ft. below the surface of the ground, Carthaginian at never less than 10 ft. (Davis).



and have a special interest from the peculiar character of the scenery. In "Belaugh Marshes" (4) we have a sunset over a network of watercourses which twist like a red ribbon through the landscape. We see the flat-bottomed Norfolk craft, built for navigating shallows, threading their way through the winding canals, coming down before the wind "On the Bure, Yarmouth" (21), or pursuing the apparently hopeless task of working to windward along a narrow channel which turns this way and that at every fifty yards, as in the "Breezy Morning, Belaugh" (11). A morning effect under the title "Gossamer" (7), with the swans coming along mid-stream in procession through the mist, is a peculiar and charming effect very well represented. There are twenty-two small oil paintings and about twice the number of water-colours, containing much that is worth looking at.

THE *Pall Mall Gazette* of Monday published an ill-tempered but amusing reply from Mr. Ruskin to some innocent evangelicals who asked him to subscribe to pay off the debt on Duke-street Chapel, Richmond. Why, he asked, did they build churches they could not pay for? Why not preach behind the hedges rather than run into debt? "and of all manner of churches thus idiotically built, iron churches are the damnablest to me." In the latter sentiment we are disposed inwardly to concur, though we do not wish to emulate Mr. Ruskin's peculiar and rather pronounced phraseology.

UNDER the heading "Naval and Military Intelligence," a communication appeared in the *Times* of the 9th which it is impossible for any who feel concerned in the efficiency of our marine artillery to read without a very disagreeable kind of interest. It is there stated that on the previous day "the barquette ship *Imprieuse* made a protracted and thoroughly satisfactory trial of her multifarious armaments and gun-mountings at Portsmouth." In the course of this "thoroughly satisfactory" trial it appears that at the first fire from the barquette gun at its extreme angle of (horizontal) training, the flash set on fire some of the ropes in the vicinity. In succeeding rounds "Several misfires occurred either from defective tubes or the results of insufficient handling, and the last round was considerably retarded by the giving out of the spindle by which the breech-piece is pushed into the breech." In succeeding trials of other guns "only a few misfires occurred," but on the starboard guns being fired with 50 degrees of training "the blast carried away several clutches and forced open one of the ports." This, we learn, is "not insignificant," as it shows that the blast "would probably prevent the 6-in. guns nearest the midship barquettes from being worked in action." If this is a "thoroughly satisfactory" trial, what is an unsatisfactory one like? Or was it a misprint, and should it have read "thoroughly unsatisfactory"?

#### WOOD CARVING, POTTERY, AND GLASS EXHIBITED IN INDIAN COURTS.

##### COLONIAL AND INDIAN EXHIBITION.

No nation in the world can surpass the inhabitants of India in skill and hand-cunning, and that patient industry which the savage exhibits in the carving of his canoe-paddles and war-clubs, though with the Hindoos (using this name in a general sense) this quality has been refined and directed to the best results by centuries of practice, and nowhere is this marvellous hand-cunning exhibited to greater advantage than in their wood-carving. The instinct of nearly all Oriental races is to decorate a surface by breaking it up, so to speak, with a more or less intricate pattern, often in slight relief, and by this means great richness of effect is obtained. The Hindoos have great fertility of resource in designing these diapers, witness some of the screens, which have hardly two panels alike, though the difference is only noticeable on close inspection, which will further reveal the fact that there

is a marked character and likeness running through all their work, the same *motifs* being introduced, with very slight variation, again and again. In giving a few illustrations of the Indian wood-carving we have endeavoured to select typical, interesting, and various specimens of their work,—specimens that may be taken as representative of what is best in Indian work.

Figs. 1, 2, and 3 are from the central pro-

we have often before noticed, we find well-known Classical *motifs* introduced again and again, and handled in a way characteristic of the workers. We give the palm to the Burmese for wood-carving, both for design and workmanship. There is a sideboard back exhibited, composed of interlacing scrolls, which might have been wrought by Grinling Gibbons himself. The Burmese are fond of grotesque heads, half animal, half human,



Fig. 1.



Fig. 2.



Fig. 3.



Fig. 4.



Fig. 5.



Fig. 6.

vinces. Figs. 2 and 3 are thoroughly characteristic in design and workmanship, the carving being in slight relief, having the appearance almost of having been laid on in the form of a fret. Fig. 1 is more elaborately carved, and is very rich and flowing in design, and withal simple, so that it is effective at a distance.

The remaining illustrations are from Burmah. The scroll-work in figs. 4, 5, and 6 is very finely carved in much higher relief than is usual with Indian work, and the design, too, is much more flowing and "Classical." In fact, in all Indian work, as

and several instances of these may be seen on the screens in front of their exhibit.

##### Pottery.

There is a good deal of painted pottery exhibited, and some of it is very excellent. The Hindoos, like the Chinese, possess the art of producing the best effect with one or two colours, blues being the favourite. The bulk of the pottery is decorated in a deep blue, with turquoise introduced into the background to give relief to the patterns. Sometimes a low-toned purple is sparingly introduced, but in the majority of cases only the two blues are used.





PATNA

GLASS





In selecting our illustrations we have been guided by two considerations,—beauty of shape and skillfulness of decoration. Most of the Indian shapes are graceful and effective, and admirably adapted for decoration, a most important consideration in painted pottery, and one not sufficiently studied by Europeans. Simple shapes are the most effective, and most of the shapes here figured are simple. The Indians are apparently more restricted than the Chinese in the matter of shapes, and the same form will be seen again and again in different sizes and with slight modifications. Figs. A to I, in the pages of sketches in this number, are from Mooltan, Punjab, and are entirely of native manufacture. The decoration will be found to consist of about three *motifs*, which occur in all their pottery. The decoration on figs. A and D is one type, that on E and the neck of B another type, and that on F and J another type. The beauty of this pottery is mainly due to the glaze, which gives a charming softness to the colours, and is in itself brilliant and soft without being "shiny." De Morgan in his tiles has perhaps approached nearer this kind of glaze than any other pottery painter in this country.

Fig. G is decorated with raised and incised ornament glazed with a soft yellow glaze. There is also a case of rather rude-looking pottery glazed with soft colour glazes, but they were not of sufficient merit to warrant us giving sketches of them.

Fig. I is part of a large vase, and shows clearly the type of ornament commonly used in this Punjab pottery. The outline is a deep purplish blue, and the background pale turquoise.

Figs. J and K are from Bombay. The decoration is in black on a peacock-blue ground, and the effect is very rich and unique. That in black on a green ground is not as satisfactory. The Bombay pottery is produced under the direction of the school of art, and some critics think that the work is in consequence less characteristic than that of Mooltan, for instance. There is a slight hardness in some pieces, we must admit.

Figs. L to S are from Jeypore. The decoration on Fig. O is very Persian in character. That on Fig. P is very daring, and is not ineffective.

The last three figs., T, U, and V, are from Rampore native state. Some of their pottery (figs. T and U) has a dark rich green ground with the decoration in white slip coloured turquoise. The effect is very striking. There is also some red terra-cotta pottery, decorated in slip, and coloured blue and turquoise, which has something fresh about it. All the pottery we have figured is painted under the glaze. Looking at Indian pottery generally, it will be noticed that the Hindoos prefer to space out the surface, and decorate the different spaces, to adopting the Japanese method of letting the decoration cover the surface without occupying the space to be decorated. Their decoration may be termed geometrical in character; there scarcely being a single piece painted in the free manner of the Japanese. The effect of their pottery is bold and effective, owing to its simplicity, and will well repay the attention of English designers and craftsmen.

#### Glass.

The only town exhibiting any notable glass is Patna, and we give sketches of five pieces to give an idea of the class of glass it is. The glass itself is both transparent and opaque, and varies from white to turquoise, blue, green, grey, yellow, and mauve. Some of it is fluted, but the bulk of it is plain. Two or three specimens are decorated with ornament in gold. Hindoo glass is of much less merit than the pottery, if this Patna glass may be taken as representative; and evidently glass is little used by the natives, who prefer pottery and metal work.

**The Institution of Civil Engineers.**—At the first meeting of the present Council of the Institution, Mr. H. L. Antrobus was re-appointed treasurer, Dr. William Pole, F.R.S., honorary secretary, and Mr. James Forrest the secretary. From a new edition of the list of members, corrected to the 3rd inst., it appears that there are now 1,558 Members, 2,187 Associate-Members, 499 Associates, 20 Honorary Members, and 910 Students, together 5,174, against 4,884 at the same date last year.

#### ARCHITECTURE AT THE ROYAL ACADEMY.—VII.

CONTINUING the subject of domestic architecture, we notice next No. 1,619, "Arundel and Fitzalan Houses, Arundel-street, W.C.," Mr. John Dunn. These are the group of chamber residences facing the Thames Embankment, which form a block of buildings in a very tame late Gothic style; they look better in reality, however, than in this weak and spotty drawing. No plan.

1,620, "St. Bride's Vicarage, Fleet-street," Mr. Basil Champneys. A pen elevation of the house of which we published a view in the *Builder* of May 22, with plans, which are not appended here. It is a successful reproduction of the London house of the eighteenth century, and is in keeping with its surroundings, but certainly looks tame enough in this line elevation. It is a pity the plans were not added, because they show very good practical dealing with an awkward and restricted site.

1,621, "House at Bickley, Kent," Mr. Ernest Newton. A very homelike house in cottage style, simple and unaffected, shown in a good pen drawing, and with the distinguishing merit of having a plan appended.

1,624, "Mourne Park, County Down," Mr. John Birch. What is called an "imposing pile," shown in a large and effective pen drawing, a square tower with angle turret in the rear standing boldly in the centre of the group of building. As far as one can see, it does not look interesting in detail, and seems to have no central idea in its design; a number of parts put together. No plan.

1,626, "Abbeystead, Wyresdale, Lancashire," Messrs. Douglas and Fordham. A pleasantly-designed domestic Gothic house, with a good deal of character; long, low, diversified in the outline of the plan, which is not given plan-wise, however, but can only be judged of from the perspective. Behind the domestic-looking façade (under part of which runs the carriage-drive beneath a segmental arch), is apparently a square "keep," with a castellated turret at the angle. This, if modern, is an anachronism, though it certainly serves to contrast very well with the character of the front buildings. A plan might have shown us its justification, real or supposed.

1,629, "New House at Scarborough," Mr. E. J. May, looks like a sketch of an old tumble-down house, selected from the point of view of the picturesque. If the size of the windows is correctly represented, the "new" house must be decidedly deficient in light and air.

1,634, "Saltskog, near Stockholm, Sweden," Mr. Howard Ince. Apparently a timber house, after the (constructive) manner of the country, with a certain amount of English feeling imported into it. The balconied recess under the gable is a good feature. Sketches of the hall and of the staircase-window are added. The design is picturesquely grouped, and there is more variety of incident in it than is usually found in a house of that size. No plan.

1,637, "Houses at Barnes Common," Mr. Herbert Read. Hung high; apparently picturesque, but rather too manifestly intending to be so. No plan.

1,640, "New Studios, South Kensington," Mr. W. Flockhart. There is no doubt a great deal of character in this front, particularly in the treatment of the windows, which, in the first floor, are mullioned five-lights, with a decorative panel formed over three of the lights, above the line of the window-head. The "character" in the twenty-twenty gables is overdone; the projecting curls look as if they would be certain to chip off some day. No plan. The drawing (pen and ink) is a bold and effective one.

1,645, "Rebuilding of 125-129, Mount-street, Grosvenor-square," Mr. W. H. Powell. Skied, and difficult to see. Apparently a rather "broad" treatment of the mass of building in a dark-and-light-stripes manner (what profane persons used to call the "streaky-bacon style"), but the heavy façade has little but plate-glass to stand upon in the ground story. No plan.

1,649, "Residence, Shrewsbury," Mr. T. M. Lockwood. A brick and half-timber house, got up with great propriety, but without a touch of originality anywhere. Drawing mannered and hard, and makes us wonder, like some others, why it was placed on the line. Another view of apparently the same house is shown in No. 1,663, which appears more interesting, but is hung too high to be seen well. No plan.

1,650, "Croft Stables, Stanstead, Essex. Back View," Mr. W. D. Caros. The front view is shown in No. 1,657. Very good drawings, especially 1,657, which would have been much more worth placing on the line than some that enjoy that honour. Buildings picturesque decidedly; how far in detail suited to their practical requirements we cannot, of course, judge very well from picturesque drawings. The author is to be commended for appending a plan, in which he shows the harness-room in the right place, adjoining, but not opening into, the stable. Whether it is advisable to have so close a communication between the coachman's parlour and the stable may well be questioned, and the small staircase and partition wall from it, jutting into the stable, makes the way to number four stall rather awkward steering for the horse. From the scale it appears that the stable-door for the horses is only three feet wide,—much too narrow. Very few of the "picturesque" architects really know how to build stables.

1,652, "Beeston Lodge, Cheshire," Messrs. E. Salomons and John Ely. This house, of which we published a view and plan some time ago, is shown in perspective in one of the best water-colour drawings in the room; a trifle heavy, perhaps, but very thoroughly worked out. The house is red brick with stone dressings, and stone mullioned windows below, with black-and-white work above; this upper portion over-arching slightly. The roofs are red tiled. The whole is exceedingly effective and rich, and the most of this has been made in the drawing. The design has, however, the defect of a certain want of refinement in detail, and a somewhat too obvious effort at effectiveness; the authors do not seem to have quite the pure gospel, so to speak. Still, it is a country house out of the common way, and evidently carried out with great care, and the plans, of which ground and first-floor are appended, are very good. Though on somewhat irregular lines, they are nevertheless convenient, and the rooms well-arranged in regard to each other, and the rooms and corridors are full of little unexpected points, embayments, flirtation corners, &c., which add so much to the interest of an interior, we do not mean specially in the view of flirtation, but for general interest and variety. A whist-gallery is placed at one end of the billiard-room, raised a few steps; this may have been the wish of the owners; we should not think it the most favourable position for playing anything worth calling whist, with the click of the billiard-balls and the calling of the score going on below, not to speak of the temptation to look away from the little green cloth to see what is the progress on the large one. The morning-room would be rather deficient in light, unless it gets a full level eastern sun, which there is nothing to show (*N.B. Points of the compass should be shown on plans*, especially those of dwelling-houses). But on the whole this is a noteworthy house. We might, for all we know, have been able to say the same of No. 1,607, which is a still better water-colour drawing, occupying a similar central position on another wall, had the authors of that also allowed us the chance by showing a plan; but they gave us nothing but a picture. A dwelling-house, of all other buildings, without a plan is only half, say only a quarter, illustrated; it may be a pretty house, but whether it is a good or a bad one no one can say.

1,670, "Wortley Vicarage, Yorkshire," Mr. Basil Champneys. A house with mullioned windows and Elizabethan curved and recurved gables, presenting no special features. The pen perspective is very spotty in effect, and produces the impression of the grounds being neglected and the place deserted. No plan.

1,673, "Houses in Cadogan-square," Messrs. Ernest George & Peto. A picturesque brown-tinted drawing (published in the *Builder*, of May 15) showing houses decorated with flat scroll ornaments in brickwork, and rusticated pilasters standing on corbels, and with no meaning or architectural function of any kind; but this is the fashion now, and the authors cater for it better than most of their contemporaries, though they can do much better things than this. No plan.

1,674, "Proposed Restoration of Glenbucket Castle, Aberdeenshire," Mr. R. T. Blomfield. A sketch should have been given showing the present condition of the castle; it is impossible otherwise to form a judgment about it as a restoration. The drawing shows corbelled out angle turrets, square and circular, after the



ancient Scotch manner, and an effective arrangement of windows under the eaves of the roof—not, we think, in the ancient Scottish manner, but effective nevertheless. No plan is given; in fact, as a restoration of an ancient dwelling-house for modern use it is impossible to judge of it at all. It is a view of a modern-antique castle, and that is all.

1,675, "Wedderburn House, Hampstead," Mr. Horace Field. There is nothing objectionable in this; but what, in the name of goodness, are the claims of either drawing or design to be hung on the line? Who has been responsible for the hanging?

1,676, "Proposed House, Beckenham-place Park, Beckenham," Mr. John Ladds. A rather attractive domestic Gothic house, but with no particular principle of design manifest in it. The author is to be credited with the unusual merit of having appended plans; and perhaps it is rather unkind in the same breath to find fault with them; but while the drawing-room, library, and billiard-room form a connected suite, the dining-room seems unnecessarily thrust away from them; and, in spite of its contiguity to the kitchen regions, there is no way for the dinner (as far as we can see) from the kitchen to the dining-room except through the cut-off door in the passage, and in full view of the main hall and staircase. A serving-dormer may be intended, but is not shown. The two inner angle faces of the main hall also are rather shams, to produce an octagon which does not arise naturally out of the planning of the building.

1,679, "Stowell Park, Gloucestershire. North and South Elevations, Restorations, and Additions," Mr. John Belcher. Neatly-drawn elevations of an old house, with portions in section, the meaning and object of which are, in the absence of a plan, absolutely unintelligible.

1,680 and 1,683, by Mr. Basil Champneys, are small pen sketches of various houses at Sunningdale, of no very special character, but quiet and domestic looking, which is probably what was aimed at. Wonderful to relate, plans are appended to all of them, in a sketchy but sufficient manner,—a fact which leaves us too surprised and impressed to make any further notes this week.

#### THE ANNUAL REPORT OF THE METROPOLITAN BOARD OF WORKS.

The Annual Report of the Metropolitan Board of Works, for the year ending December 31, 1885, has just been issued, and it forms a record of a vast amount of heterogeneous work which has been done, and on the whole done well, by the Board,—which, whatever the anomalies and defects of its constitution, is nevertheless the only body exercising municipal authority (however limited to certain functions) over the metropolis as a whole.

With regard to sewerage and drainage, the Board has been engaged since the year 1879 in constructing in various parts of London additional large sewers by way of supplementing and relieving some of the sewers of the main drainage system, which in times of heavy rain were found to be inadequate to carry off with sufficient rapidity the enormous quantity of water which found its way into them. At such times the sewers were apt to overflow, greatly to the inconvenience of the inhabitants of some of the low-lying districts, and the new relief sewers have been constructed in order that the storm water may be more rapidly carried off, so as to prevent the occasional floodings. The new main sewer from Roehampton-lane, Putney, to the Clapham-road, with branches running into it at various points, is still in course of construction. The contract price for these works, commenced in 1882, is 151,995*l*. The new sewers for the relief of the Ranelagh and King's Scholars' Pond sewers, commenced in 1883, are virtually completed, the price for which the work was undertaken being 96,300*l*. To relieve Holloway and its neighbourhood from flooding, it was deemed necessary to make a new sewer, 17,700 ft. in length, commencing in the Holloway-road. A tender to execute these works for the sum of 78,509*l*. was accepted by the Board in November, 1884, and a total length of about 10,000 ft. has been completed. A new sewer at Eltham, which has cost 23,500*l*.; one at Lee, costing 5,336*l*.; and two at Hammersmith, costing together 8,353*l*., have also been completed; and the Queen's-road, Dalston,

passing along Great Cambridge-street to the Middle Level Sewer in Bethnal Green-road, was commenced in February, 1885, the contract sum being 19,850*l*.

With regard to the sewage and the river Thames, the Report details the various steps which have been taken by the Board consequent on the report of the Royal Commission on Metropolitan Sewage Discharge, but this portion of the report is now "ancient history," as the subject has been prominently before the Board on two recent occasions, when we published full accounts of the Board's proposals.\*

Having chronicled the steps taken by the Board to carry out the provisions of "The Metropolis Management (Thames River Prevention of Floods) Amendment Act," which empowers the Board to require the wharfs, walls, and banks of the river Thames within the metropolis to be so raised as to prevent the overflow of the river, the Report goes on to refer to the metropolitan street and other improvements already carried out or in progress. At the date of the report the Board was still engaged in acquiring the property required for the formation of the new street from Tottenham Court-road to Charing Cross, authorised by the Street Improvements Act, 1877, and during the year claims to the amount of 160,088*l*. in respect of the property so acquired had been settled.

With regard to the operations of the Board under the Artisans' and Labourers' Dwellings Improvement Acts, the Board reports that only one official representation had been received by it during the year. The blocks of buildings already erected in the metropolis upon ground acquired and cleared by the Board under the powers of the Acts are 221 in number, and the number of persons housed in them is 21,678.

The Act of Parliament which empowered the Board to acquire and maintain for the free use of the public most of the bridges over the Thames within the metropolitan limits was passed in the year 1877, and the Report details the operations of the Board under the Act during the past year, and refers to the proposed establishment by the Board of ferries or other means of cross-river communication below London Bridge.

The parks, commons, and open spaces now under the Board's control have a total area of 1,834 acres, the largest items being Blackheath, 267 acres; Hampstead Heath, 240 acres; Clapham Common, 220 acres; and Wormwood Scrubs, 198 acres.

Having given a *résumé* of Bills in Parliament promoted or opposed by the Board, the Report gives an account of the present position of the Metropolitan Fire Brigade, the total strength of the force being, at the date of the Report, 589 officers and men. There are 55 fire-engine stations, 26 street stations, 127 fire-escape stations, 42 land steam fire-engines, 87 6 in. manual engines, 37 small manual engines, 3 self-propelling steam fire-floats for river service, 4 steam tugs, 4 steam fire-engines on barges, 144 fire-escapes, 5 long fire-ladders, and 4 vans to carry the same, and 131 horses. The fires of 1885, compared with those of 1884, show a decrease of 19, but, compared with the average of the last few years, an increase of 441. The Board call attention to the fact that the expenditure upon the Fire Brigade in the year 1884 was found to be in excess of the income by 10,854*l*. 17*s*. 7*d*., and they point to the necessity of increasing the limit of that portion of the consolidated rate applicable to fire-brigade working expenditure from one halfpenny in the pound on the gross annual value of property to one penny in the pound on the net or rateable value. They also ask for increased contributions from the insurance offices.

With regard to the water supply of the metropolis, the Report chronicles the gradual extension of the constant-supply system and the fixing of fire-drains.

The Board's powers and action with regard to gas-testing; tramways; telephone and telegraph wires; the prevention of the spread of cattle diseases; the inspection and registration of dairies, cowsheds, and milk-stores; the control of slaughter-houses and offensive businesses; the storage and transit of explosive substances and petroleum; and the supervision of "baby-farms" under the "Infant Life Protection Act, 1872," are all set forth in the Report, and their mere enumeration is enough to show

how many really extraneous duties,—duties never contemplated when the Board was instituted,—have been thrust by Parliament upon the Board in the absence of any nearer approach to a metropolitan municipality.

When we turn to the financial transactions of the Board, we find that its revenue is equal to that of many a kingdom. The Board's expenditure during the year 1885, including 1,486,592*l*. advanced on loan to other local authorities, 1,197,892*l*. invested in Treasury Bills, and 225,539*l*. applied to the reduction of debt, has amounted to 5,543,181*l*. of which 1,644,280*l*. has been defrayed out of money raised by the issue of Metropolitan Consolidated Stock.

The Report details at length its procedure in the supervision of streets and buildings under the Metropolis Management and Building Acts, and the appendices include the reports of the Engineer and Superintending Architect on the work done in their departments during the year. From the report of the Superintending Architect we learn that the total number of building operations (for the year 1884) was 26,363, including alterations, the amount of fees received by the District Surveyors in respect of the same being 46,792*l*. 11*s*. 6*d*. It seems that the difference in the value of the several districts is considerable. The gross fees received in thirty-nine districts during 1884 varied from 22*l*. to 592*l*. In two of the districts the receipts did not amount to 100*l*. each; in four districts the receipts were less than 300*l*. each; in nine less than 400*l*. each; in eleven less than 500*l*. each; and in thirteen less than 600*l*. each. In thirty-one districts the receipts ranged from 608*l*. to 2,337*l*.

#### COMPETITIONS.

*The University College of Wales, Aberystwyth.* We are informed that the Council of the College have awarded the premiums offered for the best three designs for new buildings at Aberystwyth in the following order: First prize of 100*l*. to Mr. Frederick Boreham, F.R.I.B.A., Finsbury-pavement, E.C.; second prize of 50*l*. to Messrs. Seward and Thomas, St. John's Chambers, Cardiff; and the third prize of 25*l*. to Mr. T. G. Williams, of Liverpool. The council, before adopting any of the plans referred to, have asked Mr. J. P. Seddon to prepare designs showing how the old building may be adapted to meet the requirements laid down when the specifications for a new college were considered. The ultimate decision as to whether the remains of the old college, of which a considerable portion escaped injury during the late fire, will be utilised, or an entirely new college be built, will depend mainly on financial considerations.

*Harrogate Bath Hospital.*—The Governors of the Bath Hospital and Convalescent Home at Harrogate, having decided on erecting a new building, recently instituted a limited competition, and appointed Mr. Waterhouse, R.A., assessor. They invited seven architects to send in designs, and Mr. Waterhouse decided in favour of that submitted by Messrs. Thomas Worthington and J. G. Elgood, of Manchester, who have received instructions from the committee to prepare the necessary working drawings, &c., for its erection. The outlay contemplated is about 17,000*l*.

*A New Building Estate in Surrey.*—In the neighbourhood of Woking, and within easy distances of the St. George's Hills and the rivers Wey and Thames, another large estate, about 60 acres, has been laid out for building purposes. The estate is the joint property of Mr. Alderman Norton, of Poole, and Mr. Alfred Gale, and is situated in the centre of a beautifully-wooded surrounding country, principally consisting of fir-groves and heaths. The roads have been laid out. The other works have been executed from the designs and under the superintendence of Mr. H. Humphrey Rumble, C.E., and building operations have been already commenced.

*Metropolitan Board of Works.*—We understand that among the numerous candidates likely to offer themselves for the post of Superintending Architect to the Metropolitan Board of Works is Mr. Gordon Smith, the present architect to the Local Government Board.

\* See *Builder*, pp. 457, 506, ante.



ELECTION OF TWO DISTRICT  
SURVEYORS.

At the meeting of the Metropolitan Board of Works, on the 4th inst., the Board proceeded to the election of two District Surveyors for Chelsea, the old district having been, by resolution of the Board, divided into two (North Chelsea and South Chelsea), after the death of Mr. Sancton Wood. There were thirty-two candidates for the two appointments, viz., Messrs. T. Batterbury, H. H. Bridgman, H. Cheston, S. Flint Clarkson, P. Cowper, F. E. Eales, J. S. Edmeston, G. Edwards, R. F. C. Francis, W. Grellier, F. W. Hamilton, J. Hamilton, J. Hamilton-Gordon, W. J. Hardcastle, A. Harland, E. Haslehurst, A. Heyes, G. Inskip, G. Jackson, G. A. Lean, H. Lovegrove, T. E. Mundy, R. C. Murray, W. Hilton Nash, H. A. Pelly, C. G. Saunders, M. L. Saunders, W. Smallpeice, L. Solomon, W. L. Spiers, W. H. Stevens, and H. W. Stock.

The preliminary voting to reduce the number of candidates to six was, for each appointment, taken by show of hands, as has been usual; but Mr. Williams, no doubt in view of certain circumstances referred to by us on the occasion of the last election,\* moved as an amendment on the usual procedure that the subsequent voting on the reduced number of candidates be taken by ballot. This was negatived on being put to a show of hands, but a division being demanded, the amendment was carried by 28 to 23. After a long discussion as to the way in which the vote should be taken, it was resolved, on the motion of Mr. Lindsay,—

"That after having taken a show of hands for the first six candidates, each member write the name of the candidate he wishes to record his vote for on a piece of paper, and tender the same to the Clerk, and that one or more ballots be taken until the candidates are reduced to one candidate with a majority of the votes, and that the candidate be elected to the office, the same course to be taken in electing both officers."

## North Chelsea.

The following were the six candidates selected in the preliminary voting, viz., Messrs. T. Batterbury, 30 votes; S. Flint Clarkson, 40; J. S. Edmeston, 29; W. J. Hardcastle, 38; T. E. Mundy, 33; and M. L. Saunders, 32. The following shows the result of the subsequent voting, the balloting papers being deposited by the members of the Board in a mahogany box (marked "Tenders") which was taken round by an officer, the papers being counted and the name of the candidate on each called out by the Clerk:—

	First Ballot.	Second Ballot.	Final Ballot.
Batterbury .....	4	—	—
Clarkson .....	19	23	25
Edmeston .....	5	7	9
Hardcastle .....	7	6	7
Mundy .....	6	6	—
Saunders .....	6	5†	—
	6	5†	—

Mr. Clarkson, having thus received a majority of the votes cast, was declared to be duly elected, and he briefly thanked the Board.

## South Chelsea.

The six candidates selected by show of hands for this appointment were Messrs. J. S. Edmeston, 25 votes; W. J. Hardcastle, 26; H. Lovegrove, 21; T. E. Mundy, 27; M. L. Saunders, 24; and W. L. Spiers, 16.

The balloting gave the following results:—

	First Ballot.	Second Ballot.	Final Ballot.
Edmeston .....	9	10	10
Hardcastle .....	9	8	7
Lovegrove .....	1	—	—
Mundy .....	11	15	22
Saunders .....	5	3†	—
Spiers .....	6	3†	—

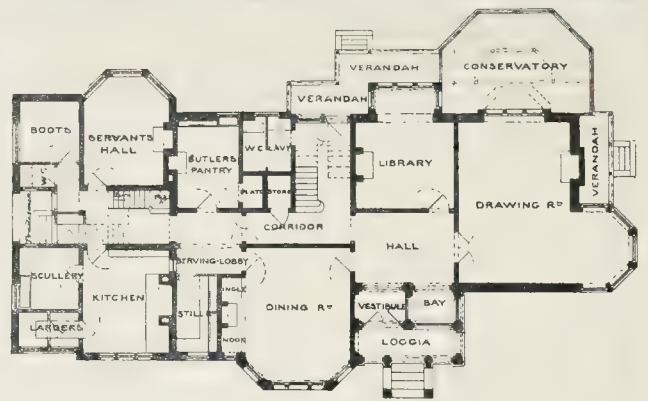
Mr. Mundy, having received a majority of votes, was declared to be elected, and he also thanked the Board.

The innovation in the method of election, however necessary it may be, caused some delay and confusion, and it is therefore satisfactory to know that at the meeting of the Board to be held this Friday, June 11, Mr. Fowler will move, "That it be referred to the Works and General Purposes Committee to consider and report as to the future mode of conducting the elections of District Surveyors."

\* Builder, pp. 182, 188, and.

† Both these candidates were, by resolution of the Board, struck out together.

‡ Struck out together by resolution.



GROUND FLOOR PLAN

Scale of 1" = 20 Feet

"Hatton House," Westgate-on-Sea.—Plan.

## Illustrations.

CHURCH OF THE SACRED HEART,  
LIVERPOOL.

THIS church, designed by Messrs. Goldie, Child, & Goldie, of Kensington-square, was commenced in the spring of last year, and is now rapidly approaching completion. It stands on very high ground, and is consequently much exposed to wind and weather; hence the plan adopted for the atrium and principal entrance, which had to face the front and stand below it.

The confessionals and priests' corridor were specially planned to meet special requirements, and to afford easy and direct communication between the presbytery (already built), the sacristies, and committee-room.

The chancel might have been deeper with additional effect, but expense and "utility" were special instructions to the architects. A substantial working and inexpensive church with tracery was the ideal, and this it professes to be, and yet nothing is scamped.

The walling is of Yorkshire rock-faced stone, with dressings of selected Raneorn stone of the neighbourhood, and beautifully built. All the arch stones, dressings, and mouldings of the interior are in stone comparatively simple, but carefully worked out and executed.

The contract price is a very low one, and great credit is due to Mr. Fogarty, the contractor, for the thorough manner in which he is carrying out his agreement, under the practical superintendence of Mr. Hinsley, the clerk of the works.

## NEW BOARD SCHOOLS FOR LONDON.

THE Hackford-road Schools, Brixton, of which we give an illustration, are being erected by the School Board for London from the designs of the Board's architect, Mr. T. J. Bailey. They are planned to accommodate 1,000 children, with power of extension to 1,400, and the amount of the contract is 10,249l. The builder is Mr. Henry Hart. The drawing from which the illustration is taken is in the Architectural Room at the Royal Academy.

The Berner-street Schools, Whitechapel, are also being erected by the School Board for London from the designs of the Board's architect, and are planned to accommodate 1,200 children; the amount of the contract is 13,300l. The builders are Messrs. Atherton & Latta.

## ADDITIONS TO "THE PARK," LEDBURY.

"The Park," Ledbury, is a manorial house of seventeenth-century date, and stands at the outskirts of the village, at the corner of the main street and the road which leads to Tewkesbury. The original building is shaped on plan, and like other buildings of the village of which it is the most important, it is built of brick (rough cast on face) and timber,

the portion facing the main street having five overhanging gables, which have a striking effect as seen from the market place. About thirty or forty years ago a wing was added towards the lawn, so that the house now forms three sides of a square. The present alterations are being carried out in the courtyard, with the addition of a new wing in continuation of the old portion which faces the side street. The style of the old house, which is the prevailing style of the more interesting parts of the village, is being observed in the new work, all that is shown in the present view being new. The architects are Messrs. Richard Coad & J. M. MacLaren.

## "HATTON HOUSE," WESTGATE-ON-SEA.

THE above house, of which we give a view in this week's issue, is now in course of erection and rapidly drawing to a finish at the above-named sea-side place, and is carried out from the designs and under the superintendence of the architect, Mr. John Thomas Wimperis.

It is built with hollow walls faced with red bricks with stone dressings.

The dining-room, entrance-hall, &c., are fitted with old oak wainscoting with pilasters, doors, over-doors, mantels, &c., and recessed side for fireplace.

The ceiling is in ornamental fibrous plaster with large ribs and panels.

The library is fitted with walnut panelling, doors, and chimney-piece, with panelled ceiling, and the drawing-room with pine dados, and carton pierre chimney-piece and ornamental fibrous plaster ceiling, with handsome over-doors and dressings.

The staircase is in old oak with close string, carved and enriched balustrades and newels, and enriched soffits.

There are parquet floors to all the principal rooms and inner hall, and mosaic floors to all the passages and lobbies.

The stables are shown in the drawing and are just finished and provided with all the best and most approved fittings.

These latter buildings are executed in red brick, flint work, and timber.

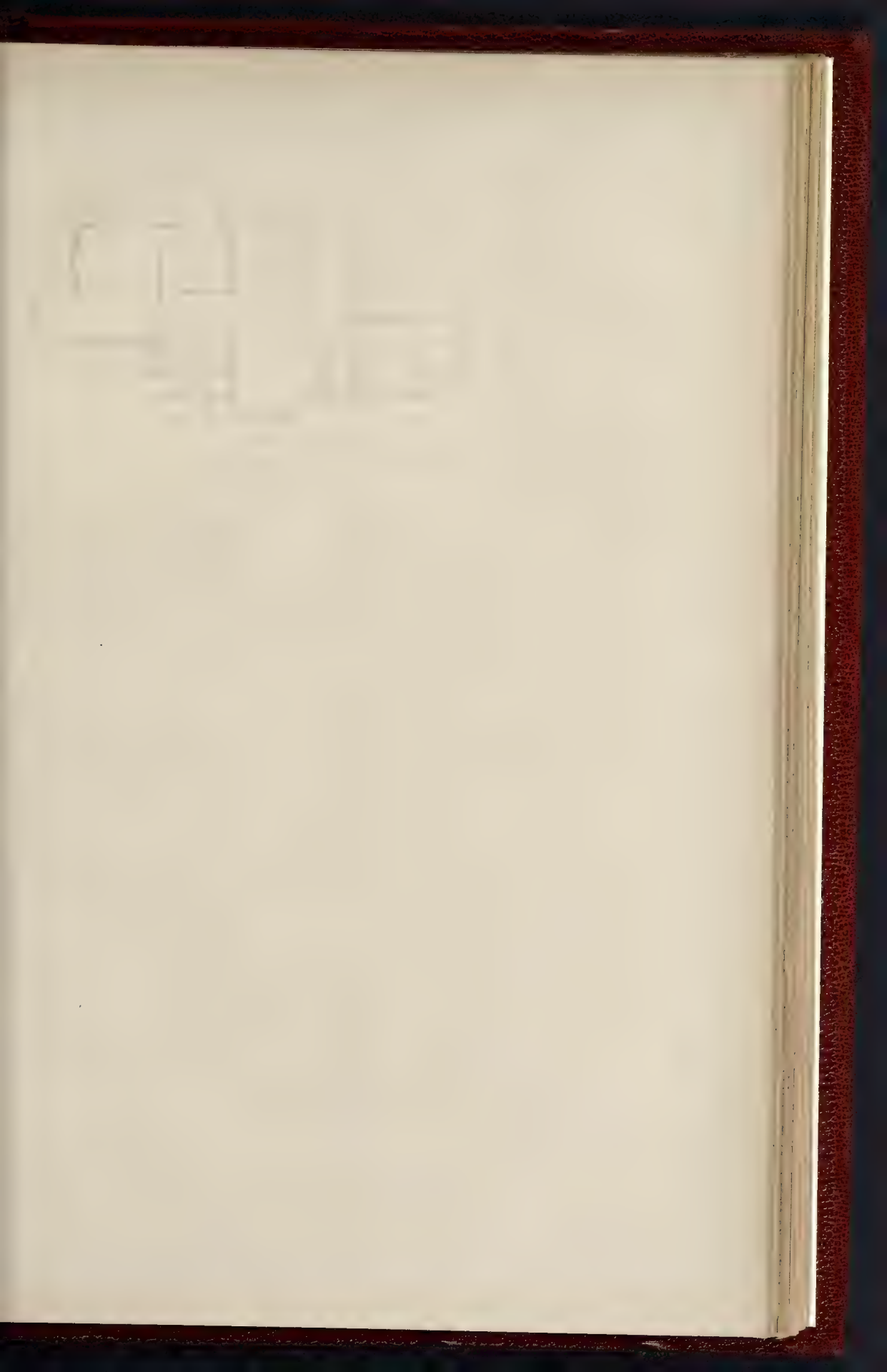
Messrs. Wm. Corbett & Co., of Westgate and London, are the builders. The carrying is done by Mr. Anstey, and the ornamental ceilings by Messrs. G. Jackson & Sons.

## TOMB OF BISHOP WM. DE LA MARCHIA.

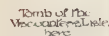
"A.A." TRAVELLING STUDENTSHIP DRAWINGS.

THIS tomb is situated in the centre of the south transept of Wells Cathedral, and is composed of Douling stone. Considerable remains of colour still exist. All the foliage was gilded on a red ground. The diapered spaces are alternately red and green; the figures at the back are treated in red and green also. For further notes on colour, see details.

Wm. de la Marchia died in 1302. The beautiful octagonal chapter-house, with its approaches, is said to have been built during





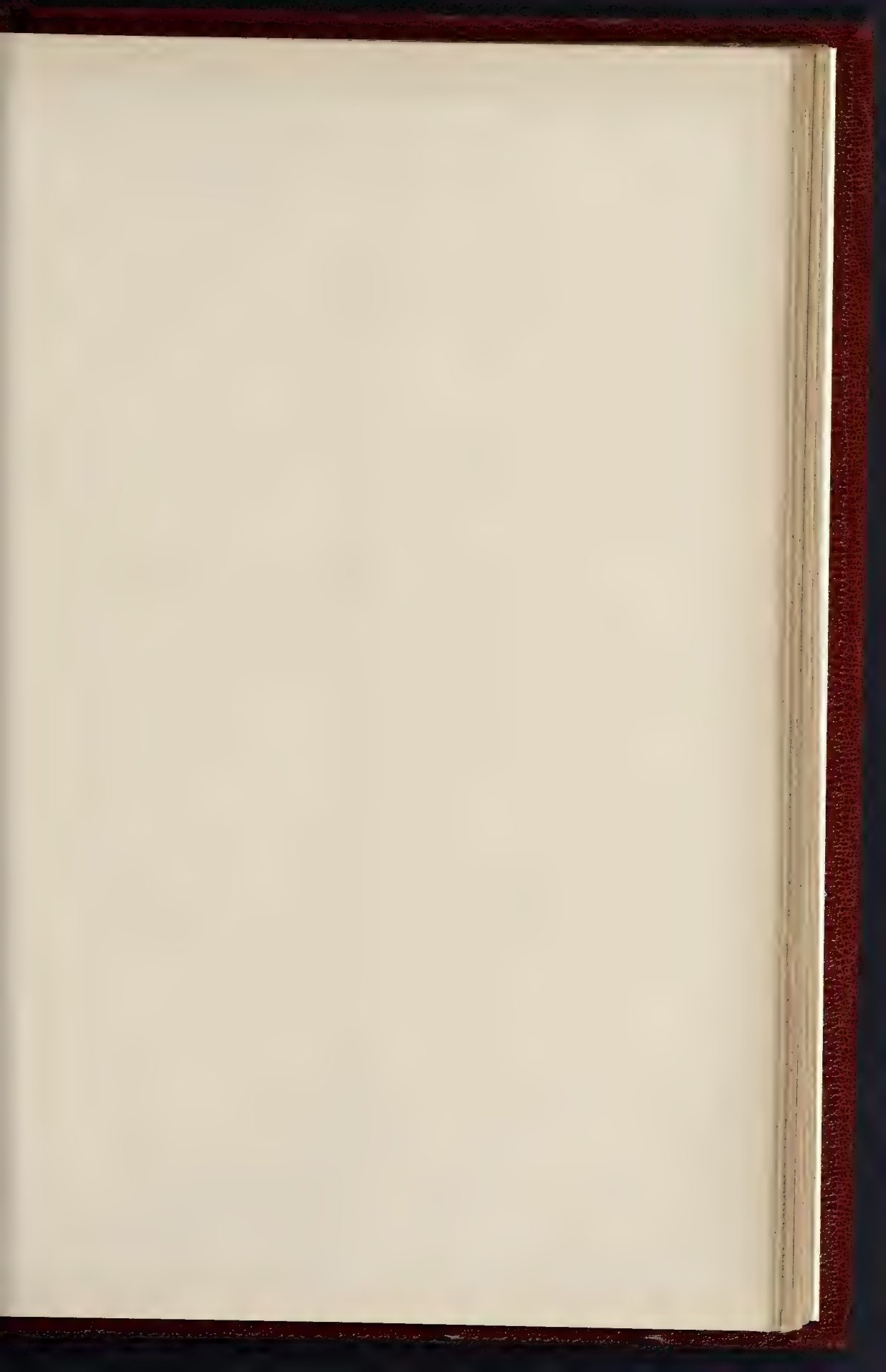


Sample of 12/1/1

4102 J. Neurosci., July 26, 2006 • 26(30):4095–4102

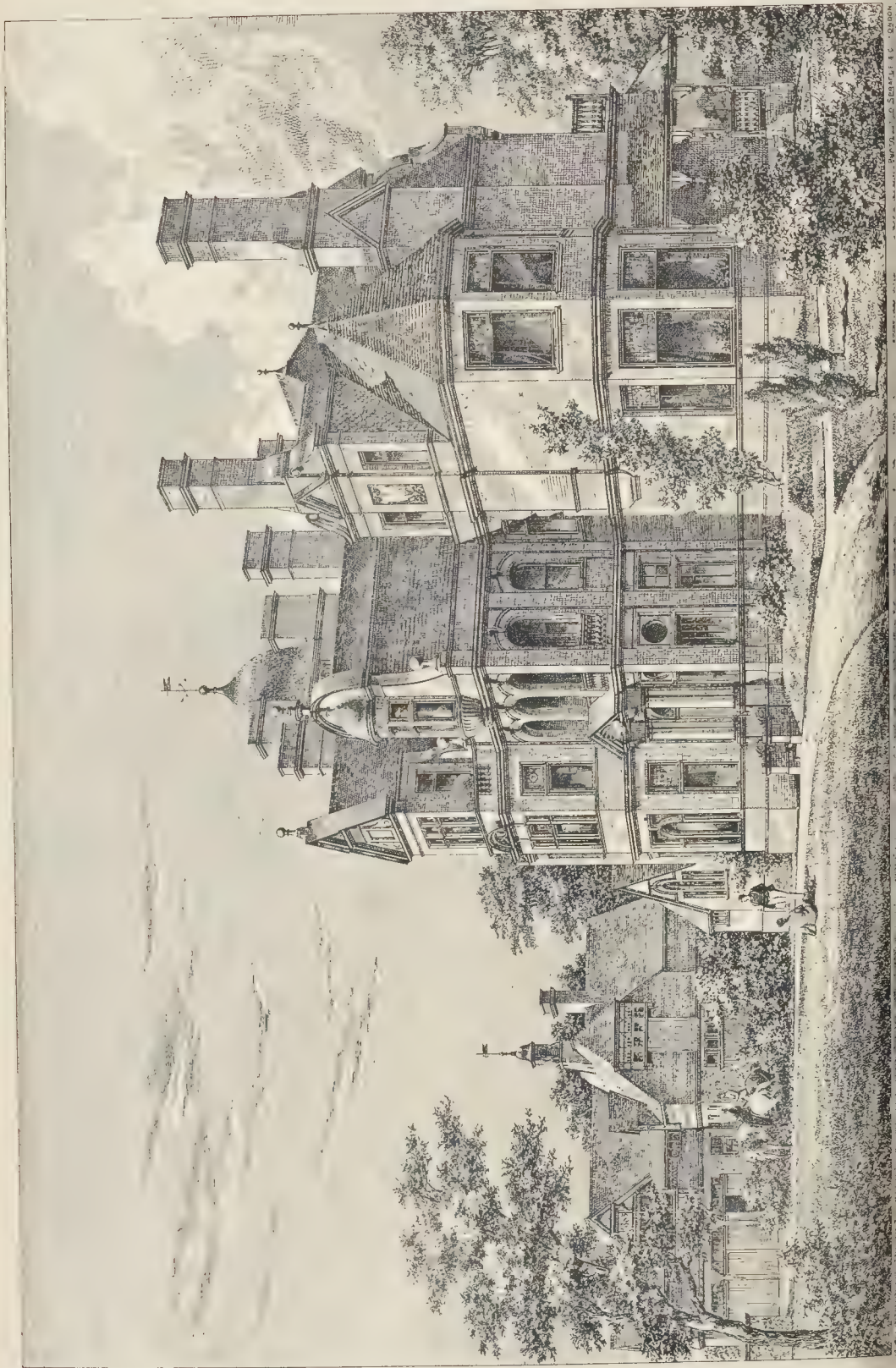
AWARDED A.A. TRAVELLING STUDENTSHIP, 1886

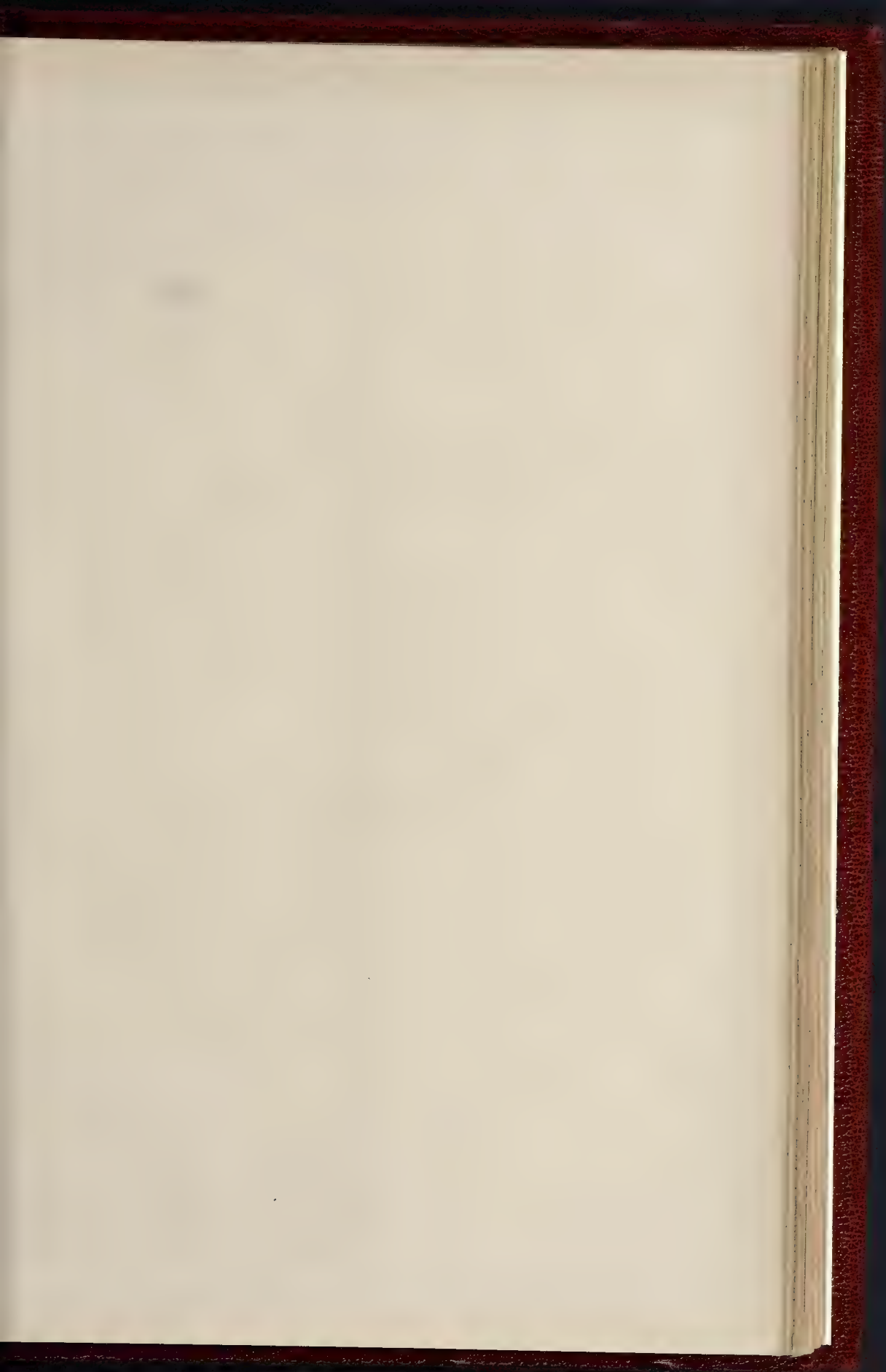
\* F. Kell Photo-Lith & Printer 8 Furnival St. Holborn, Lond.





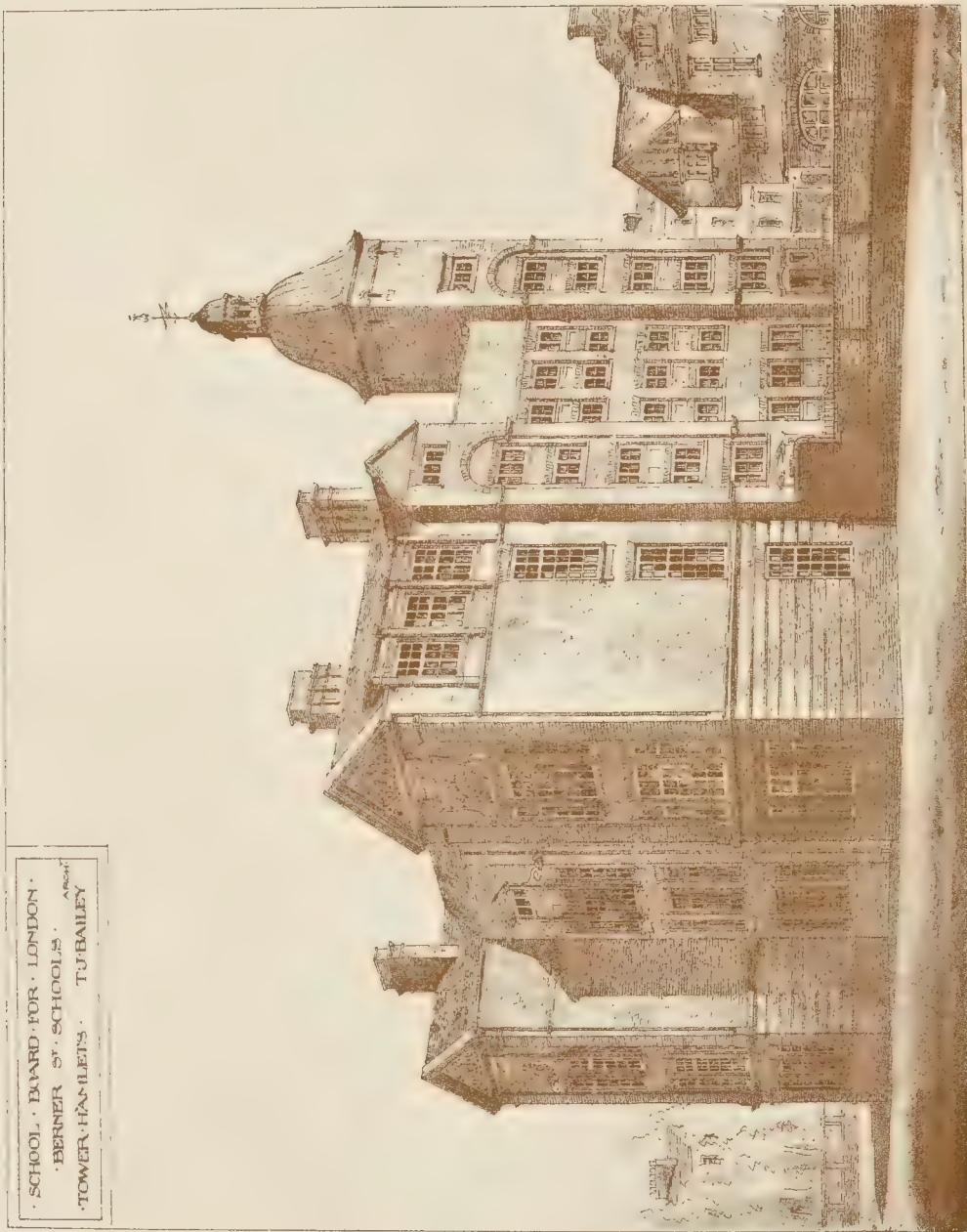
THE BUILDER, JUNE 12, 1886



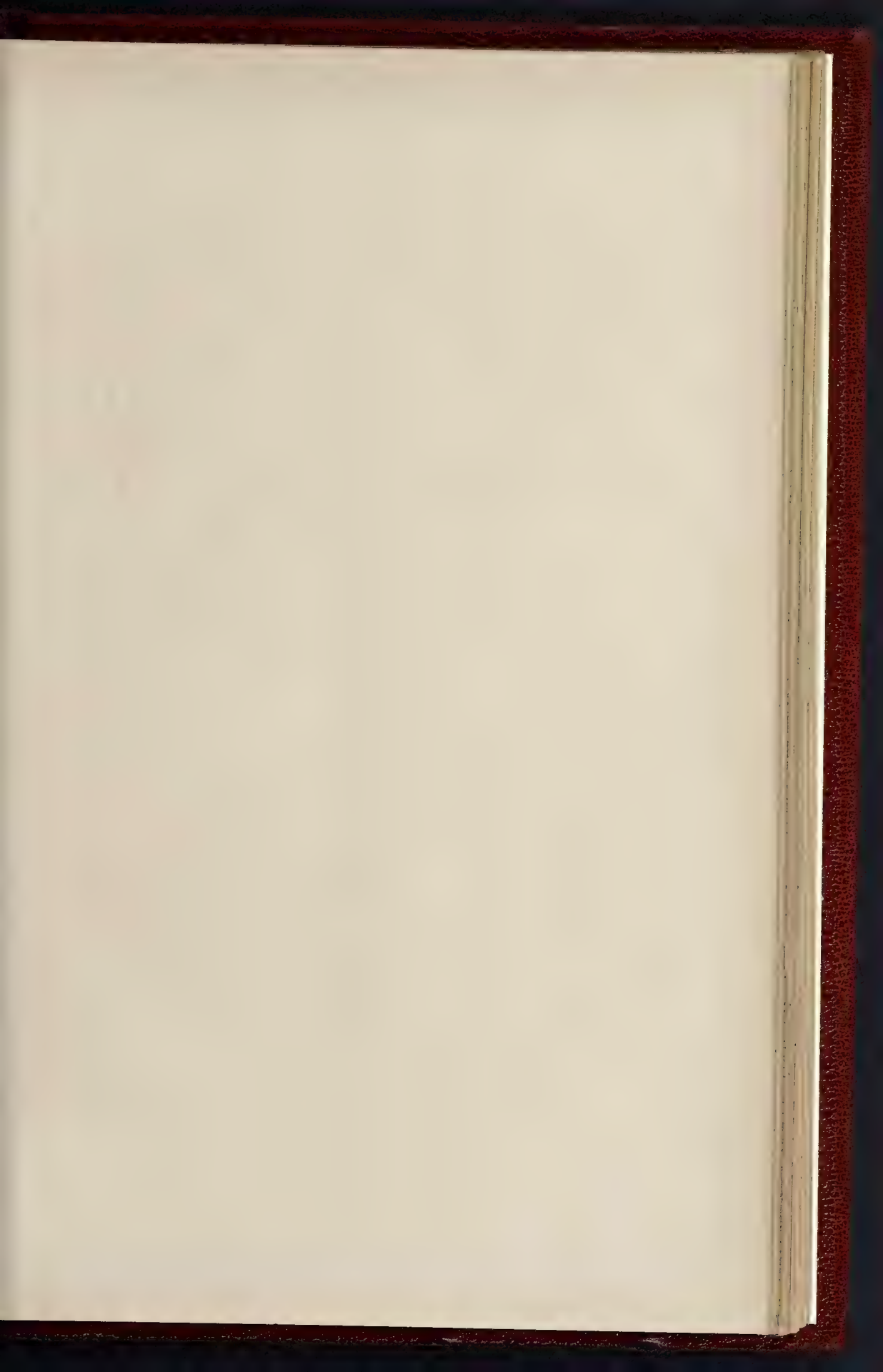




THE BUILDER, JUNE 12, 1886.



SCHOOL BOARD FOR LONDON.  
BERNER STREET, TOWER HAMLETS.  
ARCHT.  
T. BAILEY



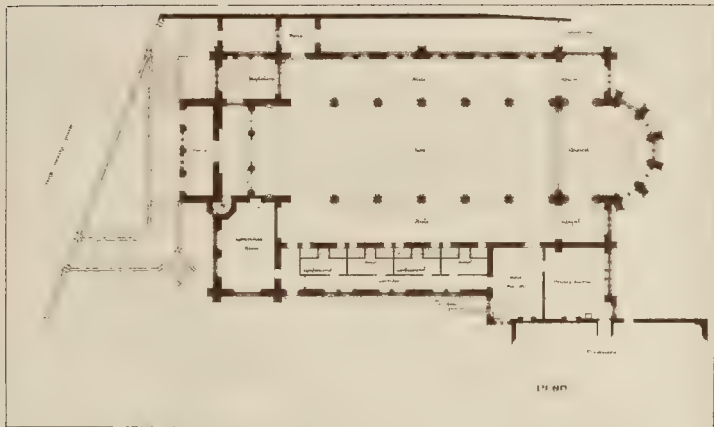




NEW ORATORY OF THE SACRED HEART, LIVERPOOL — MESSRS. GOLDIE, CHILD & GOLDIE, ARCHITECTS.

INTERIOR VIEW.

THE BUILDER, JUNE 12, 1886.



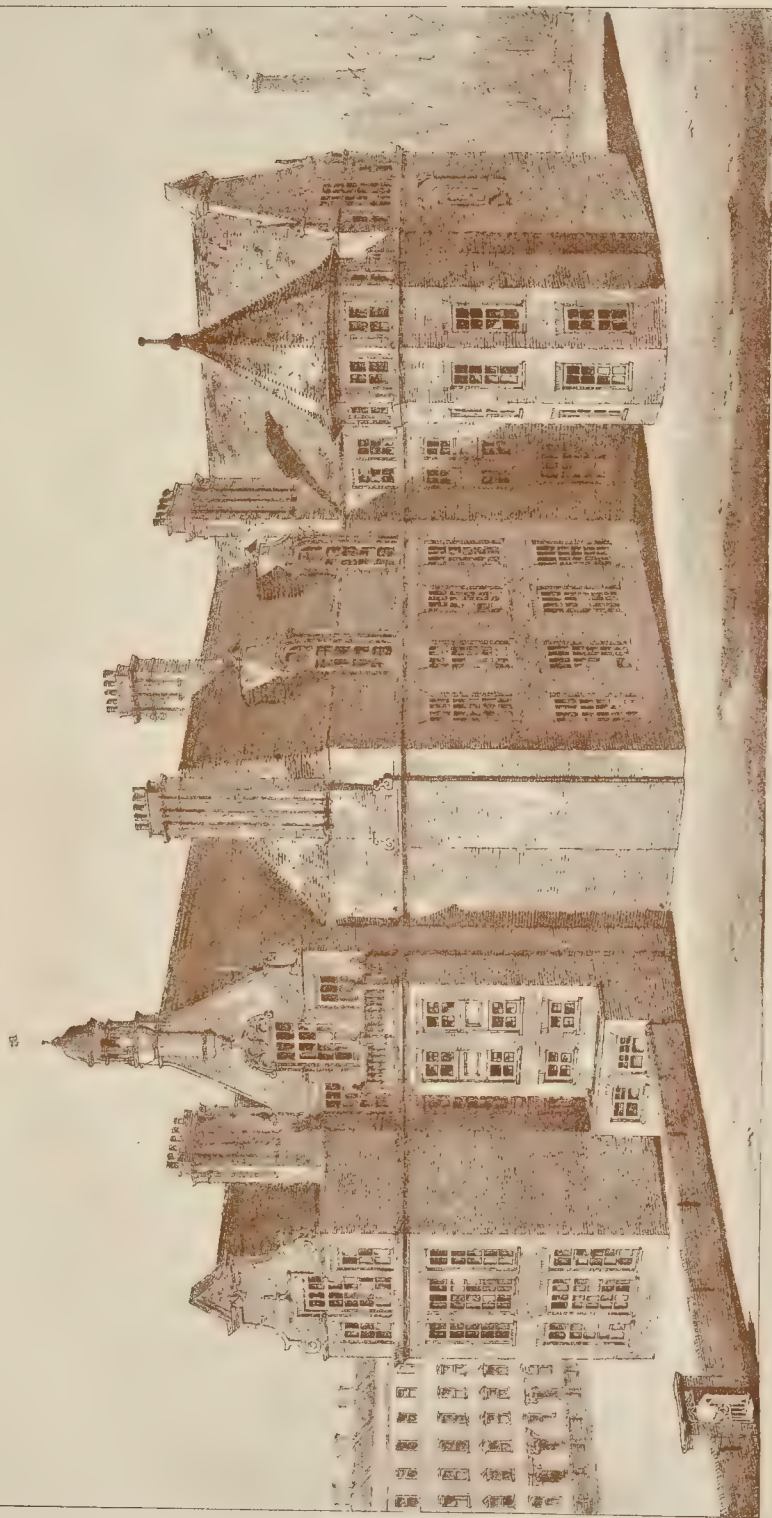
NEW ORATORY OF THE SACRED HEART, LIVERPOOL—MESSRS. GOLDIE, CHILD & GOLDIE, ARCHITECTS.

EXTERIOR VIEW.



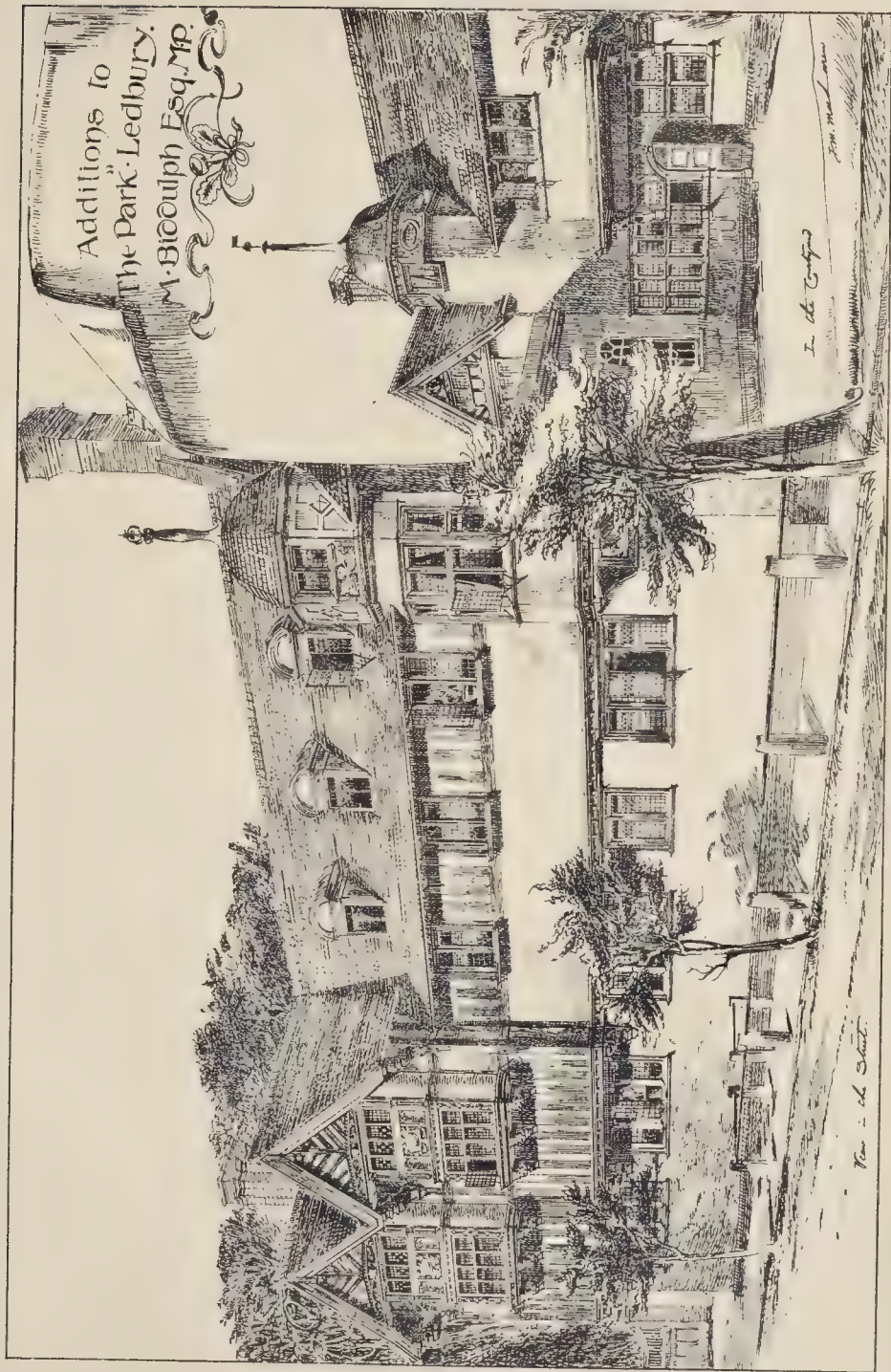


SCHOOL BOARD FOR LONDON  
HAYWARD R<sup>d</sup> SCHOOL<sup>rs</sup>  
LAMBETH  
T. DEAN, ARCHT.









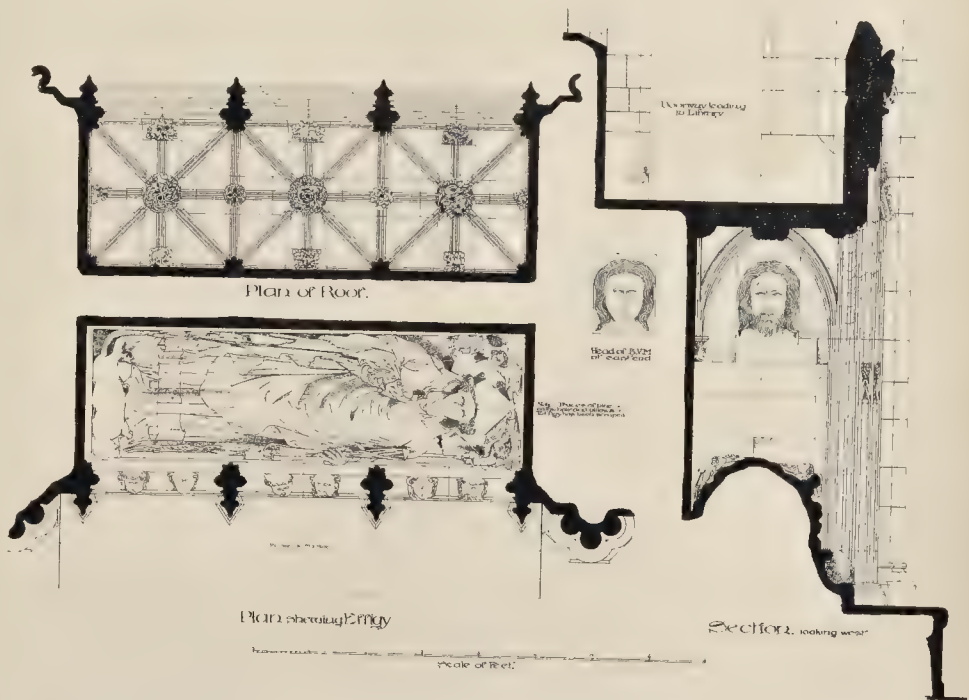
THE PARK, LEDBURY.—MESSRS. R. COAD AND J. M. MACLAREN, ARCHITECTS.







Details



TOMB OF BISHOP WILLIAM DE LA MARCHIA, WELLS CATHEDRAL, DRAWN BY MR. R. W. PAUL.

AWARDED A.A. TRAVELLING STUDENTSHIP, 1886

THE BUILDER, JUNE 12, 1886





the time of this bishop, who, had it not been for his misappropriation of Church funds to pay the soldiers of Edward I., would in all probability have been canonised. He was treasurer of England, 1290-1295. Many miracles are said to have been done at his shrine.

Amongst the many interesting details is the central boss in the vaulting, the roses being coloured green, and the leaves gilded with red edges. Most of the other carving was gilded on a red ground. The figure-work is an especial feature, the effigy itself being one of the finest in the cathedral, while the angels at the back, and those at the pillow, are very delicately executed. The grotesque heads placed along the plinth of the tomb are quite unique in their treatment. The female head in the westernmost bay is a good example of the head-dress of the period. Westward of the tomb, a row of heads, painted in fresco, and evidently part of the same idea, are placed in the hollow of the embattled cornice which finishes the curtain wall of the steps leading to the ambulatory at the back.

R. W. PAUL.

#### SOCIETY FOR THE PROTECTION OF ANCIENT BUILDINGS.

The ninth annual meeting of this Society was held in the Hall of the Society of Arts on Tuesday afternoon, the Hon. Richard C. Grosvenor in the chair. There were about fifty persons present, including a number of ladies.

The annual report, which was taken as read, stated that the Society continued its work steadily, the efforts which it made not being affected either by success or failure. During the past year, the Committee's efforts had been rewarded by success in two important instances, viz., the York churches and the Charterhouse, —clear proof that public opinion was changing, and that the world was beginning to value ancient buildings more highly. Much damage, however, was still being done yearly by the "restorer," and valuable buildings were destroyed, both in this country and abroad, owing to the great and unfortunate movement which was started years ago. Even when that movement was first set on foot, it was interesting to note that there were some who realised the harm which was being done, though they were themselves under the influence of the movement, and spoke of restoration as a thing not only possible, but commendable. In support of their views, the Committee quoted from the *Builder* of 1855, p. 489, an extract from a paper by Mr. Truefitt, read at a meeting of the Worcester Architectural Society, who, in speaking of the line to be followed in restoring an old building, said:—

"Never pull down any work and rebuild it in another style, but always prop up and patch an old building in all its varieties of form: never pull down elegant spirelets at the angles of our cathedrals because they are not of the date of the original building, but restore them: never remove such quaint original buttresses as those lying ones at the east end of a choir structure not a hundred miles from the Faithful City, merely because they were not there when the building was first erected: for if such mutilations were fully carried out, nearly all our churches would be eventually pulled down with the exception of the original portions, namely, Norman doorways and broken fonts. Our buildings should be restored just as we found them; if there were a Norman nave and a Decorated chancel, restore each, but do not try to make them alike: a building should be mended just as we patch an antique chair, or rivet an old china bowl."

The report gave other extracts, including one from the *Gentleman's Magazine* for 1826 (vol. 96, part 2, p. 109), protesting against the work which was then being done to the Hall of Gray's Inn, a building of the time of Queen Mary, such work consisting in covering the dark red brickwork with compass. The "restorers" of Gray's Inn Hall, no doubt, believed that they were improving the building and making it more Gothic; but so believed the "restorers" of ancient buildings at the present time. The only difference was that now the imitation of the Mediæval work was so much closer that it required a man with a better knowledge of the genuine Mediæval work to detect the imitations of the well-practised "restorer." And no doubt in another sixty years' time men will be scoffing at the works of to-day as the world scoffed at the restoration work of sixty years ago. But the "restorer" of to-day was the more to blame because he had had time enough to see what a hopeless task he had undertaken, and time to learn that the greater his power of close imitation the greater was the damage done to the history of art. The efforts of the Society were, however, surely telling, and during the last two or three years architects of

note had taken to putting the date upon their imitative work, while others were making sincere efforts to render their work as little imitative as possible. The report, after enumerating several of the home cases with which the Committee had dealt during the past year, referred with satisfaction to the labours of the *Société des Amis des Monuments Parisiens*; and, in conclusion, suggested the formation of a society for the preservation of ancient buildings in India,—a society in which Englishmen and natives of all races and denominations might combine for the protection and preservation of monuments in which all, but especially the natives of the country were so deeply interested.

The Chairman, in moving the adoption of the report, said that since the establishment of the Society nine years ago its necessity had become manifest more and more, and it had done good work, but he should like to see it go a step further in the future. He suggested that it might be possible to raise a fund from which the Society could directly contribute money towards the needful repairs of churches with the view of keeping those buildings out of the hands of the "restorer."

Mr. William Morris, in seconding the motion, said that the Society had scored one great success in the matter of the Charterhouse, although Mr. Beresford-Hope, who posed as a great defender of ancient institutions, was in favour of the scheme of destruction which was proposed,—a scheme which, indeed, deserved to be classed as an audacious attempt at robbery from the public. With regard to the chairman's suggestion of a special fund, no doubt it would be useful, but unfortunately the Society had had some difficulty in obtaining the necessary funds for carrying on their ordinary work. If the Government would put a thumping tax, say 75 per cent., on the cost of all restorations, and hand the proceeds to the Society to be spent in the preservation of threatened or neglected buildings, it would be a most beneficial piece of legislation for the country.\* If only a hundredth part of the sum which had been spent on "restorations" had been spent on the preservation of the buildings operated upon, there would have been no need for the existence of the Society.

The motion having been carried,

Mr. J. T. Micklethwaite, F.S.A., read a paper entitled "A Churchman's Plea on behalf of the Old Churches." He urged that although the Society had now obtained a hearing, it had still a great work to do. It had to make the guardians of old buildings understand their true value, and how easily they could be harmed. That was a hard task, but not a hopeless one, for encouragement might be drawn from the history of the very evil against which they were fighting, which was expressed in the one word "restoration." Fifty years ago churches, especially in towns, were sometimes subjected to very barbarous "improvements," but most of them suffered only from neglect. That neglect was only one manifestation of a general deadness in all church matters. At length a body of men arose who set themselves earnestly to work to bring about an awakening and reform. They were the first who in any way felt the real value of the old churches and seriously set to work to study them. If the men who formed the Cambridge Camden and such like societies had not been, the destruction of churches would have taken another form than that of "restoration," but we should not have learned the value of the remnant that remained. There could then have been no "Society for the Protection of Ancient Buildings," though it was to be doubted whether the need of it would have been less. The fundamental error of the old teachers was in holding that it was possible and proper to bring back an old church to its original condition. However old a church might be, each generation in using it had altered and improved it according to its wants and its ideas of what was right. It might be that every part of it had been built and rebuilt several times over, and that the building we now saw was five times the size of that from which it could be shown to have grown; but the changes had been made in such a fashion that the identity had never been lost, and the church was still the old church to us, as it had been to each one of the, it might be, more than thirty generations who had preceded us. Some of the adherents of the

\* Does Mr. Morris seriously imagine that the interests of the Society will be promoted by such nonsense as this?—En.

society had said, in their indignation at the brutality of the restorers, that we ought not to touch an old building at all, save to protect it from further injury than it had already received, but should keep it with all its history exactly as it had come down to us. It was, perhaps, well for the first advocates of preservation to call attention to their teaching by stating it in its barest and most extreme form, but a hearing having been obtained, it was, he thought, wisest to present the doctrine now in a form which would not provoke men to reject it as impracticable. "Restoration," as the word was now commonly used, included a right and proper treatment of a church as well as an improper one. The great revival of church life in our time had created wants which did not exist fifty years ago, and changes made to meet those wants honestly and without affectation were genuine additions to the history of the buildings. The harm had come of men trying to make believe that their nineteenth-century works were not done by themselves, but were part of some imagined original design. He contended that works done to meet the real wants of churchmen of the present day were, if good in themselves, very proper additions to an old church, but the architect of such works should take care that what he did should clearly show itself to be of its real date. Not that it should intrude itself as a thing out of harmony with its surroundings. The men of the fifteenth century could make their own additions to the churches of the thirteenth century without producing discord, and some of the men of the nineteenth century could do the same thing, or they were not fit to touch the work. Some might say that reverence required that a church should be kept decent and in proper order. That was specious, but if used to defend "restoration," it was really begging the question. Age was not indecent, and that which had upon it the dignity of centuries was far more fitting to an old church than the same thing patched, polished, and straightened up into newness. The Society wanted to make men distinguish between useful and needful repairs and useless and mischievous renovation. Repairs were right and proper when they were done for the structural good of the buildings; and so were alterations when done in the right way and to meet real modern wants. But renovation done for no other end than to gratify the vulgar taste for smartness was always wrong. If we would save the remnant of our churches from destruction, that was the lesson which we must teach to their guardians. It was not sought to stop them from improving their churches as their convenience or devotion required, but to show them a better way to do it. Let them write the history of their own time as freely and fearlessly as they would, but not in palimpsest.

On the motion of the Rev. Newton Mant, M.A., of Sledmere (who indulged in some extravagant remarks as to architects generally and diocesan surveyors in particular), seconded by the Rev. T. W. Norwood, F.G.S., of Nantwich, the thanks of the meeting were tendered to Mr. Micklethwaite for his paper; and a vote of thanks to the Chairman, moved by the Mr. John Hobb and seconded by Mr. Philip Webb, brought the proceedings to a close.

#### ARTISTS' BENEVOLENT FUND.

##### ANNUAL DINNER.

THE seventy-seventh anniversary festival of the Artists' Benevolent Fund was held at the Freemasons' Tavern on the 4th inst., the Right Hon. Lord Coleridge, Lord Chief Justice of England, in the chair.

In proposing the health of "The Queen," the Chairman referred to her Majesty's sympathy with artists, as evinced by the fact that she had this year, as usual, sent her contribution of 100 guineas to the Artist's Benevolent Fund, making a total gift of nearly 5,000l.

The Chairman, in proposing the toast of the evening, "Prosperity to the Artists' Benevolent Fund," remarked that it had been said that the world knew nothing of its greatest men. The point of that expression was that some men were checked and hindered, some cut short, some diverted perhaps, now and then, by a high sense of duty, from a career which they would have done honour to, and compelled to trudge along the road of every-day life, to die at last, as Dr. Oliver Wendell Holmes had said, "with all their music in them." That was especially true



of the artist. Some were tempted into the path of art by a feeling which they mistook for genius; perhaps by the sympathy which they thought was power, or by a multitude of other considerations, and after a few years of struggle they found themselves face to face with starvation, or something very nearly approaching it. There were others of real genius who were too poor to rise, and who, after a struggle of more or less gallantry, fell into a base captivity, and spent their lives in enriching some vulgar tradesman, or else became the real foundation of some fraudulent reputation. It was true of art as of other callings, that not all artists were among the unworldly. Any one who was at all acquainted with art knew that that supreme and magnificent genius, Rubens, was possessed of a high-minded and shrewd and tradesmanlike mode of disposing of his pictures. Sir Joshua Reynolds left a considerable fortune behind him; and Turner made something like 150,000*l.* before Mr. Ruskin wrote a line about him. But it was to assist those who were not like Rubens or Sir Joshua Reynolds that that society existed, and the Chairman concluded by an appeal on its behalf, coupling with the toast the name of the President of the Fund, Mr. Beresford-Hope, M.P.

Mr. Beresford-Hope responded, and proposed "The Chairman," who again briefly addressed the Company.

Mr. George Godwin, F.R.S., in proposing "The Royal Academy," expressed regret that the members of the Academy were apparently for the most part so very little disposed to help this, the senior Artists' Benevolent Fund. The impression seemed to prevail in some quarters that it was a mere benefit society, but that was a complete mistake. The society consisted of two parts. First, there was the Artists' Annuity Fund, a sort of benefit or insurance society, most admirably managed, but which was entirely self-supporting, and neither asked for nor received help from the public; and secondly, there was the Artists' Benevolent Fund, a charitable society, to which, in fact, the members of the Annuity Fund contributed, and to whose funds they asked the public to contribute in aid of the widows and orphans of artists. Referring to the Academy, Mr. Godwin said that, notwithstanding much that had been said against it, it still remained the great centre towards which all artistic effort was directed, and it was, he was glad to say, doing more now for the furtherance of art than it had ever done. With the toast he coupled the name of Mr. C. B. Birch, A.R.A.

Mr. Birch briefly responded, and other toasts followed. During the evening subscriptions to the amount of 400*l.* were announced, including a donation (the forty-seventh annual) of 105*l.* from her Majesty the Queen.

The musical part of the entertainment was given by some members of the Savage Club.

[In reference to Mr. Godwin's remarks as to the want of knowledge of the objects of the Fund, we quote the following from the Address of the Committee:—

"The 'Artists' Fund' was established in the year 1810, and received in 1827, from his Majesty King George the Fourth, its patron, a Royal Charter of Incorporation. It now enjoys the most gracious patronage and support of her Majesty the Queen.

The Artists' Annuity Fund is raised and wholly supported by the contributions of its members for their own relief in sickness or old age; it neither asks for nor receives any support from the public. All artists in Painting, Sculpture, Architecture, and Engraving are eligible to become members.

The Artists' Benevolent Fund is purely charitable, and has for its object exclusively the relief of the widows and orphans of members of the Annuity Fund left in need; it is supported by the donations and subscriptions of the patrons of the fine arts and artists, and annual subscriptions of the members of the Annuity Fund. The annual sums payable to the most needy of the widows and to the orphans are respectively supplemented by donations and from the interest on benefactions of Miss E. L. Pye and the late Edward Abelson, Esq. The claims of all widows and orphans who become entitled to its benefits are admitted at once, and without limit to number."

We may add that during the past year 55 widows and 18 orphans received annuities, amounting in the whole to 1,137*l.*]

**Wandsworth Workhouse.**—The Guardians of the Poor of the Wandsworth and Clapham Union at their last meeting instructed their architect, Mr. T. W. Aldwinckle, to prepare plans for alterations and additions to the old Workhouse, St. John's-hill, New Wandsworth, with a view to its occupation as an extension of the present infirmary.

#### ASSOCIATION OF MUNICIPAL AND SANITARY ENGINEERS AND SURVEYORS.

A DISTRICT meeting of this Association was held at Great Yarmouth on Saturday last, on which occasion the following papers were read and discussed.

Mr. J. W. Cockrill, Borough Surveyor, read a paper on "Great Yarmouth, and some of the recent Works of its Sanitary Authority." He said that the population of the town at the commencement of this century was 16,573; at the census of 1881 it was 45,159, and now is very near 50,000. The death-rate as given by the Registrar-General last year was 17.85. The acreage is about 3,400, of which 500 acres is Corporation waste, and available for building land. The roads and streets are upwards of 110 miles in length, exclusive of the "Rows," of which there are about eight miles. The "Rows" form a peculiar feature of the town, and accommodate a population of upwards of 13,000.

There are upwards of fifty miles of sewers in the borough. The river Yare, which divides the borough into two equal parts as far as area is concerned, forms the main sewer, and, in Mr. Cockrill's opinion, makes a most efficient one. A strong tidal current exists, with plenty of back-water, by which the sewage is swept out to sea, only returning to the beach at a point beyond the Corporation district. In 1881 and 1882 complaints were repeatedly made about the stench given off by the surface ventilators to the sewers, and in October, 1882, Mr. Cockrill was instructed to investigate and report upon the condition of the sewers in the town district, and the necessary work to put them into efficient working order. To carry out these instructions he opened 144 sewers, upwards of twenty-three miles in length, at points not more than 10 yards apart. The defects discovered in the sewers were, in a large number of cases, entirely attributable to the utter disregard with which private and even Corporation connexions had been made with them. A large number of brick sewers existed within the area bounded by the town wall; these were several centuries old, the bricks were thoroughly rotten and rat-eaten, and many of them so repaired, altered, and cut about, that there were not 10 yards in one length in which the sewer remained of its original section. In two cases the sewers had been cut off from the outlets through which they had originally drained, and were connected with another sewer at their upper ends, thus involving a deposit of 15 in. or 18 in. of sewage in about 100 yards in each case. It was not to be wondered at that about twelve months previously to the discovery being made, three deaths from diphtheria had taken place in one house draining into one of these sewers. Mr. Cockrill advised the Sanitary Authority to take up and relay all the pipe sewers in which any defects had been discovered, re-making private connexions with the same with proper junctions, and to take up all the old brick sewers and replace them with glazed pipe sewers. He also advised that full means of flushing on some automatic system should be adopted wherever possible, and that a movable flushing-tank be constructed of 3,000 gallons capacity; that the sewers should be thoroughly ventilated by pipes, with a sufficient number of surface gratings to provide fresh air; and that the sewers should be divided into lengths by light galvanised iron flaps to prevent the uprush of sewer air from the low levels into the upper reaches of the sewers. His estimate for this work was 8,000*l.* He also advised that connexions should be only made by Corporation men, and that only with proper junctions for both brick and pipe sewers, and he invented (although he afterwards found out that a similar block was in use at Leeds), a special junction block for pipe sewers. He had found that in making connexions, if he insisted on taking out a pipe and inserting a junction, that it was next to impossible to get the sewer laid correctly again, and he claimed for this block that a connexion with ordinary care could be made quite equal to that made with the junction-pipe in one piece. The report referred to was in the main adopted, and after more than two years' trial the work done gives thorough satisfaction; the estimates were not exceeded, and for the sum of 8,000*l.* about six miles of new pipe sewer were laid and seven miles of pipe sewers relaid, involving about one-third new materials; about 3,000 house and other connexions were re-made;

40 cast-iron ventilating pipes, 6 in. by 9 in. and 6 in. by 6 in. were erected against houses, three wrought-iron shafts to stand alone and two brick shafts (four brick shafts had been previously erected) and six flushing-tanks of 3,000 gallons capacity, with automatic syphons, were put at the heads of sewers where they would do most work. The cost of water to supply these flushing-tanks, and the large movable tank, led to discussion as to whether it would not be advisable for the Authority to provide their own supply for sewer flushing and street watering. Of course, opposition was raised to this; scientific evidence was obtained to prove that sea water would be both injurious to roads and health, but under Mr. Cockrill's advice the opinion of Mr. H. P. Bonhous, of Portsmouth, was obtained on this subject, and at the inquiry held before the Inspector of the Local Government Board, he completely (or at least to the satisfaction of the inspector) demonstrated that all the evil charges made against sea-water when used for such purposes were untrue, and that much good might be expected both on roads and in sewers by its use.

Mr. Cockrill said he had had previous experience in road-watering with it, found that it was much more efficient in laying dust, and that roads in the summer time were less liable to break up than where fresh water was used, but he advised that one section of the town should be watered for a whole season; this was done, a large expense was saved in quantity of water used, and also gravel which it had been necessary on previous occasions to use for patching. The Council had, during the year previously to this matter being brought on, used about 10,000,000 gallons of the company's water to flush sewers and water the roads in the district which he proposed should be served with sea water; these 10,000,000 gallons had cost 552*l.* 0*s.* 6*d.*, while the average cost of the water for seven years, in which little or no flushing had been done, came to 404*l.* 6*s.* 7*d.*, and he estimated that to supply the flushing necessary to keep the sewers clean would involve an outlay of at least 700*l.* per annum, and for this they would receive about 14,000,000 gallons only. The scheme he prepared involved fixing an "Otto" gas engine of 8-horse power (making the third he has now fixed for this Council, the previous ones working admirably), with pump, the erection of a tower, and cast-iron tank to hold 22,000 gallons, six miles of distributing cast-iron pipes of 8 in., 7 in., 6 in., 5 in., 4 in., and 3 in. internal diameter, with forty valves for flushing, and forty hydrants for street watering; six flushing-tanks of 2,000 to 3,000 gallons capacity were also included (making twelve now at work), and, much to his surprise, his estimate only came out at 4,500*l.*, and Messrs. H. F. Snow & Co., of London, are now at work upon the scheme, which is within a month of completion, the contract price being 3,987*l.*, while works not included in this contract, may, perhaps, amount to about 200*l.*

These figures give a clear gain to the Corporation, as may be seen below:—

Interest and repayment of loan on 4,500 <i>l.</i> per annum .....	£270
Working expenses, depreciation and small additions, per annum .....	140
Total annual cost .....	£410

For this sum the plant erected will raise in 120 days, of ten hours each, 30,000,000 gallons, of which about 5,000,000 gallons will go on to the streets, while the remaining 25,000,000 gallons will go into the sewers, and more can be raised at less than 1*d.* per 1,000 gallons, as less water is used for street watering; a considerable saving will also be made in horse hire; this is estimated at about 80*l.* per annum.

In the borough there are nearly fifteen miles of footway laid with concrete, in a similar manner to that now being put down, and described below. Some of this has had heavy traffic for fifteen years, and now shows no sign of wear, and will, no doubt, under fair treatment, last at least half a century longer, and, in Mr. Cockrill's opinion, is the cheapest and most durable footway which can possibly be formed.

The works now in progress have been undertaken by Messrs. M. C. Duffy & Son, of London and Yarmouth, and include about 17,000 yards super. of footway, 2½ in. thick, at 1*s.* 9*d.* per yard super.; rather more than three miles of kerbing, at 1*s.* per yard run, and a large quantity of granite crossings.

Mr. Cockrill gave the following as a few of the rules which experience had taught him



should be observed. Concrete must not be laid in frosty weather, and he had none laid from the middle of October to the end of March. It is also better to avoid extreme heat, as the sun takes the moisture out of the upper face before the cement has time to set. What concrete work he had done in hot weather is always well watered. If this is not sufficient it should be kept covered with mats. It is also advisable that the ground should be well wetted before it is laid. The expansion in hot weather is counteracted by the insertion of wood splines, placed from 5 ft. to 6 ft. apart. These are of the full depth of the concrete, and if at any time a piece of pavement is found to be lifting with the heat, at night, as soon as the temperature begins to lower, if a spline is taken out in every 100 ft. of the footway it will resume its proper position.

An objection to concrete paving, as laid *en masse*, is the difficulty of laying drains and water and gas pipes through the same, without cutting it up. The water and gas companies at Yarmouth find it possible to get under paths 7 ft., 8 ft., and 9 ft. wide, without breaking them up.

The paving now being laid is 2½ in. thick, the lower 1½ in. thick composed of four parts beach shingle, screened through a ½-in. sieve, to one part Portland cement. The top 1-in. thickness is composed of two parts beach shingle, screened through a sieve of ½-in. mesh, and one part Portland cement. The kerb is 6 in. by 3 in., and mixed in the same proportions as the paving. In practice he found that however carefully concrete is laid, or however good the proportions, it will not stand vehicular traffic, and that is the reason for the large number of granite crossings included in the present contract.

In selecting the materials forming the base of the concrete, he had found that no other class of materials wears as well as beach shingle. The Sanitary Authority has had under discussion the desirability of erecting public slaughter-houses.

Mr. E. G. Mawbey, Borough Surveyor, King's Lynn, read a paper on "The Sewerage, Surface-drainage, Sewage-disposal, and House-drainage of the Market Harboring Great and Little Bowden Local Board District."

During the day the members visited and inspected the concrete pavements of Yarmouth, and the sea-water sewer-flushing and street-watering arrangements.

#### THE CHEMICAL TREATMENT OF SEWAGE.

On Tuesday evening, at a meeting of the Society of Chemical Industry (London section), held at Burlington House, Dr. C. Meymott Tidy, F.C.S., &c., delivered a lecture on the above subject to a large audience of the members, Mr. Howard, the president of the London section, being in the chair.

Dr. Tidy said the subject was very vast, and it would be very interesting, to follow the history of the subject through all its numerous phases and changes. He had tried to follow it conscientiously through all the Blue Books, and he hoped not many people would follow his example. It seemed to him that Blue Book No. 2 was always doing its best to undo all that was done by Blue Book No. 1, the two vying with each other to baffle the reader with facts and figures. Royal Commission followed Royal Commission, the members of which seemed mostly to be badly chosen. They were entrusted with inquiries into the subject of the pollution of rivers and of the diseases resulting from their pollution, although no medical man was placed on the Commission. He did not think there was much hope of any brighter future. He thought the outlook seemed better a few months ago, but some very dark clouds had gathered later. It was, in fact, a problem of a very complex nature they were called upon to solve when asked to advise upon sewage schemes. The researches of Lawes and Way in this country, and of Wolf and Lehman abroad, had given them some valuable conclusions. Taking the population per 1,000, they would find the liquid and moist excreta amount to 2,640 lb., the dry excreta to 141 lb., while the amount per head of other dry matters would be 2½ ounces, with a large volume of water. To get results of that kind was in important matter. An important branch of the subject was the nature of the refuse,

obtained from the washings of the streets. It was found after heavy showers that the solid matter discharged into the gutters from a roadway of granite amounted to 800 grains per gallon, of which 280 were in solution and 520 in suspension. With wood pavement it was 50 grains per gallon, 40 in solution and 10 in suspension. Of course, it was to be expected that the quantities would vary with the traffic and the class of roads; but, in order to get results of any value, it was necessary to get samples every half-hour throughout the twenty-four. Factory refuse it was impossible to calculate, because the circumstances varied from day to day and from hour to hour. Samples of sewage that might be sent for analysis could not be trusted. It was even necessary in taking samples of river-water to get a series of samples at various places right across the stream. The difference would be found to be great in the same stream, between samples taken at the edge, where sediment collects and putrefies, and in the middle, where the air has free access. The calculations made as to the value of sewage were generally ridiculous and illusory. They were told to take the value of the excreta at six or seven shillings per head of population, and on that basis calculations made years ago, when London had only 3,000,000 inhabitants, had given the sum of from 1,000,000, to 4,000,000, as the value of the sewage lost. Of course, theoretically they ought to follow the teachings of science, and apply the sewage to the land, but when it came to be tested practically, it was always found that the question of making a profit out of it had to be given up. There were two things they could not do. 1. They could not produce a sludge as valuable as Peruvian guano; and (2) they could not produce an effluent as pure as drinking-water. In the purest effluent there was always left a disagreeable odour. The only way in which the effluent could be properly purified was by running it over land. In concluding his paper Dr. Tidy strongly condemned the views of those who advocated the system of water-carriage for the disposal of the sewage, and called upon the members of the Society to remember that it was their duty to apply their science to the daily wants of daily life, and thus endeavour to meet the common needs of humanity.

A discussion followed in which Dr. Dupré, Mr. Bischoff, Mr. Cresswell, and other gentlemen took part.

Mr. Cresswell regretted that the lecturer had not given them the advantage of his own views respecting an alleged recent discovery, which, if true, would deserve to be recognised as one of the greatest discoveries of modern times. He referred to the employment of permanganate of soda proposed by the Metropolitan Board of Works.

Upon this point Dr. Tidy said he had not touched, not because his opinions were not formed, but for reasons already stated. He might say that the three eminent chemists who had sent in the report referred to by Mr. Cresswell had all given evidence that nothing further was required to be done in the treatment of sewage than had been done by the Board, and that the Board, which believed it had conferred a great benefit on the community in turning the sewage into the Thames, was quite consistent in making choice of those eminent chemists to support it.

The proceedings closed with a vote of thanks to Dr. Tidy.

#### TILBURY DOCKS ARBITRATION.

On Monday last, Lord Coleridge and Lords Justices Lindley and Lopes delivered judgment in the matter of a question arising out of the arbitration between Messrs. Kirk & Randall, the contractors, and the East and West India Dock Company, concerning the contract for the construction of the large docks recently opened at Tilbury.

The question before the court was whether it was within the jurisdiction of the arbitrator to receive evidence upon and ascertain certain of the claims preferred against the Company by the contractors, more especially those involving a consideration of the nature of the soil in which the excavations had to be made. The arbitrator himself, Sir Frederick Bramwell, had ruled that the claims before him were properly within his jurisdiction, but the Company appealed to the Court of Queen's Bench to direct him to the contrary. This the court declined to do, and the Court of Appeal has now unanimously supported them.

Judgment was therefore given in favour of the contractors, with costs.

#### ASSOCIATION OF PUBLIC SANITARY INSPECTORS.

##### ANNUAL DINNER.

THE third annual dinner of this Association was held in the Venetian Saloon of the Holborn Restaurant on Saturday evening last, Mr. Edwin Chadwick, C.B., President of the Association, in the chair.

The usual loyal and patriotic toasts having been given, Surgeon-General Sir Guyer Hunter, M.P., responding on behalf of "The Army and Navy."

Dr. Alfred Carpenter proposed the toast of the evening, "Prosperity to the Association," and urged that sanitary inspectors should be granted something like "fixity of tenure" of their offices, and be paid out of the Consolidated Fund. They should not continue to be placed, as they were at present, at the mercy of members of sanitary authorities who were interested in dilapidated and insanitary property, but their tenure of office should be assimilated to that of Poor Law officers. The Association was a very useful and valuable one, not only to the members individually, but to the nation at large, for the members sought, by periodical meetings for the interchange of views, to protect the nation, and not merely their own localities, from epidemics and other results of insanitary conditions. (The toast, with which was coupled the name of Mr. Chadwick, was very heartily received.)

Mr. Chadwick, in responding to the toast, gave an interesting address on "Sanitation versus Militarism." At the outset he referred to the deplorable cost in life and money of the delay of sanitary legislation incurred by political pre-occupations. Whilst we were under further delay of legislation, it might be advisable that we should consider our normal standards of sanitation, for the future application of their principles. We must strengthen our principles by considering and revising our results. These were all sound. Take, for example, our prisons, once the chief seats of pestilences, now by sanitation, with the means of water carriage, and cleanliness in every cell, the seats of the highest health. So with our district half-time pauper schools, in which the "children's diseases" were almost banished, where typhus, by which they were once so dreadfully ravaged, was now unknown, and in one of which (Anerley), with some 900 children, there had not been a case of measles for the last twelve years. In those institutions, those who entered without developed diseases upon them showed a death rate, although they were children of the lowest type, less than one third of the death rate amongst the children of the general population, to whom the principles might be eventually applied. In extension of facts bearing on these results, urban districts should be examined and studied as normals where the separate system of drainage had been duly applied, where by correct sanitation foul smells were cleared from the houses and from the streets, and from the fields, where fresh and undecomposed sewage was duly applied with a five-fold production, and where the death rates had been reduced by one-third, and in some instances by one-half, what they previously were. Such normal examples should be kept in view and studied, though for the present they were shut out by the prevalence of sinister interests in regard to expense, or by pre-occupation with inferior political questions. These results might well be studied in contrast with those in which by the contraventions of sanitary principle the population of the Metropolis had been depressed, as declared by Lord Bramwell, through works that were now declared to be a disgrace to the Metropolis and civilisation, and were demonstrated as such in the condition of the seat of legislation itself, on which there was much to be said in exemplification of legislative disunity. To the normal results we might add the normals of the preventive service, which showed how sanitation had half emptied military hospitals which curative science, unaided by sanitary science, kept full, with augmentation of force and economy by the reduction of the army death-rates by two-thirds of what they formerly were. Our immediate means of economy by sanitation were now, however, straitened by the general distress which restricted immediate outlays of which the economical results were as yet unknown in Parliament. Let us look at Italy. Two millions of money were voted for the relief of Naples, by sanitation, from the dire visitation of the cholera. But there was a deficit in the treasury, and the Government had not the money to give. The deficit was due to the enormous expenses of militarism, to bloated armaments, and to a fleet of big war-ships, some of which ships must have cost, as ours had done, a million of money each. It might be of use to give an estimate of the civil life and force that might be gained to a country by the application of a million of money,—the cost of one big ship,—if the sum were spent on sanitation. His only son had, he was happy to state, from a Royal Engineer become a special sanitary engineer, and had been doing sanitary work in several colonies for the Colonial Office. His recent work had been at Malta, and he presented it for this occasion as an example. The complete works of constant water supply, of the water carriage from the house and the application of foul water to agricultural production by irrigation, will cost about 80,000, for



the whole of the population, about 100,000. He could confidently aver that the result of that expenditure, with well-qualified sanitary inspection, would effect a reduction of the death-rate by ten in a thousand,—as the like works under the separate system had done at home, would make Malta a real health-resort, and would also make it a great garden, with a fivefold production in an inferior climate. The expenditure on one big ship—the million of money,—would serve for the sanitation of a territory and population of some twelve or thirteen Maltsas, would save yearly a hundred lives, and more than two thousand cases of sickness, and all the expenses of lost labour to the adult population. Germany had paid the foremost attention to the application of sanitary principles to her army, and since the Franco-German war had gained by it as much life and force as was then lost by the sword. It was to be hoped that the like attention might be given by her to her heavily death-ridden civil population. For ourselves, sanitation had gained for the Indian, as well as the home army, a great extent of the relief we proposed for it. In the Indian army we had obtained a reduction from the old death-rate of sixty-nine to thirteen per thousand. During the last decade, when the reduction had been got down to twenty in a thousand, a gain of forty thousand of force, first to last, had been achieved, and a gain of six millions of money. We had yet to advance there and to hold more firmly our dominion by the sanitary improvement of the civil population. In our Colonies, where, in the ignorance of sanitation, settlements had been made on undrained and malarious sites, with undrained houses and towns, there had been a great excess of preventable disease. Sanitation defences against these, it might be shown, were of primary importance, and would give more strength of life and force than those military defences, so very gratuitously, as he conceived, imagined to be immediately necessary. In conclusion, he said, let us keep our attention on our established sanitary normals and our extending normals; with confidence it would give us a greater future than the world had ever imagined, much less seen. Towards that great future the labours of the sanitary inspectors, modest as they were, would contribute their certain and useful quota, if they went on and on, trusting ever in industry, truth, and increasing knowledge.

Other toasts followed, including "The Executive of the Association" (proposed by Lord Fortescue and coupled with the names of Mr. G. B. Jerram, Chairman of Council, and Mr. H. S. Legg, Hon. Secretary, who responded).

#### WEATHER STAINS ON WALLS.

SIR,—I should be glad if any of your readers can tell me what process is the best for taking weather stains from the face of a brick building covered by about 1 in. thickness of cement. Is there any process for dressing the face after cleaning by the application of any solution of silicate or similar substance which would not only have the effect of protecting the cement from absorption of the rain, but of rendering the face less liable to be disfigured in future by weather stains? What are the prices for cleaning and after-treatment respectively? A. F.

**Duration of Kauri Forests.**—Estimating says Professor Kirk, in his "Report on the Native Forests and the Timber Trade of New Zealand," the total extent of available Kauri forest at 200,000 acres (an area greatly in excess of that stated by the best authority, Mr. S. P. Smith), and placing the average yield at the high rate of 15,000 superficial feet per acre for all classes, the present demand will exhaust the supply in twenty-six years, making no allowance for the natural increase of local requirements. If, however, the demand expands in the same ratio that it has shown during the last ten years, the consumption in 1895 will be upwards of 240,000,000 superficial feet per annum, and the Kauri will be practically worked out within fifteen years from the present date. Under these circumstances the best interests of Auckland and the colony at large demand the strict conservation of all available Kauri forest. The progress and welfare of the northern district have been largely due to her magnificent forest resources, and their conservation will prove an important factor in the permanence of her prosperity. The utilisation of ordinary timbers should be encouraged, and it should be an axiom with the settlers not to use Kauri when red and white pine can be made to answer the purpose. Any steps tending to postpone the period of exhaustion will be of the greatest benefit to Auckland, as a longer period would be allowed for the growth of timber to take the place of Kauri within the restricted limits in which replacement is possible. Should this warning be unheeded, a large displacement of labour will result, and the prosperity of the north greatly retarded.

#### The Student's Column.

##### OUR BUILDING STONES.—XIV.

ARTIFICIAL METHODS OF RENDERING STONE DURABLE.

**B**ETWEEN the natural and the artificial stone there is a transitional series, viz., those natural stones treated artificially in order to strengthen and cause them to resist the action of weathering as much as possible.

The principal cause of the invention of these processes arose from the rapid decay of the stone of which the Houses of Parliament are built.

Now, there are many solutions which the chemist tells us may be used to saturate stone with, in order to assist in its preservation, but the majority of them are so costly,—either in the methods of application or the chemicals themselves,—that comparatively few have been tried, and, with one or two exceptions, they may be regarded from a commercial point of view as failures. It is not the slightest use to invent solutions which involve anything but the commonest and most easy methods of application, such as may be carried out with a brush or something of that sort. The principal drawback to materials only superficially introduced into the stone, however, is that a crust forms, and although they preserve it from attack for some little time, eventually this crust scales off or becomes ineffective. The solutions applied in many cases alter the colour of the stone.

Silicate of lime seems to have secured to itself a good name for preserving stone. It has long been acknowledged as one of the substances best adapted to resist both the influence of the atmosphere and the action of sea-water.

The affinity of silica for lime is so great that if a piece of clay, very gently calcined, or a little gelatinous silica be placed in a solution of lime water, the whole of the lime is quickly abstracted from the solution and enters into solid combination with the silica, forming an insoluble silicate of lime.

It was the knowledge of this fact that caused Mr. Ransome, of Ipswich, to invent a process which is one of the most admirable of scientific contrivances, and we are sorry that the invention has not been more successful in this country. In this process the surface of the stone has to be made thoroughly clean and dry and restored in places where necessary. The stone is then saturated as far as practicable with a solution of silicate of soda or potash, and afterwards applying a solution of chloride of calcium, which, coming in contact with the silicate, produces an insoluble silicate of lime, aggregating and cementing firmly together the several particles of which the stone is composed.

The silicate is diluted with soft water and made thin enough for the stone to absorb it freely. The less water used the better. The solution is applied with a brush, and it will at first be found to enter the stone very slowly. The brushing having been repeated several times it will eventually be found that a shining surface is produced. This shows that the stone has absorbed as much as it is then able; and the brushing should stop immediately the first indication of it is apparent. If, by accident, a little more of the solution than is actually necessary is applied, the excess must be removed.

After the silicate has become perfectly dry, the solution of chloride of calcium is brushed on lightly, but without making it froth.

It is stated that in some cases, in order to complete the preservation as much as possible, the stone should be washed after the first application with soft water and the operation repeated. "In the second dressing the prepared chloride of calcium may be tinted so as to produce a colour harmonising with the natural colour of the stone."

The trade circular also gives us the following cautions:—

- "1. The stone must be clean and dry.
- "2. The silicate should be applied till the stone is fully charged, but no excess must upon any account be allowed to remain upon the face.
- "3. The calcium must not be applied until after the silicate is dry; a clear day or so should intervene when convenient.
- "4. Special care must be taken not to allow either of the solutions to be splashed upon the

windows or upon painted work, as they cannot afterwards be removed therefrom.

"5. Upon no account use any brush or jet for the calcium that has previously been used for the silicate, or vice versa."

The success of the operation as a check to further disintegration depends in some measure upon the condition of the stone itself and the state of the atmosphere just before and at the time the process is applied.

In Kuhlmann's process a solution of silicate of potash or silicate of soda is applied to the surface of the stone. The surface is hardened by the decomposition of the silicate of potash.

If a limestone be operated upon, carbonate of potash, silico-carbonate of lime and silica will be deposited, besides which the carbonic acid in the air will combine with some of the potash, causing an efflorescence on the surface which will eventually disappear.\*

It will be obvious, however, that the result of the process must depend on the purity of the limestone under treatment.

M. Kuhlmann has also introduced several chemicals to be applied to the stone which have the effect of producing certain colours in order that this process shall not disfigure it more than is absolutely necessary: these colours harmonising with that of the materials to which they are applied.

Serretmey's Process.—This is also a solution which was patented for the preservation of stone.

It appears to consist in the application of two coats of specially prepared silicate, with a third coat of asphaltum.

The silicate solution, however, is said to be the only essential part of the process, the asphaltum being merely applied to protect the silicate from moisture.

No doubt a solution of silicate of lime, even in the hands of less experimental operators, will be found very efficacious in arresting further decay if the application be made in time; but there are cases when decomposition and disintegration of the stone have already made such progress that it would be both a waste of time and money to apply any of these processes to stay the evil.

Other means have been employed, by filling the pores of the stone with solution of baryta, followed by solutions of ferro-silicic acid or super-phosphate of lime.

Soluble oxalate of alumina has been used on limestones.

The principle of each of these processes is the same. It is stated that they differ from those just described, in that they cause an insoluble substance to enter into the structure of the stone without at the same time giving rise to the formation of any soluble salt, likely to cause efflorescence,—this latter being disadvantageous.

When appearance is not important, ordinary paint may be used, but, as every one knows, the atmosphere, even under favourable conditions in London (where these processes are more particularly required) destroys the paint in a few years.

Mr. Davis invented a process in which he used a solution of linseed oil and sulphur. The solution seems to penetrate the surface to the extent of a quarter of an inch, and to harden it to a remarkable extent. The percentage of sulphur held in solution by the oil itself is small, and the weight of the sulphurised oil used in proportion to the weight of the stone treated with, is likewise small, so that the percentage of sulphur, even close to the surface of the stone, is extremely minute.†

Paraffin has also been used to protect the surface of stone, and we are informed that it has been so employed on the other side of the Atlantic with considerable success. Amongst other things the Cleopatra's Needle, which adorns the Central Park, New York, and which has suffered severe disintegration, has been coated with paraffin. It has given a slightly darker colour to the stone, but is said to have been effective in stopping its decay.

Paraffin dissolved in naphtha, together with a number of other mixtures, have been made use of from time to time, but we are very doubtful whether any of these processes afford permanent protection to building stones.

It would be much better if the stone were properly selected in the first instance, and then these supplementary expenses would be considerably minimised.

\* Gillmore, on "Limes, Cements, and Mortars."

† See Dobson's "Radiments of Masonry," &c., p. 141.



We have previously pointed out that in the ordinary course of decay, many natural stones have a hard layer, formed by chemical action, on their exterior. This crust has a tendency to preserve the stone underneath; and although buildings certainly, for a time, look better for being washed down, yet we do not think this method advisable when they are constructed with this particular kind of stone for this crust is often removed in the cleaning, and the stone becomes more exposed, besides having to reform (if it can) another crust, resulting in a considerable loss of substance. This remark is only meant to apply to buildings which have been erected a considerable length of time.

## RECENT PATENTS.

## ABSTRACTS OF SPECIFICATIONS.

3,458, Joining Edges of Squares or Panes of Glass. J. Plenty.

The object is to unite or join together the edges of separate pieces or panes of glass by means of a cement composed of an insoluble silicate of lime, which unites with and forms part of the substance of the glass, gets harder and stronger with age, and is not acted upon or destroyed by the action of the weather. It is applicable to all kinds of glazing. The edges of the glass are covered with this layer of a paste composed of about three parts silicate of sodium, with one part dry powdered air-slaked quicklime, and one part carbonate of lime. Chemical action takes place, the soda combines with the glass, forming a hard insoluble silicate of lime, and uniting the separate pieces. The Soda is not seen a few pieces off, and it is claimed that this will allow large lighting spaces with no apparent break. The system can also be applied to roof-glazing or to stained glass.

8,533, Door Knobs. R. R. Harrison.

This is a combination of a method of fastening the knob to its spindle, and also to an attached rose (fast rose) for fastening the knob to the door. A square spindle has holes or depressions for a neck screw, by which the knob is fastened to the spindle. The attached rose is connected to the door by screws as usual, but the neck of the knob has a screw turned upon it, so that in addition to the small screw of the spindle the knob is kept in place by a loose ring on the neck, which, when screwed into place firmly, fastens the knob.

15,612, Screw-drivers, Gimlets, &c. T. Dussieux.

This invention relates to improvements in these tools, each being made in one piece with its handle. The essential feature is the simplicity and cheapness of production. The blades and handles are made by cutting lengths from wire of steel or other suitable metal, bending part thereof to the required shape to form the handle, and leaving a length below for the blade, the bottom of which is hammered, ground, or shaped as required.

## NEW APPLICATIONS FOR LETTERS PATENT.

May 28.—7,163, T. Maroh, Horticultural and other buildings and structures.—7,184, F. Hochuli, Saw Sets.

May 31.—7,214, F. Gibbons, Manufacture of Ceramic Tiles, &c.—7,222, W. White, Heating and Ventilating Apartments.—7,232, E. Hutton, Hopper Ventilators.—7,242, N. Haigh, Automatic Feeding Motion for Wood Tenoning Machines.—7,282, J. Jefferies, Pneumatic Door Checks.—7,292, W. Brenton, Sash Fastener.

June 1.—7,307, W. Verly and J. Walker, Construction of Floors.—7,310, H. Smith and E. Bradley, Veneer and Lumber Cutters.—7,322, J. Bradley, Gas Lighting.—7,326, E. Breathing, Roofing Tiles.—7,338, E. Picard, Manufacture of Glass.—7,361, H. Lake, Manufacture of Cement.

June 2.—7,380, T. & H. Holcroft, Water Meters.—7,399, H. Heath, Ventilators.—7,397, J. & B. Craven, Machinery for Moulding Bricks, Tiles, &c.—7,418, H. Hart, Water Cisterns.

June 3.—7,438, E. & E. Kerry, Building Bricks.—7,455, J. Kaye, Automatic Latching and Bolting Doors.—7,468, C. Baldoak, Door Latch.—7,472, T. Smith, Ventilating, &c.—7,476, J. Rambois and N. Nesche, Polishing Marble, &c.—7,477, J. Dahse and E. Heinrich, Construction of Nails.—7,482, E. Brewer, Burglar Alarm Bell Apparatus.

## PROVISIONAL SPECIFICATIONS ACCEPTED.

4,962, T. Porter, Draught and Dust Excluder for Doors, &c.—5,504, G. Newman, Sash or Window Fastener.—5,054, A. Stribling, Carpenters' Square.—5,556, J. Smith, Stores, Firegrates, &c.—5,689, N. Locke, Self-Locking Bolts for Doors.—5,803, G. Hardy, Firegrates.—5,812, J. Hill, Securing Knobs to Spindles for Door Locks and Latches.—5,965, J. Kaye, Securing Knobs or Handles to Spindles.—6,636, L. White, Manufacture of Cements and Plasters.

## COMPLETE SPECIFICATIONS ACCEPTED.

Open to opposition for two months.

9,435, T. Jenkins and R. Perress, Ventilators.—9,703, W. Youtson, Sliding Window-sashes.—9,780, W. Thompson, Artificial Stone.—10,082, J. Storer,

Roofing Materials, &c.—2,275, A. Clark, Looks.—2,833, A. Boul, Compensation Spring Balances for Window-sashes, &c.—9,621, J. Macmeikan, Chimney Tops and Ventilators.—9,942, G. Beadon, Doors and Door Fastenings.—12,532, J. Smith and A. Proudlock, Monumental Tablets, &c.—5,845, G. Johnson, jun., Machines for Macking Tongue-and-Groove Flooring.—5,994, G. Manion, Process for Preserving Timber.

## RECENT SALES OF PROPERTY.

## ESTATE EXCHANGE REPORT.

## MAY 28.

By WYATT & SON.  
Hornden, Hants—Freehold residence and grounds 4,890  
Two enclosures of freehold land, 7a. 2r. 26p. 610

## MAY 31.

By HORNBY, SON, & EVERFIELD.  
Westminster—31, Parliament-street, freehold 7,150  
9, Horseferry-road, 21 years, ground-rent 110s. 390  
Colchester, near—Freehold, Marsh Farm, 72a. 1,620  
Fulham—67 to 73 odd, Chesham-road; and 2 to 20 even, Rotherhithe-road, 97 years, ground-rent 112s. 13, Cranmore-terrace, 63 years, ground-rent 4s. 9 to 19 odd, Barton-road, 48 years, ground-rent 60s. 31, 39, 43, and 45, Rigault-road, 91 years, ground-rent 23s.; and 34 to 64 lock, Avenue-road, 94 years, ground-rent 132s.  
Thornton Heath—The freehold houses, Clayton-lea, Brookside, and Camperdown 2,130  
Quadrant-road—Ground-rent of 8s., reversion in 87 years 130

By WEATHERALL & GREEN.  
Regent's Park—Ground-rents of 21s., reversion in 33 years 875  
Brixton-road—Ground-rents of 24l., term 23 years 600  
South Kensington—143, Cromwell-road, 85 years, ground-rent 28s. 10s. 2,600  
Maids Hill—4, Bristol-gardens, 64 years, ground-rent 1,400  
Edmonton—109 to 119 odd, Upper Force-street, freehold 1,310

By SALLES, RAY, & CO.  
Kenilworth-town, 25, Churchhill-road, freehold 600

By J. AMAND.  
Stepney—103, 105, and 107, White Horse-lane, 13 years, ground-rent 15s. 270  
Lambeth—35, 38, and 37, Duke-street, and 66 and 67, Tower-street, 36 years, ground-rent 20s. 400  
Spitalfields—48 to 54 even, White Lion-street; 95, Wheeler-street; and 1, 2, and 3, Chapel-street, 27 years, ground-rent 55s. 750  
Bethna-green—24, 36, and 38, Warley-street, 39 years, ground-rent 6s. 610

By T. G. WHARTON & SHERBURN.  
Ball's pond—15 to 18, Midway-street, freehold 1,230  
South Hamsay—35, Howard-street; 1, Shakespeare-road, 84 years, ground-rent 10s. 10s.; and a plot of freehold land 680

Barnsbury—46 and 48, Thornhill-road; and 63 to 69 odd, John-street, 32 years, ground-rent 45s. 10s. 965  
Holloway, Charles-street—Prospect House, 48 years, ground-rent 6s. 645  
60 to 69, Windsor-road, 66 years, ground-rent 47s. 6s. 2,730

By WIGHTWICK & GREGG.  
Forest Hill—12 and 16, Hursbourne-road, 97 years, ground-rent 11s. 685  
Sunderland-road—The residence Carapina, 94 years, ground-rent 11s. 995

## JUNE 1.

By DAVIES & CO.  
Plumstead—Bora's Farm, and 32a. Cr. 35p., freehold 5,000  
An enclosure of market garden land, 9a. Cr. 8p., freehold 1,050  
An enclosure of accommodation land, 6a. Cr. 38p., freehold 775  
Two enclosures of accommodation land, 19a. Cr. 8p., freehold 1,800

By JAS. FOCRY.  
Rotherhithe—109, Clarence-road, freehold 365  
Highgate—7, Holly-tree, 19 years, ground-rent 12 365  
Finsbury Park—72, Blackstock-road, 85 years, ground-rent 3l. 10s. 835

By W. FLOCOMBE.  
Shepherd's-bush—9 and 10, Coulter-road, 94 years, ground-rent 10l. 10s. 40

By RICHMOND & STEVENS.  
St. John's Wood—76, Carlton-hill, 56 years, ground-rent 15s. 1,200

By PARKER, BROTHER, ELLIS, CLARK, & CO.  
Whitechapel—2 to 4, 7 and 8, East Mount-street, freehold 2,480  
5 to 19 odd, Raven-row, freehold 2,580

By P. D. TUCKER.  
Wallingford—The Rush Court Estate, 39a. Cr. 38p., freehold 18,000  
The Swan Hotel, and 8a. Cr. 18p., freehold 2,750  
Cricklewood—The freehold residence, Belle Vue 2,100  
The freehold residence, Norfolk Villa 1,485  
The freehold residence, Westhaven 1,300

## JUNE 2.

By BRIANT & SON.  
Clapham—27, Cheltenham-road, 76 years, ground-rent 8l. 630

By SON & R. REYS.  
Easton-road—64, 65, and 66, Judd street, 20 years, ground-rent 78s. 10s. 880

By H. J. BLISS & SON.  
Bethnal-green—493 and 495, Cambridge-road, freehold 1,010  
Leyton, Lea Bridge-road—Meadow Cottage, freehold 1,400  
Mile-end—41, 43 and 45, Dunk-street, freehold 1,645

Bethnal-green—14 and 16, Bonner-road, 68 years, ground-rent 8l. 638  
20, Bonner-road, 68 years, ground-rent 4s. 328  
Ground-rents of 24l., term 98 years 490  
38 and 40, Bonner-road, and a Ground-rent of 40l., 68 years, ground-rent 8l. 630

Mile-end—178, Hauxbury-street, freehold 2,615  
Bethnal-green—32 to 38 even, Russel-lane, 58 years, ground-rent 12s. 3,005  
17 to 27 odd, Polard-street, 21 years, ground-rent 870

By WALTER KNIGHT.  
Chertsey, near—A plot of freehold land 230  
Addlestone—An enclosure of land, 6a. Cr. 12p., freehold 385

## JUNE 3.

By S.B. CLARK & CO.  
Leicester-square—Nos. 14 and 15, freehold 12,000  
By C. J. WHITNEY.

Brixton—35, Stockwell Park-crescent, 43 years, ground-rent 6s. 310

By CHOLINS.  
Seven Sisters-road—An Improved Rent of 234l. 1s., term 58 years 3,940  
Peckham—31, Commercial-road, 81 years, ground-rent 6s. 10s. 325  
185, Camden-grove North, 81 years, ground-rent 6s. 10s. 293

By NEWBORN & HARDING.  
Canonbury—25, Grange-road, 50 years, ground-rent 600  
Camden-town—83, St. Paul's-road, 54 years, ground-rent 7l. 450  
Westbourne Park—68, 70, and 72, Tavistock-crescent, 77 years, ground-rent 25s. 1,020

By C. C. T. MOORE.  
St. George's-in-East—An Improved Rental of 72l. 16s., term 5 years, with a reversion 600  
Poplar—74 and 76, Bygrove-street, and 1 and 3, Hill-place, 53 years, ground-rent 7l. 10s. 380  
Ratcliffe—1 to 4, Little Queen Catharine-court, 9 years, ground-rent 6s. 11  
Bethnal-green—7, Norton-street, freehold 250

By PRICKETT, VERNALDE, & CO.  
Hamstead Heath—The cottages known as Gampgore House, Ludlow Cottage, and The Lawn 4,350  
Hamstead Heath-street—The Coach and Horse public-house, coppyhold 1,460  
A coppyhold house and shop 360

By HAIN & JENNINGS.  
Brighton—17 and 19, Denmark-villas, freehold 1,990  
Brookley, Gabriel-street—A plot of freehold land 62

By MARSH, MILLER, & LANGTON.  
Feltham—Two freehold cottages 330  
By VASTON, BULL, & COOPER.

Tottenham—A plot of freehold land 65  
Norwood-green—An enclosure of land, 21a. 2r. 2p., freehold 2,020  
An enclosure of land, 7a. Cr. 19p., freehold 885  
Heston—A plot of land, 1a. 3r. 2p., freehold 330  
Southall—The Old Gasworks, seven cottages, and 4a. Cr. 59p. 800

North Hyde—An enclosure of market garden land, 10a. 3r. 21p. 1,010  
Enclosures of land, 46a. Cr. 23p., in four lots 4,165  
Hendon—An enclosure of land, 8a. 2r. 26p., freehold 1,750  
Heston—An enclosure of land, 5a. 1r. 11p. 365

## JUNE 4.

By R. RAY.  
Merton—61, Merton-road, freehold 540  
Griffith-road—A plot of freehold land 210

By BURNS & SONS.  
Willesden-lane—The residence, Woodstock, 92 years, ground-rent 17l. 10s. 900  
Blandford-square—27, Sherborne-street, 55 years, ground-rent 4s. 555

By W. B. HALLER.  
Holloway—61, Lorraine-road, freehold 700  
Green-lanes—81, Digby-road, 88 years, ground-rent 7l. 360

By W. HALLITT & CO.  
Maida-vale—72, Sutherland-gardens, 77 years, ground-rent 12s. 755

By MURRELL & SCOBELL.  
Clerkenwell—12, Red Lion-street, freehold 815  
By NORMAN, TAYLOR, & CO.

Sydenham Hill—Crescent Wood House, 62 years, ground-rent 67s. 4,000  
Camden-town—157, 181, and 183, High-street, freehold 8,150  
High-street The Britannia public-house, 31 years, ground-rent 80s. 7,950  
60, Park-street, 31 years, ground-rent 2 l. 980

Park-street—Rental of 198s. a year, term 51 years, 165, High-street, freehold, and a Ground-rent of 4 l. 7,310  
71, Park-street, 61 years, ground-rent 12s. 2,150  
2, 3, and 5, High-street, a plot of freehold land 295

Haverstock-hill—Maitland Park House, 66 years, ground-rent 20s. 1,710

By ROBSON & PARRY.  
Stroud-green—66, Upper Tollymore Park, 39 years, ground-rent 10s. 880

## MEETINGS.

MONDAY, JUNE 14.  
Society of Antiquaries of Scotland (Edinburgh).—3 p.m.

TUESDAY, JUNE 15.  
British Museum.—Mr. John A. P. MacBride on "Later Greek Sculptors." 2.31 p.m.

WEDNESDAY, JUNE 16.  
Royal Meteorological Society.—Four papers to be read. 7 p.m.

Builder's Foremen and Clerks of Works' Institution.—Ordinary meeting. 8.3 p.m.

SATURDAY, JUNE 19.  
Architectural Association.—Vacation Visit (see advt.).

**Richmond Hill.**—We are glad to learn that the Duke of Buccleuch's property at Richmond Hill has been purchased by the local authorities, who, with a public spirit not always manifested on such occasions, have thus saved from destruction one of the most beautiful pieces of sylvan landscape near London. The purchase money is stated to be 90,000l.



## Miscellaneous.

## Birmingham Architectural Association.

At the ordinary meeting held at Queen's College on Tuesday evening, June 1st, the following gentlemen were elected to serve as the officers and committee of this Association for session 1886-87.—President, F. B. Osborn, F.R.I.B.A.; Vice-President, John Cotton; Ordinary Members of Committee, H. Bock, H. H. McCounal, A.R.I.B.A., Franklin Cross, A. V. Ingall, W. H. Kendrick, T. W. F. Newton, F. B. Peacock; Hon. Treasurer, A. Reading, A.R.I.B.A.; Hon. Librarian, A. Hale; Hon. Secretary, Victor Scruton.

## Sanitary Institute of Great Britain.

At an examination held by this Institute on June 3rd and 4th, sixty candidates presented themselves,—ten as Local Surveyors and fifty as Inspectors of Nuisances. Questions were set to be answered in writing on the 3rd, and the candidates were examined *visu voce* on the 4th. As a result, the Institute's certificate of competency to discharge the duties of Local Surveyor has been awarded to Messrs. Edwin T. Beard, J. G. Morley, W. H. Parry, F. H. Tulloch, and T. W. Wits. The Institute's certificate of competency to discharge the duties of Inspector of Nuisances has been awarded to Messrs. C. G. Bateman, J. W. Brooke, T. B. Warren, W. F. Wheeler, J. V. Leventon, C. F. Newman, E. Clayton, W. J. Treadwell, M. Hampson, G. Bartlett, W. J. G. Wreford, G. Darley, T. Salter, A. E. Black, J. E. Smith, A. J. Munro, T. H. Freeman, J. E. Evans, J. W. Hildreth, G. Taylor, A. M. Thompson, W. Garland, W. W. Cooper, L. W. Mellows, S. Crane, T. Ashdown, F. P. Burscough, H. Brownings, J. B. Massey, J. Cooper, W. Jones, J. J. Sargent, R. Chamberlain, W. Green, A. Gunn, J. Radcliffe, T. Anderson, W. J. Press, J. Wilkinson, A. R. Bull, G. Phimster, C. Cox, J. Haworth, and H. C. Bascombe.

**Society of Engineers.**—At a meeting of the Society of Engineers, held on Monday evening, at the Town-hall, Westminster, Mr. Perry F. Nursey, President, in the chair, a paper was read on "Some Modern Improvements in the Manufacture of Coal Gas," by Mr. R. P. Spice, C.E., past-president. The author gave a résumé of the history of the various steps in the progress of coal-gas manufacture since the adoption of clay retorts. Referring to the objections raised to these on their first introduction, he showed how these objections had been disproved by experience. He then noticed the exhausters in its two forms,—by air-pump and steam-jets—and explained the advantages of both. The question of charging and drawing retorts by machinery instead of by hand was fully considered. Some of the difficulties that arose in practice were afterwards discussed, such as those caused by dips and anti-dips, choked ascension-pipes, and those occasioned by naphthalene, with the various remedies proposed. The paper then dealt with the advantages of purification in closed vessels, as now carried on by means of carbonising coal with a small percentage of slaked lime mixed with it before charging the retorts; the result being the entire abolition of the nuisance arising from the frequent opening and cleansing of purifiers on the old method, which is no longer necessary.

**Trade Memo.**—Messrs. W. H. Lindsay & Co., of the Paddington Ironworks, announce that they have been appointed by Messrs. Dorman, Long, & Co., of Middlesbrough, sole agents for the sale of their English steel and iron rolled joists, &c. We are informed that all Messrs. Dorman, Long, & Co.'s joists are branded with their name in full, and are guaranteed to stand a test of from 22 to 24 tons tensile strain. The prices, we are informed, are only very slightly in excess of those of Belgian joists. We are glad to see English ironmasters competing with those of Belgium in rolling joists of deep section.—The Coalbrookdale Company have just removed their London show-room from Holborn Viaduct to the Victoria Embankment, corner of New Bridge-street, Blackfriars, and opposite Queen Victoria-street.

**Tottenhall.**—A window in Tottenhall Church, Wolverhampton, has recently been filled with stained glass from the studio of Messrs. Warrington & Co., of Fitzroy-square. The window is of two-lights, and illustrates subjects of two of the Acts of Mercy, beneath architectural canopies.

## British Archaeological Association.

The closing meeting of the session was held on Wednesday, June 2nd, Mr. W. H. Cope in the chair. Mr. J. T. Irvine exhibited sketches of some early Norman sculptures in Castor Church, Northants, and pointed out their resemblance in style to others on the font of the neighbouring church of Wansford. Mr. R. Mann described a remarkable carved stone found at Bath, having figures on three of its sides. Mr. Loftus Brock, F.S.A., reported the existence of a Saxon font at Tring, Bucks, now lying overturned in the porch. It is covered with interlaced work. A paper was then read by Mr. Algernon Brent on some early seals, which were exhibited at the same time. One of these was of Richard de Redvers, Earl of Devon, who died 1184. A second paper was then read by Mr. G. B. Wright, F.S.A., on a Roman building at Reims. It is only partially executed, and was inspected by the members of the Leland Club during the recent visit to France. There are six or more columns in a row,—their bases and about one half of their shafts being perfect, *in situ*; the remains of a hypocaust, and a great many walls, indicating that the building has been one of magnitude. The position is close to the Great Roman Archway in a public garden. The excavations are suspended for the present, until the Town Council has given sanction for the further works of clearance. The Rev. Scott Surtees pointed out some points of resemblance of the construction to those of the Roman Camp on the Saalberg. The concluding paper was by Mr. E. Walford on the painted glass still existing at Vane House, Hampstead, formerly the residence of Bishop Butler. There is a similar series of roundels at Oriel College, Oxford, believed by Cardinal Newman to have been brought from Hampstead.

**Steel Rails for Foundations.**—Steel rails are now frequently used in the foundations of large buildings, and Chicago is, we believe, the city where they were first employed. The Montank Block and the Central Building, now being erected on the old Rookery site, are among the structures partially supported by steel rails. Such a foundation is especially required in that city on account of the nature of the soil. In New York and elsewhere, where there is a solid rock bottom, there is usually no need of such a device, but even New York builders who have seen the use rails are put to are on the point of trying the experiment. The rails are laid close together imbedded in cement, which in time becomes almost as hard as the steel itself, and there is no danger of weakening the steel by rusting when it is so protected from air and moisture. Such a foundation enables the builder to make the stone piers above lighter, and thus save a good deal of room in the basement. And on the basis of recent prices, steel rails are cheaper than stone. This is an enlargement upon a system of wire concrete introduced into construction in this country some ten or twelve years since, in which a network of steel or iron wire was woven into the concrete.—Iron.

## PRICES CURRENT OF MATERIALS.

TIMBER.	£.	s.	d.	£.	s.	d.
Greenheart, B.G. ....ton	6	5	0	7	0	0
Teak, E.I. ....load	11	10	0	15	0	0
Sequoia, U.S. ....foot cube	0	2	4	0	2	9
Ash, Canada ....load	3	0	0	4	10	0
Birch ....	2	10	0	4	0	0
Elm ....	3	10	0	4	10	0
Fir, Dantais, &c. ....	1	10	0	4	0	0
Oak ....	2	10	0	6	0	0
Canada ....	2	10	0	6	0	0
Pine, Canada red ....	2	10	0	4	0	0
" yellow ....	3	0	0	5	0	0
Lath, Dantais ....fathom	3	10	0	5	0	0
St. Petersburg ....	4	0	0	6	0	0
Wainscot, Riga ....log	2	15	0	4	10	0
" Odessa, crown ....	3	7	0	0	0	0
Deal, Finland, 2nd and 1st, std. 100	6	0	0	7	0	0
" 4th and 3rd ....	6	0	0	7	0	0
Riga ....	6	0	0	7	0	0
St. Petersburg, 1st yellow ....	7	0	0	14	0	0
" white ....	7	0	0	8	0	0
Deals, Swedish ....	6	0	0	15	0	0
White Sea ....	7	0	0	17	0	0
Canada Pine, 1st ....	17	0	0	30	0	0
" 2nd ....	12	0	0	17	0	0
" 3rd, &c. ....	6	0	0	10	0	0
" Spruce 1st ....	8	0	0	11	0	0
" 3rd and 2nd ....	5	0	0	7	0	0
New Brunswick, &c. ....	5	0	0	7	0	0
Battens, all kinds ....	4	0	0	12	0	0
Flooring Boards, sq. 1 in., prepared, first ....	0	9	0	0	13	0
" Second ....	0	7	0	0	8	0
Other qualities ....	0	5	0	0	7	0
Cedar, Cuba, &c. ....foot	0	0	34	0	0	4
Honduras, &c. ....	0	0	23	0	0	4
Australian ....	0	0	2	0	0	3

## TIMBER (continued).

	£.	s.	d.	£.	s.	d.
Mahogany, Cuba ....	0	0	5	0	0	7 1/2
St. Domingo, cargo average ....	0	0	5	0	0	7 1/2
Mexican ....	0	0	34	0	0	0
Tobacco ....	0	0	4	0	0	0 1/2
Headways ....	0	0	41	0	0	0 1/2
Maple, Bird's-eye ....	0	0	34	0	0	0 1/2
Rose, Rio ....	7	0	0	10	0	0
Bahia ....	8	0	0	10	0	0
Box, Turkey ....	5	0	0	17	0	0
Sapota, St. Domingo ....foot	0	0	7	0	0	11
Porto Rico ....	0	0	8	0	0	1 1/2
Walnut, Italian ....	0	0	4	0	0	5

## METALS.

	£.	s.	d.	£.	s.	d.
Iron—Pig in Scotland ....ton	0	0	0	0	0	0
Bar, Welsh, in London ....	4	10	0	4	17	6
" in Wales ....	4	5	0	4	10	0
" Shropshire, London ....	8	5	0	6	10	0
Sheets, single, in London ....	6	15	0	8	10	0
Roofs ....	6	0	0	7	0	0
Nail-roads ....	5	10	0	6	10	0
COPPER—						
British, cake and ingot ....ton	42	10	0	43	10	0
Best selected ....	44	0	0	44	10	0
Sheets, strong ....	25	10	0	26	0	0
" India ....	47	0	0	48	0	0
Australian ....	0	0	0	0	0	0
Chili, bars ....	39	10	0	40	0	0
Yellow Metal ....lb.	25	10	0	26	0	0
LEAD—Pig, Spanish ....	12	15	0	0	0	0
" English, common brands ....	13	5	0	14	0	0
Sheet, English ....	13	5	0	14	0	0
BRASS—						
Silesian, special ....ton	14	0	0	14	5	0
Ordinary brands ....	13	15	0	14	0	0
TIN—						
Banca ....ton	0	0	0	0	0	0
Billiton ....	0	0	0	0	0	0
Straits ....	90	10	0	0	0	0
Australian ....	100	0	0	0	0	0
English ingots ....	103	0	0	0	0	0
ZINC—						
English sheet ....ton	18	0	0	18	5	0

## OLLS.

	£.	s.	d.	£.	s.	d.
Limeoil, Cochin ....ton	21	0	0	21	5	0
Cocunut, Coch. ....	31	10	0	0	0	0
Ceylon ....	25	10	0	0	0	0
Copra ....	0	0	0	0	0	0
Palm, Lagos ....	23	10	0	0	0	0
Palm-nut Kernel ....	0	0	0	0	0	0
Repeased, English ....	22	10	0	0	0	0
" brown ....	21	0	0	21	5	0
Cottonseed, refined ....	18	0	0	19	0	0
Castor Oil, Olsun ....	25	0	0	45	0	0
Lubricating, U.S. ....	6	0	0	10	0	0
" Redned ....	8	0	0	13	0	0

TURPENTINE—						
American, in casks ....cwt.	1	4	6	1	4	6
Tap—Stockholm ....	0	17	0	0	17	6
Archangeal ....	0	10	6	0	11	3

## TENDERS.

**BEDFORD.**—For new house, St. John's Hospital Building Estate, Bedford, for Mr. W. Sparks. Messrs. Burgess & Oller, architects, Great Yarmouth. £538 0 0  
Warton & Walker, Bedford. £538 0 0  
\* Accepted.

**BEXHILL (Sussex).**—For the erection of two covered seats on the Marina, and twelve uncovered. Mr. Joseph B. Wall, architect:—  
J. H. Webb, Bexhill (accepted). £120 0 0

**BEXHILL (Sussex).**—For his fittings to the Devonshire Hotel, for the proprietor, Mr. Joseph B. Wall, architect:—  
Cabinet Work.  
J. Higgs (accepted). £175 0 0  
W. Thompson, Clerkenwell (accepted). 150 0 0

**Peatner's Work.**  
F. J. Ruse, Bermundsey (accepted). £40 0 0

**BROUGHTON (Hants).**—For the erection of dwelling-house, with shop, bakehouse, slaughter-house, stabling, van shed, &c., at Broughton, Hants, for Mr. Thomas Hinxton, Mr. F. B. Babb, architect, Salisbury:—  
W. J. & C. S. Young, Salisbury. £1,494 0 0  
Gilbert Harris, Salisbury. 1,490 0 0  
E. H. Sturges, Ludgershall, near Andover (accepted). 1,265 0 0

**CAMBERWELL.**—For repairs to house, Love-lane, Camberwell, for Mr. Haden. Mr. Joseph B. Wall, architect:—  
F. Head. £129 0 0  
J. Butler, Fulham (accepted). 98 10 0

**CARDIFF.**—For new Wesleyan mission chapel, Cardiff. Messrs. W. G. Habershon & Fawcett, architects, Cardiff:—  
D. J. Davies. £2,430 0 0  
D. Davies. 2,300 0 0  
J. E. Evans. 1,994 0 0  
T. Gough. 1,977 0 0  
H. Marshall. 1,971 0 0  
C. Shephard & Son. 1,833 0 0  
J. Hallett. 1,811 0 0

## [All of Cardiff.]

**CROUCH END (Middlesex).**—For the erection of shop, residence, and stable, The Broadway, for Messrs. H. Williams & Co. Mr. John Farrer, architect and surveyor, Finsbury-parsonage:—  
Macfarlane Bros. £1,840 0 0  
Wilkinson Bros. 1,675 0 0  
J. Smith & Sons. 1,569 0 0  
Dunmore. 1,545 0 0  
Houghton. 1,535 0 0  
Toms. 1,527 0 0  
Outhwaite & Son (accepted). 1,443 0 0

**CROYDON.**—For rebuilding the Rail View Hotel, Seladon-road. Mr. F. West, architect, Cooombe-road, Croydon:—  
Marriage, Croydon. £2,110 0 0  
Taylor, Croydon. 1,909 0 0  
Maides & Harper, Croydon. 1,664 0 0  
Page, Croydon. 1,675 0 0  
Smith & Sons, South Norwood. 1,596 0 0



## COMPETITIONS, CONTRACTS, &amp; PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

## COMPETITIONS.

Nature of Work.	By whom required.	Premium.	Designs to be delivered.	Page.
Infectious Diseases Hospital .....	Liverpool Corporation...	50l. and 25l. ....	August 10th ..	i.

## CONTRACTS.

Nature of Work, or Materials.	By whom required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Sefton-street Improvement .....	Liverpool Corporation	Official .....	June 16th ..	ii.
Painting and Repairing Workhouses .....	Poplar Union .....	J. S. & F. Clarkson .....	June 17th ..	xviii.
Works, Repairs, and Building Materials .....	War Department .....	Official .....	June 18th ..	ii.
Painting Household Barsacks, &c. ....	do. ....	do. ....	June 19th ..	ii.
Making-up Streets .....	Wandsworth Bd. of Wks .....	do. ....	June 22nd ..	ii.
Road Making and Paving .....	Metro. Pubes Dist. ....	O. Claude Robson .....	do. ....	ii.
New Stables .....	Winbleton Local Bnd. ....	Official .....	do. ....	xviii.
Erection of Mortuary Buildings .....	Vestry of St. Luke, Middlesex .....	do. ....	do. ....	ii.
Paving Works .....	Greenwich Bd. of Wks. ....	do. ....	June 23rd ..	ii.
Paving Margins of Tramways .....	do. ....	do. ....	do. ....	ii.
Stores .....	do. ....	do. ....	do. ....	ii.
Pipe-Sewers, &c. ....	Hackney Board of Wks .....	J. Lovegrove .....	do. ....	ii.
Erection of Houses, Angle .....	Lambeth Vestry .....	H. McIntosh .....	June 24th ..	xviii.
Painting, Papering, and Repairing Works .....	Admiralty .....	Official .....	June 25th ..	i.
Making-up Roads, Sewers, &c. ....	Met. Asylums Board .....	do. ....	June 28th ..	xviii.
Cornish Boiler .....	Waxham Drainage Com. ....	do. ....	do. ....	ii.
Building and Attaching Chapel to House .....	Folkstone Cor. ....	W. Lee .....	do. ....	ii.
Guernsey Granite, Kewish Rag, Flints, &c. ....	A. W. Conquest .....	do. ....	do. ....	ii.
Making-up Roads, Sewers, &c. ....	Lowestoft Town Council .....	R. H. Inch .....	June 29th ..	ii.
New Schools .....	Basingstoke Sch. Bnd. ....	C. B. Bol .....	July 6th ..	xviii.
Engines, Boilers, and Pumping Machinery .....	Acton Local Board .....	C. N. Laidy .....	July 6th ..	ii.
Completion of New West End Station .....	do. ....	H. Cheston .....	Not stated ..	ii.
Completion of Tower, Christ Church, Epsom .....	do. ....	do. ....	do. ....	i.

## PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page.
Surveyor .....	Southend Local Board .....	200l. ....	June 22nd ..	xvi.

**CUBITT TOWN.**—For the erection of house and workshop, in Bilson-street, Cubitt Town, E., for Mr. G. Payne. Mr. J. W. Stocker, architect, St. Mary Axe.—W. Buckland, Cubitt Town (accepted) £293 0 0

**CUBITT TOWN.**—For the erection of two houses in Sessell-street, Cubitt Town, E., for Mr. W. H. Day. Mr. J. W. Stocker, architect.—W. Buckland, Cubitt Town (accepted) £273 0 0

**GREAT HAWWOOD (Lancashire).**—For wrought-iron palisading and entrance-gates. Quantities supplied by Mr. A. W. R. Simpson, architect, Richmond-chambers, Blackburn:—

	£ s. d.	£ s. d.
J. W. Singer & Sons, Frome ..	837 10 0	737 0 0
Edgar Keeling, Totley, & Co. ....	684 2 6	663 15 6
Jones & Willie, London .....	695 0 0	0
St. Pancras Ironworks Co., London .....	611 0 0	462 0 0
Raby, Fell, & Co., Manchester ..	615 0 0	0
James Stead, Blackburn .....	495 0 0	385 0 0
Wm. Crompton, Blackburn .....	490 0 0	358 0 0
Marshall & Williams, Birmingham ..	463 7 0	412 7 0
Margrave & Co. Belfast .....	462 0 0	340 0 0
Baylis, Jones, & Bayliss, W. Verhampton ..	416 3 4	380 13 0
C. Smith & Sons, Birmingham ..	411 10 6	351 10 6
Robert Kay, Helmsboro, Manchester ..	382 13 0	346 0 0
Hill & Smith, Brierley Hill, Stafford ..	375 0 0	355 0 0
Hugh Hubberstey, Great Harwood .....	355 15 6	228 13 8
Arthur Simpson, Blackburn ..	349 5 8	309 5 8
Worrell & Co. Liverpool .....	347 19 0	350 0 0
E. C. & J. Key, Birmingham ..	342 12 0	0
Brownlee & Murray, Glasgow ..	333 18 0	0
Richard Odde, Bury .....	332 17 0	262 17 0
William Walton, Burnley .....	314 18 0	259 18 0
F. Morton & Co., Liverpool ..	312 0 0	0
Thomas Wardleworth, Padham, near Burnley ..	283 10 0	0
Thomas Ashworth, Burnley (accepted) ..	240 0 0	197 18 0

\* With wrought-iron heads to palisading.  
† With cast-iron heads to palisading.

**HAMMERSTEAD.**—For making up roads at Hammer-smith, for the Vestry:—

	Slaiclar-road, Balmer-road.
Hindle & Morrish .....	£280 .....
Trehearne .....	195 .....
George Oulton .....	145 .....
Chas. Killip .....	132 .....
Tom & Wimpey .....	123 .....
Coat (accepted) .....	83 .....

**HAMPSTEAD.**—For the making of sewers, manholes, ventilating shafts, &c., and for the making of roads and paths, &c., on the National Standard Land Company's Woodbine Estate, Hampstead:—

Rowland Bros. ....	£1,825 0 0
Amos Oliver .....	1,900 0 0
George Oulton .....	1,787 0 0
Chas. Killip .....	1,750 0 0
George Felton .....	1,444 0 0
Ford & Co. ....	1,370 0 0
William Kay .....	1,260 16 0

**HAMPSTEAD.**—For the erection of the Bickersteth Memorial Hall, Hampstead. Mr. Wilfred J. Hardcastle, architect, Lancaster House, Strand. Quantities by Messrs. Young & Brown:—

E. Lawrence & Sons .....	£1,405 0 0
Neave & Neave .....	1,393 0 0
Charles Wall .....	1,377 0 0
Kirk & Randall .....	1,361 0 0
A. & E. Braid .....	1,357 0 0
Poster & Dicksee .....	1,354 0 0
C. F. Kearley .....	1,347 0 0
Staines & Son .....	1,344 0 0
B. E. Nightingale .....	1,343 0 0
Higgs & Hill .....	1,324 0 0
B. C. Howell & Son (accepted) ..	1,230 0 0

**HOLLOWAY.**—For the erection of hall, 19, Albion-road, Holloway. Mr. T. S. Archer, architect, Basinghall-street:—

Adams .....	£1,040 0 0
Patman & Fotheringham .....	389 0 0
Elbbage .....	786 0 0
Holliday & Greenwood (accepted) ..	713 0 0

**KILBURN.**—For alterations to the Albert Edward, Albert-street, Kilburn, for Mrs. Wright. Mr. H. I. Newton, architect, Queen Anne's-gate:—

Excell & Lister .....	£625 0 0
Campbell (accepted) .....	457 0 0

For Fetherers' Work.

Paddon (accepted) .....	46 0 0
-------------------------	--------

**LONDON.**—For alterations and additions to 77, St. John-street, and 29, St. John's-lane, Clerkenwell, for Messrs. Fenner, Appleton, & Co. Mr. Herbert D. Appleton, architect, Wool Exchange.

Quantities by Mr. F. T. W. Miller, Guildhall-chambers:—	
Clarke & Bracey .....	£1,139 0 0
T. H. & R. Roberts .....	2,687 0 0
Patman & Fotheringham .....	1,871 0 0
Shurmer .....	1,845 0 0
Colls & Sons .....	1,788 0 0

**LONDON.**—For the erection of Portman Chapel, Creech and mission-house. Mr. Alfred R. Pite, architect, Bloomsbury-square. Quantities by Mr. Rookwood:—

Hayward & Son .....	£3,400 0 0
Harris .....	3,182 0 0
Woodward .....	2,994 0 0
Lathay Bros. ....	2,887 0 0
Tomlinson .....	2,868 0 0
Falkner .....	2,798 0 0
Patman & Fotheringham .....	2,773 0 0
Simpson .....	2,750 0 0
Hooper .....	2,743 0 0
Smit & Sons .....	2,719 0 0
Grover .....	2,673 0 0
Macey .....	2,621 0 0
Wall Bros. (accepted) .....	2,575 0 0

**LONDON.**—For pulling down and rebuilding 24 and 25, Castle-street East, W., for Mr. Smith. Mr. W. J. Miller, architect. Quantities supplied:—

C. Manning .....	£2,657 0 0
Spencer & Co. ....	2,620 0 0
E. Fairchild .....	2,439 0 0

**LONDON.**—For alterations to the Gloucester Arms, Mason-street, Old Kent-road, for Mr. R. A. Lewcock, architect, Bishopsgate-street Within:—

Simpson .....	£265 0 0
Rayo .....	198 0 0
Spencer & Co. ....	195 0 0

**LONDON.**—For the extension of Leadhall Market, for the Honourable the Corporation of the City of London. Mr. Horace Jones, architect. Quantities by Messrs. William Reddall & Son:—

Webster .....	£23,540 0 0
Holliday & Greenwood .....	22,947 0 0
Colls & Sons .....	22,824 0 0
Nixon .....	22,140 0 0
Boyes .....	22,110 0 0
Conder .....	22,000 0 0
Hart .....	21,987 0 0
Holland & Hannen .....	21,976 0 0
Hall, Reddall, & Co. ....	21,938 0 0
Chappell .....	21,830 0 0
Bywaters .....	21,793 0 0
Kilby & Gayford .....	21,570 0 0
Perry & Co. ....	21,494 0 0
Morier .....	21,432 0 0
Gentry .....	20,875 0 0
Mowlem & Co. ....	20,487 0 0

**LONDON.**—For the erection of billiard-room addition at the Buckley Constitutional Club, for the Committee. Mr. Joseph B. Wall, architect, Walbrook:—

Thos. Sayers .....	£270 0 0
S. Schfield .....	265 0 0
T. D. Long .....	260 0 0
Jerrard .....	224 0 0
G. H. Webb .....	224 0 0
East .....	246 0 0
H. L. Holloway .....	199 0 0
Congdon Bros. ....	189 12 0

**LONDON.**—For rebuilding 2, Gloucester-street, Troobald-road, W.C., for Mr. Haslett. Messrs. John & Stuart Clarkson, architects. No quantities.

Brigman .....	£1,497 0 0
McCormack & Sons .....	1,499 0 0
Manning .....	1,329 0 0
Fussy & Lumley .....	1,246 0 0
Sabey & Son .....	1,169 0 0

**LUDDENDEN (Yorks).**—For new shed and warehouse, Luddenden. Mr. T. L. Patchett, architect, Halifax:—

Total amount of highest Tenders .....	£1,532 14 8
£100 lowest Tenders .....	1,391 19 8
Total amount of accepted Tenders, which include old material re-used ..	1,424 10 0

[Architect's estimate, £1,500.]

Accepted Contractors.  
Excavators, Masons, and Bricklayers' Work.—Mr. Rowland Gaskroper, Warley.  
Carpenter's and Joiner's Work.—Mr. James Lister, Holden Bridge.

Plumber's and Glazier's Work.—Mr. Levi Crabtree, Luddenden.  
Slater's and Plasterer's Work.—Messrs. J. & T. Alderson, Luddenden.

Ironfounders' Work.—Messrs. Wood Bros., Sowerby Bridge.  
Cemented Flooring.—Messrs. George Greenwood & Sons, Halifax.

**LUTON (Beds.).**—For the erection of dyeing premises at Luton, for Mr. T. Lye. Mr. J. B. Brown, architect, Luton:—

T. & E. Neville .....	£1,698 0 0
Slough Bros. ....	1,670 0 0
G. Smart .....	1,475 0 0
W. Dunham (accepted) .....	1,452 0 0

[All of Luton.]

**PENN (Bucks).**—For the erection of St. Margaret's Parish Room, &c., Tyler-green, Penn, Bucks. Mr. Arthur Vernon, architect, High Wycombe:—

Z. Wheeler .....	£240 0 0
------------------	----------

**SHINBRIDGE (Gloucestershire).**—For new house and farm buildings at Shinbridge, Gloucestershire, for the Right Hon. Lord Fitzharding. Mr. J. H. Littlejohn, architect, Berkeley. Quantities by Mr. B. W. Fope, Bristol:—

Church, Bristol .....	£3,570 0 0
Stephens & Bastow, Bristol .....	3,335 0 0
S. Cox, Stroud .....	3,293 0 0
Nicholls & Co., Shinbridge .....	3,261 0 0
Wm. Jones, Gloucester .....	3,228 0 0
Meredith, Gloucester .....	3,150 0 0
Roach & Son, Chalford .....	3,100 0 0
F. & J. Williams, Bristol .....	2,984 0 0
Workman & Son, Shinbridge .....	2,885 0 0
H. A. Fove, Bristol .....	2,869 0 0
Harper, Stroud .....	2,924 0 0
D. C. Jones & Co., Gloucester .....	2,920 0 0
Baxter, Stroud .....	2,917 0 0
G. Drew, Chalford .....	2,916 0 0
Coleman, Chalford .....	2,897 0 0
Wilkins & Son, Bristol .....	2,880 0 0
Gregory & Son, Berkeley .....	2,867 0 0
A. King, Gloucester (accepted) ..	2,798 0 0

**SPALDING (Lincolnshire).**—For Wesleyan Methodist Chapel, Spalding. Mr. F. Boreham, architect:—

Thompson & Son, Louth .....	£2,150 0 0
S. & W. Pattinson, Spalding ..	2,090 0 0
Broadhurst, March .....	2,800 0 0
J. Holloway, London .....	3,790 0 0
G. Mower, London .....	2,667 0 0
J. Collingwood & Son, March ..	2,963 0 0
Bennett Bros., Downham .....	2,578 0 0
Scholes, Rouse, & Clarke, Stamford ..	2,450 0 0
J. Holmes, Wainfleet (accepted) ..	2,388 0 0

**STOKESBY (Norfolk).**—For works at Hilbro' House, Stokesby, Norfolk, for Mr. F. W. Waters. Messrs. Bottle & Oley, architects, Great Yarmouth:—

Second Contract.—Billiard Room and outer Entrance Hall.  
E. Howes (bricklayer), Great Yarmouth .....

R. Riches (carpenter), Postwick ..	£262 0 0
Wolverton & Son (plumbers), Great Yarmouth .....	45 8 0

[All accepted.]



**STOKE NEWINGTON.**—For taking down and rebuilding the premises, 189, High-street, Stoke Newington. Mr. R. A. Lewcock, architect, Bishopsgate-street Within:—

Coldwell	£1,368	0	0
Kilby & Gray	1,291	0	0
Pringle	1,231	0	0
Goodall	1,199	0	0
Anley	1,189	0	0
Itory	878	0	0

**STOKE NEWINGTON.**—For taking down and erecting the temporary iron and wood building at corner of Rectory and Avering roads, Stoke Newington, and for providing and laying in sundry foundations for permanent lecture-hall on the site, for the Building Committee of the Rectory-road Congregational Church. Mr. R. A. Lewcock, architect:—

	Laying Foundations.	Removing from Building.	Removal of Organ.
Crogon	£285	0	£187 10
Jackson & Todd	245	0	—
Lascelles	184	0	107 0
Goodall	180	0	104 0
Boome	138	0	60 0

**STRATFORD (Essex).**—For pulling down and rebuilding the George public-house, The Broadway, Stratford, for the London and Burton Brewery. Mr. T. S. Archer, architect, Basinghall-street:—

Forrest	£3,687	0	0
Boyce	3,405	0	0
Hall, Beddall, & Co.	3,303	0	0
Perry & Co.	3,332	0	0
Holland	3,298	0	0
Mortier	3,213	0	0
Holliday & Greenwood	3,139	0	0
Asby & Horner	3,063	0	0
Barne (accepted)	2,788	0	0
Flitings			
Holland	£204	0	0
Lascelles	289	0	0
Boyce	285	0	0
Hall, Beddall, & Co.	283	0	0
Asby & Horner	280	0	0
Perry & Co.	257	0	0
Mortier	251	0	0
Forrest	237	0	0
Holliday & Greenwood	215	0	0
Barne	192	15	0

**STREATHAM.**—For alterations and additions to 3, Streatham-row, for Messrs. Leverett & Frye. Mr. J. O. Smith, architect, Southampton-street, Strand:—

W. Mason	£407	0	0
Hill Bros.	359	0	0
W. Morton	345	0	0

**TOTTENHAM.**—For pulling down and rebuilding two houses, with shop and stable, at Eagle-place, High Cross-lane, Tottenham, for Mr. Dixon. Mr. Chas. J. Higgins, architect:—

Thompson	£275	0	0
Holloway	880	0	0
Williams	648	0	0
Wilkins Bros.	637	0	0
Lauble	623	0	0
Deering & Son	605	0	0

**TOXTETH PARK.**—For the completion of Wendell-street, for the Toxteth Park Local Board. Contract No. 8. Quantities supplied by the engineer, Mr. John Price, Assoc. M. Inst. C.E.:—

Hayes & Son, Bolton	£249	9	9
Chas. Burt, Toxteth Park	220	0	0
McCabe & Co., Kirkdale	210	6	9
L. Marr, Toxteth Park	189	11	6
Anwell & Co., Liverpool	179	9	6
W. F. Chadwick, Liverpool	175	15	0
R. Lomax, Eccles	170	7	9
Walkden & Co., Bootle (accepted)	169	18	6

[Engineer's estimate, 1901.]

**TOXTETH PARK.**—For the completion of Holme-street (Contract No. 7), for the Local Board. Quantities supplied by the engineer, Mr. John Price, Assoc. M. Inst. C.E.:—

McCabe & Co., Liverpool	£286	14	0
Hayes & Son, Bolton	262	9	4
Chas. Burt, Toxteth Park	261	0	0
Anwell & Co., Liverpool	279	3	8
L. Marr, Toxteth Park	241	14	7
R. Lomax, Eccles	237	1	11
W. F. Chadwick, Liverpool (accepted)	236	18	1
Walkden & Co., Bootle	167	0	0

[Engineer's estimate, 1902.]

\* Withdrawn owing to error.

**TOXTETH PARK.**—For the completion of Whittier-street, for the Toxteth Park Local Board. Contract No. 9. Quantities supplied by the engineer, Mr. John Price, Assoc. M. Inst. C.E.:—

Hayes & Son, Bolton	£253	1	4
McCabe & Co., Kirkdale	237	3	8
Chas. Burt, Toxteth Park	230	0	0
L. Marr, Toxteth Park	192	19	0
S. McCullagh, Toxteth Park	189	13	5
Anwell & Co., Liverpool	184	12	1
W. F. Chadwick, Liverpool	180	3	2
R. Lomax, Eccles	178	11	6
Walkden & Co., Bootle (accepted)	173	8	0

[Engineer's estimate, 1901.]

**WITNEY (Oxon).**—For new residences for Mr. J. Vanner Early. Messrs. Dunk & Geden, architects, Leadenhall-street, E.C.:—

Bartlett Bros., Witney	£2,670	16	0
Wilkins & Son, Rysham	2,567	0	0
W. Cantwell, Witney	2,499	0	0

**YARMOUTH.**—For new class-room and lobby, for eighty children, to St. George's Board Schools, Great Yarmouth. Messrs. Bottle & Olley, architects, Great Yarmouth:—

H. Springall	£464	0	0
R. Davy	459	0	0
J. S. Cooper	447	10	0
E. Howes	441	0	0
J. Bray	438	0	0
J. Leggett	429	0	0
Cork & Beech (accepted)	423	10	0

[All of Great Yarmouth.]

**YARMOUTH.**—For additions to business offices, for Sir E. K. Leach & Sons, North Howard-street, Great Yarmouth. Messrs. Bottle & Olley, architects, Great Yarmouth:—

Wm. Wright	£212	16	8
Cork & Beech	754	10	0
E. Howes	715	0	0
J. Leggett (accepted)	752	0	0

[All of Great Yarmouth.]

**SPECIAL NOTICE.**—Lists of Tenders frequently reach us too late for insertion. They should be delivered at our office, 46, Catherine-street, W.C., not later than Four p.m. on THURSDAYS.

## PUBLISHER'S NOTICES.

Registered Telegraphic Address, "THE BUILDER, LONDON."

### CHARGES FOR ADVERTISEMENTS.

SITUATIONS VACANT, PARTNERSHIPS, APPRENTICESHIPS, TRADE AND GENERAL ADVERTISEMENTS.

Six lines (about fifty words) or under ..... 4s. 6d.  
Each additional line (about ten words) ..... 6s. 6d.

Terms for Series of Trade Advertisements, also for special Advertisements on front page, Competitions, Contracts, Sales by Auction, &c., may be obtained on application to the Publisher.

FOUR LINES (about THIRTY words) or under ..... 2s. 6d.  
Each additional line (about ten words) ..... 5s. 6d.

PREPAYMENT IS ABSOLUTELY NECESSARY.  
\* Stamps must not be sent, but all small sums should be remitted by Cash in Registered Letter or by Money Order, payable at the "at-office, Covent-garden, W.C. to

DOUGLAS FOURDRINER, Publisher.  
Addressed to No. 46, Catherine-street, W.C.

Advertisements for the current week's issue must reach the Office before THREE o'clock p.m. on THURSDAY.

The Publisher cannot be responsible for omissions if addressed envelopes are sent, together with sufficient stamps to cover the postage.

**SPECIAL.**—ALTERATIONS IN STANDING ADVERTISEMENTS OR ORDERS TO DISCONTINUE same must reach the Office before TEN o'clock on WEDNESDAY mornings.

PERSONS Advertising in "The Builder," may have *Articles addressed to the Office, 46, Catherine-street, Covent-garden, W.C.* free of charge. Letters will be forwarded if addressed envelopes are sent, together with sufficient stamps to cover the postage.

**TERMS OF SUBSCRIPTION.**  
"THE BUILDER" is supplied gratis from the Office to residents in any part of the United Kingdom at the rate of 18s. per annum. For all parts of Europe, Australia, and New Zealand, 26s. per annum. To India, China, Ceylon, &c., 30s. per annum. Remittances payable to DOUGLAS FOURDRINER, Publisher, No. 46, Catherine-street, W.C.

## TO CORRESPONDENTS.

Registered Telegraphic Address, "THE BUILDER, LONDON."

W. Bros.—A. G. Vésley.—J. G. P.—J. B.—T. C. M. (shall appear).  
Y. S.—M. St. C. L.—E. F. & Co.—A. W. (to be sent).

All statements of facts, lists of tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

Note.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

We cannot undertake to return rejected communications.  
Letters or communications (by post and news items) which have been duplicated for other journals, are NOT DESIRED.

All communications regarding literary and artist matters should be addressed to THE EDITOR; all communications relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

### Best Bath Stone.

**WESTWOOD GROUND,**  
Box Ground, Combe Down,  
Corsham Down, And Farleigh Down,  
**RANDELL, SAUNDERS, & CO., Limited,**  
Corsham, Wilts. [Adv.]

### Bath Stone.

BEST QUALITY OF ALL KINDS.

**PICTOR & SONS,**  
Box, Wilts. [Adv.]

**Doubling Freestone and Ham Hill Stone**  
of best quality, in blocks, or prepared ready for fixing. An inspection of the Doubling Quarries is respectfully solicited; and Architects and others are CAUTIONED against inferior stone. Prices, delivered to any part of the United Kingdom, given on application to **CHARLES TRASK & SONS, Norton-sub-Hamdon, Ilminster, Somerset.**—Agent, Mr. E. WILLIAMS, No. 16, Craven-street, Strand, W.C. [Adv.]

**Doubling Free Stone** For prices, &c., address S. & J. STAPLE,  
**HAM HILL STONE,** Quarry Owners, Stone  
**BLUE LIAS LIME** and Lime Merchants,  
(Ground or Lump), Ilminster. [Adv.]

**Asphalte.**—The Seyssel and Metallic Lava Asphalte Company (Mr. H. Glenn), Office, 38, Poultry, E.C.—The best and cheapest materials for damp courses, railway arches, warehouse floors, flat roofs, stables, cow-sheds, and milk-rooms, granaries, tun-rooms, and terraces. [Adv.]

**Asphalte.**  
Seyssel, Patent Metallic Lava, and White Asphaltes.  
**M. STODART & CO.**  
Office:  
No. 90, Cannon-street, E.C. [Adv.]

**MICHELMORE & REAP,**  
Manufacturers of

**CHARLES COLLINGS' PATENT.**

**COLLINGS' PATENT HINGES,**  
LEVER, SCREW, & BARREL BOLTS,  
Self-acting "FALL DOWN" GATE STOPS,  
and IMPROVED GATE FITTINGS of every Description,  
36A, BOROUGH ROAD,  
DISCOUNT TO BUILDERS. LONDON, S.E.

# BRABY'S PATENT GLAZING.

## GLASS SET FREE.

ALLOWING EXPANSION AND CONTRACTION, AND PRECLUDING BREAKAGE.  
ABSOLUTELY WATERTIGHT. PAINTING AND PUTTY SUPERSEDED.  
**OVER THREE MILLION FEET FIXED.**

DRAWINGS AND PRICES ON APPLICATION.

— MODELS AND SECTIONS ON VIEW. —  
LONDON: 352 to 364, EUSTON ROAD. LIVERPOOL: 6 and 8, HATTON GARDEN. GLASGOW: 335, ARGYLE STREET.



# The Builder.

Vol. L. No. 2261.

SATURDAY, JUNE 10, 1845.

## ILLUSTRATIONS.

Artisans' Dwellings, Victoria-square, Liverpool.—Designed by Mr. Clement Dunscombe, M.A., M.I.C.E.	884-885
Sections and Elevations of Artisans' Dwellings, Victoria-square, Liverpool	888, 889
Sculpture at the Paris Salon: Memorial Statue of Louis Philippe and his Queen.—M. Merclé, Sculptor.	893-893
Sculpture at the Paris Salon: "The Constable De Montmorency," M. Paul Dubois, Sculptor; "L'Immortalité," M. Longepied, Sculptor.	893-897

## CONTENTS.

Architectural Backgrounds	871	Chimney-piece from Roussay	880	Provincial News	921
Notes	871	Obituary	880	Church Building News	901
Technical Instruction in Building and Engineering	875	A New Nail	881	Stained Glass	901
Architecture at the Royal Academy.—VIII.	875	Artisans' Dwellings, Victoria Square, Liverpool	881	The Student's Column: Our Building Stones.—XV.	901
The Congress of French Architects	876	The Crematorium at Milan (Illustrated)	881	Vatiorum	902
Sculpture at the Paris Salon	876	Alfred's (Venetian) Tests	882	Recent Patents	902
A Bank in the Report on the Ventilation of the Houses of Parliament	879	Dutrons' Patent Sour Trap	882	Recent Sales of Property	903
New Head Quarters for the London Seaside Volunteers	879	Arbitrat on Case: Ingeter Hall and Stables, Staffordshire	882	Miscellaneous	904
Dist-Bills	880	Direct e. Earl of Shrewsbury and Talbot	882	Price Current of Building Materials	904
		Buildup de Marchia's Tomb	882		905

### Architectural Backgrounds.



the admirably-written, but now certainly not much read, Essay on the Picturesque, by Sir Uvedale Price, one of the most interesting chapters is that which he devotes, with much

intelligence and great acuteness of observation, to architecture and building; disavowing at the same time any technical knowledge of architecture, and illustrating his views on the subject more from the works of great landscape painters than by examples of known buildings, though not without, too, some considerable references to the latter. This treatise, written a good deal as a sequel to Burke's "Essay on the Sublime and Beautiful,"—and forming with that work and Alison's "Essay on Taste," what may be considered the old English classics in this walk,—enters largely into the subject of landscape gardening, and in the chapter referred to particularly in its relation to buildings, and that in a manner very interesting and suggestive.

While treating thus fully, however, of the landscape surroundings of buildings, the author does not seem quite to recognise the fact that these must resolve themselves into what is more strictly background on one side at least of every building having a principal front, a character applying to nearly all buildings not absolutely "monumental," as the term is architecturally used, and to some even of these. To this not much noticed topic of background in architecture, a little space may perhaps be not unfitly devoted in these columns. Landscape and buildings may be considered as mutually accessory to each, accordingly as one or the other may be for the time the chief object of attention; and as from the architect's stand-point his art claims that place, the relation which his work is to bear to the natural features of its site, and especially to those with which it must combine when seen in its most important aspect, becomes a matter of serious moment, and a very important element in the motive of his design; and it is, without doubt, frequently from deficient appreciation of this truth that buildings fail to produce the effect which the general merits of their design would seem calculated to secure. This is not the place to dwell on the many varying and often conflicting reasons which must be weighed by an architect in his choice of style and disposition of parts in designing a building, and some of which may, in many cases, overrule considera-

tions arising chiefly from the character of a site; and there are, of course, instances in which a building may be so circumstanced as in itself, from mere mass or extent, to outweigh any influence attaching to a perhaps tame and unmarked site; cases in which it becomes, in fact, the office of the architect to dictate and not at all to follow local character; and when this happens, the taste and judgment of a designer are shown in what may be held more strictly pure architectural design, as distinguished from what (borrowing a term from mathematics) we may describe as mixed design,—influenced, that is, in a great degree, by local rather than directly architectural considerations.

We must, for the purposes of our subject, suppose that the several questions involved in the best treatment of a design are pretty equally balanced, and consider how, under such circumstances, this special point of "background" should weigh in the scale.

To begin with,—of course it is only in buildings in which external appearance is felt to be of importance that this influence can be at all materially recognised; but, at the same time, it may be said that, however practical or commonplace the purpose of a building may be, any architect claiming to be at all a master of his art will find means of making it interesting in external character. The reference to the effect of buildings represented in the landscapes of the great masters, so frequently made use of, as mentioned above, by Sir Uvedale Price, is very consonant with sound reason, as these, for the most part, represented existing structures, built most probably of local materials, and thus, as Wordsworth was at pains to teach the Lake people, having one great element of the picturesque in their harmony of tone with the natural objects around them. It is no gain, in an artistic sense, that "advanced civilisation," as the phrase goes, has so furnished the means of easy communication and of ready carriage of materials, that the products of all places are almost as available for use in all others as in their own; these facilities for the use of exotic materials have led, in but too many cases, to the neglect of those, more fitting but perhaps less "taking," of local origin, ignoring the unquestionable fact that the vegetable clothing of a country or district has such a relation to its geological features and products that where the former constituted the background the latter will not fail to harmonise with it when forming the substance of buildings relieved against it. As a first point, then, to be regarded by an architect in aiming at harmony between his building and its background we would name the use, as far as possible, of local materials in its construction, used, too, in such manner and form as shall

least disguise the qualities of colour or texture which give them a marked character. It would be difficult to exaggerate the gain in respect of picturesque effect which might be secured by a recurrence to this natural and primitive practice in places where it has been forsaken. No stronger case of the kind could, perhaps, be quoted than that of the Lake district just referred to.

A hideous practice had grown up in the last century, and was continued in the early part of the present one, of coating all new buildings with a surface of rough cast, highly coloured in most cases with what in the broad dialect of the country was known as "boornat cambre," a copious infusion of which was held essential to afford the hot, foxy, yellow-fawn colour which had become dear to the tutored (?) native mind. The picturesque old farm-buildings of an earlier date, among which may be found many to arrest and charm the eye of an artist, showed no such vicious treatment, but grew, as it were, from the soil, in the strong, broad, rugged random walling of native ragstone.

Settling at Rydal in the second decade of the century, Wordsworth found the natural beauty of the country deformed and blotted over by these great yellow blotches of building, and, by precept and example, set himself to work a reformation, in the course of years bringing about so complete a change that, except in cases where additions had to be made to buildings already so coated, the face of yellow roughcast became the rare exception, and the bold, wholesome rubble work in dark grey stone the almost universal rule. The gain to both buildings and landscape is immense, and, with the rich body of foliage so common in that country, it has become quite possible for a new building to be felt as an addition to the beauty of the scene instead of, as at one time, a sure blot in it. To take another example. There were, in this country, until the last half score of years or so, few combinations of landscape and buildings so interesting and picturesque as that presented by Arundel, its castle, church, and accessory buildings, in form varied but not too broken, the square masses of building alternating with the rounded and undulating shapes of the foliage, and the whole resolving into a graduated decline from the higher level towards that of the sea. In colour the combination was no less happy; the grey of the masonry, the green of the trees, and the quiet mild red of the tiles met in harmonious contrast (there are accordant and discordant contrasts), and made a picture which artists delighted to dwell on. In an evil day (architecturally speaking) the Duke of Norfolk resolved to build a great church close



to his castle, and, under a no less evil star, his architects decided to build it of yellow oolitic stone. Farewell, henceforth, to the landscape charm of Arundel! A large raw mass of Bath-brick coloured masonry took precedence of all else in the view, drowned all the delicate contrasts of tint erewhile so interesting and attractive, and caused the artist who had once delighted to get a note of Arundel under one or another of its many phases of effect, to close his sketch-book and turn away with a sigh,—haply with a groan. A rather undignified, but not inapt, comparison was made, in our hearing, of this result, to that of putting a new cream-cheese into a bowl of lobster-salad; and, in truth, the jar was not less on the sense of fitness. An architect, if an artist, should be so much alive to the effect which his building is to have on its site, as to give it deep consideration as he works it out on paper; and had such forethought guided the designers in this instance, one charming picture of Old England would not have been irretrievably destroyed. Centuries, but not less, may tone down this raw product to quiet combination with what existed there before it. Netley Abbey, as was once noticed in these pages, has gained an exquisite grey in its long contest with time, and it is built of an oolitic stone; but no one now living, or for generations to come, can again realise what Arundel was to the lover of the true picturesque, before it was defaced by an unhappy invasion of crude Bath stonework.

Our limits forbid our dwelling much at large on the several points of our subject. Let us speak next on form in relation to background. One general truth may be stated in this respect,—that where the natural forms are bold or much varied a building will tell best which is designed with decided sobriety and simplicity of form and detail, avoiding anything like an aim at *competing* with the power of its background. On the other hand, where the natural features are tame and subdued, boldness of design will have its best opportunity for effect. In the case of buildings having a character of defence, such as the castles and fortified houses of the feudal period, more of an air of rivalry with natural boldness of site may be admissible; but even in these a *tempered* spirit of contrast will be found more really powerful in effect than any very pronounced character of emulation. The fact is that so powerful is any impression, even of a quiet kind, produced by natural objects that it is always safer to build in subjection than, so to speak, in opposition to them, and where their character is *decidedly* powerful, all attempt in the way of competition will be a failure. A recollection from the Lake country again occurs to us in illustration. The simple, unobtrusive character of the old and often diminutive churches of that district strikes most tourists who have an eye for artistic effect, and they are felt to combine and harmonise with the bold scenery in a way in which more ambitious buildings would quite fail to do, and even in the case of the larger churches, such, for instance as Crosthwaite Church, the ancient parish church of Keswick, its considerable scale appears subdued and unpretentious among its mountain surroundings from its broad horizontal character, square spireless tower, and absence of vertical prominences or features of marked detail; and its character is felt to be in consonance with its site. When a new church was to be built for Ambleside, the very eminent architect justly selected to deal with that beautiful position did not, unfortunately we think, look at the problem of fitly occupying it from the point of view which seems to have been that of the old church-builders, but to have thought that the bold massive natural features of the site must be met by a design in some sort competing with them. The result is that a church of strongly-marked character, and very interesting in many points of its treatment, does not enhance the power of the landscape; but failing, as was to be expected, in the aim, apparently, to assert its *own* scale and importance by a large massive tower and spire (very far larger than would be supposed by any one not actually testing their scale), it is at once

dwarfed by the background of cliff, hill, and mountain, and serves also to dwarf them, since its large scale is unappreciable in such association. Had a church of *flatter* treatment been designed, with a low square tower or simple bell-turret, both it and the landscape would have gained in effect. In designing buildings for town sites, where existing structures will back their new neighbour, too little thought is often bestowed on the very grave consideration of what effect will be produced by their combination; and we frequently see a multiplied aggregation of similar, but disconnected, forms where a departure from the existing type might have produced a happy and picturesque contrast instead of as in too many cases, a new building being felt as an intrusion and an eyesore.

Suppose the Radcliffe Library at Oxford had been treated with another spire, like St. Mary's, or another tower like Magdalen, what an immeasurable loss to that most picturesque city would have resulted. Yet in the present *fashion*, as we must term it, of dealing with such structures, it is a hundred to one but some such course would have been pursued, and this is but one instance among many which might be appropriately cited.

It was not, surely, without thought that Wren placed on Ludgate-hill the short spire which emphasises the mass of his majestic cupola beyond, as we know it was not without thought that he, with his well-trained eye for effect, decided on the character to be given to his two western towers of St. Paul's.

If architects before settling the designs of their town buildings would more frequently, with the useful modern aid of photography, try how the forms they contemplate using would group in harmony or contrast (or both) with what must be their background, there would be less frequent occasions for lamentation over *new* good work put out of place, or over *old* good work put out of countenance.

The subject of "Architectural Background" seems to include those cases in which existing architectural masses form the principal features of distance or middle-distance in views of interest, and may, for ages perhaps, have given the leading character to the landscape for miles around; and any material alteration of such through dealings with them, in way of repair or restoration, would be felt as a serious injury to the scenery of a whole district. There are those of us who can well remember how, during the third decade of this century, when Windsor Castle was under the hands of the architect later known as Sir Jeffrey Wyattville, much solicitude was felt lest the noble structure which from its elevated site was a feature in the background of the landscape for leagues in different directions, should be damaged in its character and charm by the changes and additions made in it. Whatever other criticism may be passed on the work then done, it must be admitted that nobility of outline and mass was preserved, and the castle still forms one of the finest of distant objects from many points. One of the most striking instances of its scenic value in a distance may be found, in clear weather, on the open country road between Headley and Ashted, near Epsom, where at a distance of some twenty-one miles it rises against the sky with a dignity which would have led to its record in the sketch-book of the present writer had not the exigencies of a time-table interfered; the foreground also being (some fourteen years since) picturesque and full of character. Not so, we fear, can the handling of St. Alban's Abbey be characterised in relation to its landscape. The long low-roofed nave, with its many clearstory lights, had a character and value in the neighbouring scenery which could not, without damage, be taken from it, and the needless (as we think) raising of the roof (as if, forsooth, there were some inherent vice in one of a low pitch) has made a change, sensibly taking away the particular feeling and landscape value of the church in its old form. Another instance of unfortunate alteration in a long-recognised and characteristic architectural feature is found in Chester Cathedral. It is true that much dilapidation and defacement had taken place in this building, and restoration to anything like

its original external detail meant extended and heavy labour. The particular character, however, of the central tower was so marked and peculiar, and had for generations so presided over the city with an air of grave solemnity, that it was surely worth while in any restoration of that leading feature to preserve to the utmost that dignified, if rather sombre, air of old-time stillness. The octagonal angle turrets, cut down probably on account of their decayed state, had been given a pointed dome shape, and covered with lead a little above the battlement level, and with the square breadth of the massive red stone tower aided in giving an impression of size and power probably a good deal beyond what belonged to the absolute scale. Had the turrets been a little raised only, and finished in a form something like those of King's College Chapel at Cambridge, a sufficient restoration would have been made, and the old solemn character little interfered with; but the shafts being carried up high above the parapet, and finished with projecting embattled caps with large gurgyles, and tall pinnacles being placed on the small buttress projections on the tower faces, the repose of the whole has disappeared; the tower seems much lower, in its main mass, as compared with the cathedral, and the structure generally much smaller in scale. Other restorations by the same practised hand give cause for no such regrets; as, for instance, Exeter and Worcester cathedrals, and in these comments a result is pointed out not perhaps easily foreseen, but which, perhaps, some careful trials in perspective upon views or photographs of the tower, in combination with the buildings which it backed, might have prevented.

Speed is so much the prevalent passion of the day that in architecture, no more than in other callings, can due preparation by thorough study be easily secured; but it is no less the fact that, without this, both in respect of a design in itself, and in its relations to its backings and surroundings, no results can be secured which shall escape the evil repute of interfering for the worse with the landscapes they invade, but which, with due and full care and study of the points we would impress, they might have enhanced and beautified.

#### NOTES.

**B**Y the defeat of Mr. Gladstone's measure for the Government of Ireland and the consequent withdrawal of all Bills of a contentious character, another chapter in the history of railway legislation is closed. Mr. Gladstone, in referring to the Railway and Canal Traffic Bill, remarked that it was of a magnitude which rendered it impossible to proceed with it compatibly with the intention of winding up as rapidly as possible the business of the Parliament. Consequently, this measure, which promised to go a long way towards settling one of the most vexed commercial questions of the day, falls to the ground. This cannot but be regarded as unfortunate, as it will be a great disappointment to many, and the railway directors themselves, while they may perhaps experience a sense of relief at the disappearance of a measure which they regarded with so much alarm, must recognise the fact that such relief is only temporary, and that matters are left in an unsettled and unsatisfactory condition. At the same time, the attention which has been drawn to the subject has led to a better knowledge of the various points in the controversy, and some of the companies have proved themselves willing to meet to a certain extent the demands of their customers, and to redress admitted grievances. The Bill has been freely criticised, certain clauses failing to commend themselves to either party, and statesmen may find plenty of material with which to build up a satisfactory measure in the future. It is certainly a matter of regret that such a determined attempt to deal with this matter should have met such a fate, but the time and trouble which have been bestowed upon it may yet bear fruit.



WHAT is called, rather unadvisedly, the "Westminster Abbey Restoration Bill" was read a second time and passed for consideration in Committee on Wednesday. The object of the Bill is to give authority to the Ecclesiastical Commissioners to make grants out of funds under their control for the restoration of Westminster Abbey, the Dean and Chapter having no sufficient funds available. As these funds are really required not necessarily or primarily for restoration in the commonly understood sense of the word, but for carrying out the extensive repairs which have now become necessary for the very stability and preservation of the fabric, it would be better that the Bill should be so worded, and that such an expression as "restoration," which begs a very large question and may lead to endless disputes as to the application of the fund, should be avoided. Mr. Cavendish Bentinck availed himself of the opportunity to read the House a lecture on architecture, and on the misdeeds of Deans and architects, in the course of which he condescendingly spoke of the late Dean Stanley as "a very worthy man," and insinuated that the powers vested in the Dean and Chapter were so great that if they chose "they might pull down the magnificent western towers." Now the western towers are not in the least magnificent. They are a very bad attempt at a sort of bastard Gothic-Classic, by an architect (whether Wren or not is disputed) who had obviously no feeling for or knowledge of Gothic detail. We have no wish to see them interfered with, but to talk of them as "magnificent" is ridiculous.

MR. JOHN FIELD'S analysis of the accounts of the Metropolitan and Suburban Gas undertakings, for 1885, the seventeenth annual number, continues to be such an excellent abstract that it could be wished that it included a longer list of the provincial undertakings. Of these nineteen only are given, nine of them being in the hands of Corporations and ten in those of companies. The field thus surveyed is, however, large enough to give great value to the results tabulated. They are of a very satisfactory nature. During the last five years the capital employed for producing equal quantities of gas, the working expenses on the same, and the selling price of gas, have all been reduced in each of the former groups of undertakings. The produce of gas per ton of coal carbonised has slightly increased, but the cost of coal per 1,000 cubic feet of gas sold has diminished in a higher ratio. The net proceeds of residuals per 1,000 cubic feet of gas sold has, however, diminished, and, measured as a percentage on the cost of coal, has fallen 13 or 14 per cent. since 1881. Thus there has been reduction of price of material, of price of labour, and of net profit. Mr. Field has not tabulated the relation of net profit to capital, so as to be compared from year to year.

THE magnitude of the gas industry of the United Kingdom is best illustrated by two House of Commons returns dated May 27, 1884; the first relating to all authorised gas undertakings belonging to local authorities, and the second to all others. In England and Wales there are 112 of the former, representing a capital of 15,000,000*l.*, on which a net profit of 459,738*l.* was distributed in the year 1883. The gas undertakings in the hands of companies, including the metropolitan companies, now condensed into three, number 350. The total share capital paid up at the end of 1883 was 27,906,128*l.*; and 4,885,906*l.* had been borrowed. The sums earned, expended, and divided, are not stated in this return. The total capital invested in gas shares and loans in the United Kingdom is 51,988,881*l.*, of which 17,874,951*l.* is in the return of the local authorities. By the outlay of that capital for works, nearly 77 thousand millions of cubic feet of gas were extracted from 7,700,000 tons of coal, and distributed to 2,019,846 consumers, besides providing for 375,536 public lamps, in the year 1883.

MR. E. REICHARDT, of Jena, has lately published some experiments and observations with regard to the use of lead pipes for water distribution. He examined the leaden pipes which had been in use for upwards of 300 years for the supply of water to the town of Andernach, and found them to be coated internally with a layer, about half of a millimetre thick, of phosphate and chloride of lead, with a little free oxide of lead. Very small quantities of lime and magnesia were present in this coating, and the metal of the pipes, after being in use for this long period, was perfectly good in quality. Further experiments were made with a piece of common lead piping, which was capable of containing about 1 litre of water, and which was tested alternately with spring water, distilled water, and water impregnated with carbonic acid. Each kind of water was allowed to remain in the pipe for periods varying in length up to several weeks. Both distilled water and water containing carbonic acid speedily gave indications of reaction on lead; but spring water, even after many weeks, had no action on the lead. In these experiments the pipe was completely filled so as to exclude the air; but when the pipe was alternately emptied and filled, so as to give opportunities for the oxidation of the lead, the metal readily became soluble in water. The conclusion Mr. Reichardt arrives at is that lead pipes which are not always full should not be used for pumps and water distribution.

SOME investigations have recently been made at the chemical laboratory of the Berlin Polytechnic on the destructive action of cements on lead. A piece of pipe which had served for about six years as the supply-pipe to a fountain basin was examined. It had been embedded in cement and was much corroded, the effect being most marked at the end nearest the basin. There was a coating of a chocolate-coloured layer of oxide of lead, of the hardness of glass. A portion of this was pounded in an agate mortar, and dried at 110 centigrade. It was found to contain 99.05 parts of oxide of lead, the residue consisting of carbonic acid with traces of lime and silica. Dry Portland and Roman cements have been found by Mr. Otto Peschke, of Berlin, to have no action on lead, but the presence of water effects corrosion. Mr. Peschke invites the attention of engineers, architects, and chemists to this action, which it is difficult to explain, and which may be due to certain phenomena in connexion with the induration of cement-mortar, which are at present extremely obscure.

THE greater part of the interior of the Duomo of Orvieto is still divided off for the workmen employed on the restoration which is being carried on by Signor Franci, the Presidente delle Opere, in conjunction with Signor Zampi, both under the supervision and control of a Committee of the Belle Arti. The roof of the south aisle is complete, as is also the nave roof, with the exception of another truss and the connecting rafters between it and the west wall of the church; when this is done the north aisle roof is to be treated in a similar way. The walls of the north and south aisles are being ruthlessly stripped of all the Renaissance additions to the church, but great care is being taken to preserve whatever remains may exist of the thirteenth-century frescoes. It is also suggested to remove the greater portion of the thin slabs of alabaster, now used in several cases instead of glass in the window openings; preserving it, however, in most of the lower portions of the windows where it exists, in order to keep a record of the system. We hardly think the mixture of alabaster and glass in one opening would give a very happy result, but nothing is settled as yet as to how the two materials will be connected together.

WITH the number just issued (Jahrgang xliii., viertes heft), the *Archaeologische Zeitung* ends its long and honourable career. This particular number has one paper which

should interest readers. Dr. Furtwängler boldly attacks the genuineness of the well-known antique head in the British Museum, usually called the "Hera of Gigenti." Dr. Furtwängler says that in looking at casts of the head he had all along been troubled with a sense of insecurity as to its date and style. When he was over last year in England he took occasion to examine the original. He plainly states his conviction that the head is a forgery. The head is of fine Italian marble, of bluish-grey colour, a good deal corroded. It first saw light at Naples, passed into the hands of Sig. Castellani, at Rome, hence to our museum. With it Dr. Furtwängler thinks must stand or fall three other heads, of which he gives sketches, one still in the possession of the Castellani family, another in the Berlin Museum, and that belonging to the private collection of Count Warsburg, in Vienna. The arguments of Dr. Furtwängler rest on an elaborate analysis of style which it would be unprofitable to retail except in the presence of the original. It will be interesting to see what answer the guardians of the "Hera of Gigenti" will make to this attack. For our own part, we still incline to believe the head to be genuine.

WE regret to learn that the sub-committee for the Paris Exhibition of 1889 have agreed to sanction the proposal, which has been referred to more than once in our Paris letters, to erect an iron tower, 900 ft. high, as one of the attractions of the Exhibition. We think they have made a mistake. It is a foolish and costly piece of clap-net, which will only please the mob.

A CORRESPONDENT sends us a cutting from the advertisement columns of a provincial paper containing a most edifying and touching effort on the part of a local architect to raise himself into fame and practice. The advertiser gives his name and residence in large type, with the affix "architect and surveyor," followed by a categorical statement of the work he is prepared to carry out:—"Architectural and constructional details and specifications of every class of building. Building operations superintended during progress. Perspectives. Dilapidations. Plans put on deeds," &c., &c. But the cream of the advertisement is in a sentence added at the end:—"N.B. Stated by Professor —, of the — Phenological Institution, to possess those natural abilities essential for an architect or engineer." This is actually copied *verbatim* (except the omission of the humbugologist's "name and college") from a published advertisement!

**Technical Instruction in Building and Engineering.**—The City and Guilds of London Institute for the Advancement of Technical Education have issued the prospectus of their summer courses of lectures and laboratory instruction for technical teachers and others. During the month of July the following among other courses will be held in the Institute's New Buildings in Exhibition-road:—"On Iron Girder Bridge Designing, with Experiments on some Materials used in Construction," by Professor W. C. Unwin, B.Sc., M.I.C.E. This course will extend over two weeks, from ten till five daily, Saturdays excepted, commencing on Monday, July 5th. "On Plumbing."—A course of four lectures, by Mr. W. R. Maguire, of Dublin, on Tuesday, June 29th, Wednesday, June 30th, Thursday, July 1st, and Friday, July 2nd, at 7.30 p.m. each day. (Fee for the course, 5*s.*) "On Brickwork and Masonry."—A course of four lectures will be given by Mr. John Slater, F.R.I.B.A., Examiner for the Institute in Brickwork and Masonry, on Monday, July 12th, Tuesday, July 13th, Thursday, July 15th, Friday, July 16th, at 7.30 p.m. each day. (Fee for the course, 5*s.*) "On Building Materials."—A course of four lectures will be given by Mr. W. G. Dent, F.C.S., on Monday, July 26th, Tuesday, July 27th, Thursday, July 29th, and Friday, July 30th, at 7.30 p.m. each day. (Fee for the course, 5*s.*) Further particulars and syllabus of each course may be obtained at the Central Institution, Exhibition-road, S.W., or at Gresham College, London, E.C.



## ARCHITECTURE AT THE ROYAL ACADEMY.—VIII.

1,685, "Porch in Terra Cotta, East Sheen," Mr. T. E. Collcutt. This pretty corner of domestic architecture we have already illustrated. It consists simply of a porch with an elliptical arch, and a window adjoining, the decorations consisting of pilasters and a frieze enriched with ornamental detail of an Elizabethan cast. A plan is added. The drawing is an exceptionally good specimen of pen drawing.

1,686, "No. 70, Ennismore Gardens," Mr. Basil Champneys. A neatly-drawn pen elevation of a house in the manner which is analogous in England to that of Francis I. in France, though later chronologically; Classical wall columns and entablatures, one over another, forming frames for mullioned windows. The front is in three divisions, crowned with three ogee-curved gables, with decanter-stopper finials, which (let us once more observe) are not a bit the better or more artistic detail because there are numerous precedents for them. The design is less flat in effect than appears on the drawing, the first-floor windows on each side and the centre second floor one being projected as bays, apparently on elliptical lines, and treated with a good deal of boldness, the wall-space under the windows being dished out in double curve (like the front of a theatre gallery), and carried by corbels decorated with foliage and masks. The ornament is well distributed so as to emphasise the salient points of the design, and give a general richness of effect with plenty of undisturbed wall-space to balance the windows and decoration. The whole of the details can be got out of books, it is true; but they are treated and combined exceedingly well. No plan.

1,688, "The Black Bull Tavern, High-street, Lewisham," Mr. Horace T. Bonner. Hung too high to be well seen; a house with two gables and bays diversifying a flat front wall; architecturally adequate to the occasion. No plan.

1,693, "Alterations and Additions, Woodlands Park, Stoke d'Abernon, Surrey," Mr. Rowland Plumb. Nothing to show what portions are additions and what are old. In such cases a small plan, with old work scored and new work in black, would enable one to understand what has been done. As it is, one can only say that it is a pretty house of Domestic Gothic character, with a good deal of picturesque incident about it; but how much of this is the present architect's we cannot tell. We may observe that the pilasters and gables at the angles of the porch do not harmonise with anything else in the building.

1,694, "Proposed House, Beckenham Park Place, Beckenham," Mr. John Ladds. Another "proposed house," a better one than No. 1,676, in that it shows much more breadth of treatment, but a very poor drawing,—the semicircular bay is, in fact, all out of drawing. Plans are added.

1,695, "Part of a New House, Cromer," Mr. E. J. May. We presume Mr. May is so particular in saying a "new" house in this as in another case, from a sub-consciousness that otherwise it would certainly be taken for an old one. This is an excellent specimen of artistic pen drawing, by a draughtsman who has a style of his own, and a picturesque piece of building, with a heavily-timbered gable and a castellated octagonal bay sticking out of one side of it. The object seems to be to persuade the spectator that the house has been added to at different times by different owners. A house that has really been through those phases is often very interesting on that account, but we do not feel the same interest in these made-up effects.

1,697, "Lanhydrock House, Cornwall, as restored," Mr. R. Coad. A view of a large Gothic house, extending round three sides of a parallelogram, taken with a very high point of sight, and therefore, of course, placed by the inspired hangers at the top of the room, so that we can see it from the worst point of view. It is, to all appearance, a charming old house, but, as it is impossible to tell what in it is ancient and what is modern, no more can be said about it here.

1,702, "Mansion, Grosvenor-square," Mr. J. T. Wimperis. A cold but very well finished pen drawing, showing a Classic front with a ground story slightly projected and carrying three-sided bays above, running through two stories; a central porch with semicircular

panelled arch projects from the centre of the ground story; a soffit, with a projecting semicircular balcony, is carried across from one bay to another at the second-floor line level. A well-marked cornice runs across the whole, with a central dormer and "fronton" (to borrow the French word) over it. The building is of a style and handling which does not evoke our sympathies much, but it is palatial and dignified. The columns carrying the soffit between the bay windows are surely too attenuated.

1701, "Lincoln College, Oxford, Addition to Rector's Lodgings," Mr. H. Wilkinson Moore. A pleasant bit of quiet domestic architecture, and the door and windows on each side, under a label, group very nicely.

1705, "Private Residence, Montreal, Canada," Messrs. Taylor & Gordon. A small water-colour drawing hung rather too high to be well seen; apparently a large red brick house on a basement (battered and rising a few feet above the ground) of grey granite. The salient feature is a large circular angle turret rising from corbels on the first-floor level. There is no very marked style about it. No plan.

1706, "Portion of new Wing to Mansion at Fetcham, Leatherhead," Messrs. Romaine-Walker & Tanner. An interior (from the seats round the wall apparently a billiard-room with the billiard-table omitted), a wainscoted room with a frieze of decorative paper over, and a fireplace nook, with small leaded windows. The main light is from vertical leaded windows in the ceiling lantern. A pleasant-looking room and a good drawing.

1707, "Buchan Hill, Sussex," Messrs. Ernest George & Peto. This is the sheet of drawings we published in the *Builder* for May 15 last, showing a staircase, a fire-side, and part of a gallery. The drawings, tinted in brown, are among the most admirable and artistic in the exhibition; and the staircase, with its moulded and enriched angle posts, and its stairs formed out of solid slabs of oak, moulded in front and on the soffit, and its carved open-work panels, is a piece of work at once rich and solid in effect. The only point we object to is the sham jointing or raticution of the lower part of the posts, which is certainly contrary to good taste as a treatment of wood-work. The fireplace, with its sloped-out chimney-breast and grotesquely-carved corbel, is delightful, though it might be said that there is too much of the look of modern antique about the whole.

1708, "Design for a Country House," Mr. C. D. Fitzroy. Apparently a student's design, and creditable as such, but not what we should have expected to find on the Academy walls.

1710, "Park Lodge and Entrance Gates, near Kingston," Mr. F. W. Lacey. A good specimen of the lodge type of house: brick below and half timber above; the first-floor joists brought boldly out on one front, with moulded ends, the upper portion over-sailing considerably. A careful pen drawing. No plan.

1716, "Staircase, Gosford House," Mr. W. Young. A large and good, though not particularly effective, pen drawing of a grand staircase, hall, and gallery, on the Italian model. The staircase has a flight on each side, joining over an arch at the further end of the hall. The pilasters and arcade of the gallery are carefully drawn. The whole is dignified, but has little originality (we presume it is a modern staircase, not a drawing of an old one). The coved ceiling seems weak in comparison with the sub-structure.

1720, "Cottage Residence at Winchfield," Mr. T. E. Collcutt. The low windows in the upper story, with low-pitched gables over them, and irregularly spaced, have a pleasant and picturesque look. The verandah supports might have been made a little less ugly; the figures introduced ditto. A plan is added.

1726, "Lodge" to the house shown in No. 1,693 (see above), Mr. Rowland Plumb. A good little water-colour drawing showing a lodge treated with the usual materials at present in vogue for lodges; brick, with timber and plaster above; in this case a band of wall tiles is introduced between them. The changes have been rung very often on this style of work now; this example is characterised by more careful and considerably-worked-out design, less effort to appear abnormally picturesque, than in a good many other examples.

1731, "New Premises in Edgware-road," Messrs. Eales & Son, hung high; a street front presenting no very special feature for comment.

1735, "House at Otford, Kent," Messrs. Roger Smith & Gale. Two very nicely-drawn and coloured elevations of a good-sized red brick house with stone dressings and mullioned windows; an angle tower with an ogee-pointed lead roof forms a feature in it; and on the long front some timber and plaster work is introduced in the upper portion. The wall spaces between the windows look a little bare; they seem to want some filling-up here and there. A plan is appended, but without the names of the rooms; the turret forms an angle nook to what is obviously the drawing-room. The house seems conveniently and compactly planned, and the offices spacious and well shut off from the rest.

1736, "Holborough Court, Snodland, Kent," Mr. Hubert Bensted. A very good water-colour drawing of a solid, well-built, dignified, but rather prosaic-looking house; the shape of the windows is ugly, and cannon-ball finials are scattered over the copings and gables with too lavish a hand. No plan is given; it is what we should expect to find a good house; the exterior has no nonsense about it; but it leaves the regret that on so good a basis a little more decorative and really architectural effect had not been realised. The tower is the only bit where there is an attempt at a little picturesque effect, and that, to say truth, not very successfully. The plain and simple stables and out-buildings group well in the drawing, but the whole seems rather an opportunity lost.

1739, "House at West Wickham, Kent," Mr. A. R. Stenning. Hung high. A pen drawing of a house meant to be picturesque; but too much all gables and chimneys repeating each other. No plan.

1743, "House at Combe, near Shaftesbury," Mr. E. Towry Whyte. A small pen drawing of an inner quadrangle, quiet and domestic, but with nothing for special comment. No plan.

1744, "House about to be erected facing Rotten-row," Mr. G. Truett. An odd little meagre pen sketch, apparently made in a hurry, showing a house in which the windows are arranged and grouped with much originality, but no detail can be made out. It is a pity the author did not take the trouble to make a more adequate drawing of it. No plan.

1745, "Stable, Weirleigh, Kent," Mr. John Belcher. A little water-colour drawing of a charmingly original bit of building. The coach-house is apparently contained between two lumps of unadorned brick wall, across the top of which is supported a timber upper structure which sails far away from its base, so that it has to have extra support from a line of posts and a bressumer, on a separate brick foundation. The stable is behind. The author should have added a plan, but he may be complimented on having produced a little building which would certainly make one take out one's sketch-book on coming across it.

1746, "A Warehouse Facade," Mr. W. Stirling. We presume not an executed one, although the label of "Smith & Co." is affixed to the building. A peculiar and original coloured elevation, with a great deal of merit and originality in it; a mixture of Gothic effect with quasi-Classical details. The gable on the right over the warehouse doors would be much better without the spiky finials on each side of it; they spoil the solidity of the whole.

1748, "Studios, Weirleigh, Kent," Mr. John Belcher. Another small water-colour drawing of a picturesque building with timber and plaster upper story; pretty, but we prefer the stables; we feel quite grateful for those stables.

**The Chapter-House of St. Paul's.**—The enlargement and reconstruction to a great extent of the Chapter-House of St. Paul's Cathedral, which has been in progress during the last few months, is now almost completed. The works consist of an additional story, whilst the interior has been structurally re-arranged. Several of the interior walls have been removed, and new reception and other apartments have been constructed. The works have been carried out with the view of providing a residence for the Archdeacon of London, who intends taking up his permanent residence in the Chapter-house. The ecclesiastical business of the Dean and Chapter will continue to be carried on there as heretofore. The works have been carried out under the superintendence of Mr. F. C. Peourose, architect to the Dean and Chapter, and by their own workmen.



## THE CONGRESS OF FRENCH ARCHITECTS.

THE Fourteenth Congress of French Architects was held last week, according to the programme previously published in our columns. The annually increasing number of the attendances at these meetings is a proof of the interest with which they are regarded among the members of the profession in France.

Owing to indisposition, the venerable president, M. Bailly, was obliged this year to give up the chair to M. Achille Hermant, the vice-president, who on the 7th opened the Congress in the Hémicycle des Beaux Arts, the first meeting being, as usual, devoted to the nomination of special committees. M. Moynaux then undertook the delicate task of reading a critical paper on the architectural exhibits at the *Salon*, about which we have already spoken at some length. The paper was distinguished by great critical insight and originality of view.

The same day the Congress paid a visit to the new synagogue in the Rue de la Victoire. Of the four synagogues in Paris\* this is the richest and most important, being probably (except that at Berlin) one of the largest in Europe. It is designed by M. Aldrophe. The general style of the building may be said to be Romano-Byzantine. The effect of the really fine exterior is very much lost owing to the narrowness of the street in which it stands. The front shows two stages of arcades surmounted by a circular tympanum over them, pierced with a large rose-window. On the ground level a large porch leads to a columned vestibule, from whence we enter the interior,† of a severe and grandiose character, which was made to look more striking on the occasion of the visit of the Congress by the additional effect produced by rich hangings, lighted lustres, the accompaniment of organ-music, &c., the visit being almost like a religious celebration, while a learned Rabbi discoursed to the meeting on the relation of the architectural design to the ritual. Since the Mosaic law, as we all know, forbids all representation of men or animals in sculpture, the architect had to evolve from his fancy sufficient decorative incidents to give interest to his work. Thus, in the vestibule the principal feasts of the year are inscribed in Hebrew on escutcheons interwoven with myrtle and olive foliage. In the nave, whose five bays are separated by columns, the arcades of the tribunes are richly ornamented, and rest on brackets of acanthus leaves, and on the frieze are the Commandments inscribed in Hebrew. The highest decorative effect has been concentrated on the arch separating the nave from the entrance to the sanctuary. In front of this is the "théba," the tribune of white marble where the officiating priest stands. It is raised five steps above the floor of the temple. Behind it is a splendid silver chandelier presented by Baron Alphonse de Rothschild. On each side a stair of twelve steps leads to the entrance to the Tabernacle. Columns of marble, with carved capitals of fruits, separate the hemicycle into five bays, with windows, in which are represented the emblems and banners of the tribes of Israel. Over these are circular windows, with central designs emblematic of the five books of Moses. In the upper frieze are inscribed in Hebrew the names of the five principal prophets, whose names appear also, but in French, among the painted decorations of the cupola. Ten steps of white marble lead to the door of the "Holy of Holies" the oak door of which is carved and gilded, and over it is a circular panel with a pediment over it, containing the ten commandments cut on white marble. In the tympanum is a plaque, also in white marble, on which the name of the Eternal is engraved in Hebrew letters, surrounded with rays of gold. The building contains also a small temple where daily prayers are said, and the Consistory chamber. The stained glass is by MM. Oudinot, Lefevre, and Lussot; the organ-case, a remarkable piece of work, is made by M. Merklin; and the lighting apparatus, in bronze and wrought iron, by M. Lacarrière, from designs by the architect. The total cost of the synagogue was 3,200,000 francs.

On the 8th, in spite of torrents of rain, the Congress visited at St. Denis the ateliers of M. Guibert Martin, the able mosaic worker

who received last year the medal founded by M. Paul Sédille for art industries. This manufactory, once at Sèvres, and after that at Grenelle, was transferred to St. Denis in 1867. It has been nearly eighty years in existence, and is the only establishment which has given itself, since its origin, to the production of glass mosaic and enamel. After having seen the melting furnaces and other branches of the work, the members of the Congress examined the finished product in the garden, where examples of mosaic are laid out with very good effect in the midst of the interposing spaces of green.

Not to reduce our sketch of the Congress to the level of a tourist's guide, we merely observe here that the Cathedral of St. Denis was the object of the second extra-mural excursion; and concerning St. Denis, and its date and history, and how it was restored by Viollet-le-Duc, it is unnecessary to say more here, except to comment on the startling anachronism presented by the window in which Louis Philippe and his family are represented in costumes of the nineteenth century, presenting a strange contrast with the other windows and the general style of the cathedral. Viollet-le-Duc, however, though a great archaeologist, critic, and restorer, did not shine equally in the matter of original design, and while the great church stands magnificently among the mill-chimneys and industrial buildings on the Plain of St. Denis, like a defiance sent by the past ages to the modern ones, the parish church, built by Viollet-le-Duc, between 1864 and 1867, makes a very poor show, opposite to it. The style does not want grace, and the interior details are charming, but the general architectural design has no breadth of treatment, and the clock-tower, heavy as it is, seems crushed beneath the neighbouring cathedral. This formidable neighbourhood also weighs heavily on the new Mairie of Saint Denis, which the party afterwards visited. This municipal building, only just finished, is the work of M. Paul Layanand, who has chosen the style of the French Renaissance, and has availed himself well of the sources of effect offered by the style of that fine epoch. The building, which has cost nearly a million francs, is to receive shortly some pictorial decoration, to be executed by M. Delahaye.

The second day's proceedings terminated by a paper from M. Eugene Guillaume, the eminent sculptor, who had taken for his subject "L'Unité de l'Art." After him M. Charles Lucas read a report on the "Congrès des Sociétés Savantes," and the meeting adjourned to meet the next morning to inspect the mosaics of the new Escalier Daru, at the Louvre, executed by M. Guibert Martin from the designs of M. Lenepveu. The work is far from completion, but from the scaffolding the members were able to appreciate the grand style of the figures personifying Germany, Italy, Flanders, and France. Above there is a frieze of winged genii, and medallion portraits of illustrious masters of various schools. Before quitting the Louvre, M. Edmond Guillaume, the architect for the new works, wished to show his professional brethren the new treatment of the Salle des États. The very rich decoration of this room has been executed under the direction of M. Paulin, a young artist who probably has a great future, to whom, however, we would recommend some modification in the exuberance of the details which encumber the frieze and injure the general effect.

The incessant rain nearly put an end to the visit to the building-yard of the new Sorbonne, which was transformed into a morass. M. Nenot escorted a courageous minority of the party over the works, but as we shall be able to give a descriptive plan and elevation of the building next week, we pass over further notice of it now. The less enterprising majority repaired to the Pantheon, the next visit on the list, but, dealing here with a monument even better known than Saint Denis, we need not follow the Congress into the immense nave, at present melancholy and bare in its aspect, or into the vaults where the crowns and garlands offered up to Victor Hugo are accumulated. We will only observe that of all the decorative paintings going on or completed there, those of M. Puvion de Chavannes seem by their tone, at once quiet and harmonious, to harmonise best with the decoration of a stone interior. The paintings by M. Bonnat, opposite to them, appear coarse and violent by comparison; those of MM. Cabanel

and Maillot are only misal illuminations magnified to an exaggerated scale; and the triptych by M. Laurens cuts a grotesque hole in the wall instead of harmonising with the total effect. These irritating contrasts form an emphatic condemnation of the system of parcelling out the decoration of a building, and form a curious satire on the "Unity of Art," the subject of M. Guillaume's paper aforesaid.

At two o'clock came the paper by M. Henzey, the eminent Egyptologist, on Chaldean architecture under the king-architect Gondea, 3,000 years B.C. This dissertation came as a kind of sequel to the interesting details given last year by M. Ledrain, the joint curator of the Assyrian Museum, and M. Ronchard, on that chapter of the art of a remote past so long buried in obscurity, and on which the labours of M. de Sarzec, French Consul at Bassorah, have thrown considerable light.

This year the ancient capital of Champagne was the object of the archaeological excursion of the Congress, who, on the 10th, in spite of a deluge of rain, successively visited the principal monuments of Troyes, under the guardianship of M. Selmersheim, diocesan architect of the Département de l'Aube. Among these were the Church of the Madeleine, the roof-loft of which was made by Jean de Gualde in 1508; St. Rémy; the cathedral, so well known as a splendid example of architecture from the thirteenth to the fifteenth centuries, and rich in works of art of all kinds; St. Urbain, a chef d'œuvre of the thirteenth century, commenced by Pope Urban, and left unfinished; the Hôtel de Marizy, one of the historic monuments of France; and the Hôtel de Ville, built in 1630. We can only give a brief note of the proceedings of Friday, the 11th, entirely devoted to the work of special committees and to technical papers. There was an interesting paper by M. Bousard, on the sanitary conditions of rural buildings, and an interesting and learned one in which M. Gosset, architect, of Rheims, gave us, by the help of numerous drawings, a complete history of religious buildings in their successive transformations from the early Basilica form to their modern form, of which the Church of the Sacré Cœur at Montmartre formed the latest and most complete type. The closing day of the Congress was commenced by a visit to the Catacombs, those vast subterranean excavations which extend under the right bank of the river, and which enclose the spoils of the ancient cemeteries of Paris. This excursion, made by candlelight, between a double row of human remains diversified by funeral inscriptions, was not a very exhilarating recreation, and after two hours tramping on the dust of past generations, we were not sorry to see the light of day again. It is the Service of "Ingénieurs des Mines" of Paris, and not that of the architects, which has the responsibility of looking after the catacombs and guarding against the failures of the ground which have been too frequent of late. The Congress was taken there, accordingly, rather from curiosity than professional interest.

The last meeting in the Hémicycle des Beaux Arts attracted a numerous audience. By the side of M. Kaempfen, the Directeur des Beaux Arts, who presided in the name of the Ministre de l'Instruction Publique, were placed Mr. l'Anson, the delegate of the Institute of British Architects, Mr. Pullan, representing the Archaeological Institute of Great Britain, and MM. Hermant, Charles Garnier, Questel, Sédille, and Paul Wallon. After a few words from M. Kaempfen, M. Paul Sédille spoke at some length on the series of works which had placed the late M. Théodore Ballu in the highest rank of contemporary architects; the completion of Ste. Clotilde, the rebuilding of the Tour St. Jacques la Boucherie, the construction of the Tour St. Germain l'Auxerrois, of the churches of La Trinité, St. Ambroise, St. Joseph, and that of Argenteuil, and lastly of the Hôtel de Ville, constituting certainly a sufficiently considerable body of work to transmit the name of the architect on the honour to posterity, without any necessity for the inexpressible silence of the speaker in regard to Ballu's colleague in the last-mentioned work. As we recently observed, when the Hôtel de Ville was put up for competition, Ballu obtained the prize in conjunction with M. Depertthes, whose name M. Sédille never once mentioned. Why this ostracism of the name of a colleague who is recognised by every one, whose name is in all the official papers, and who is still actually directing the completion of the building? It was more than forgetfulness,

\* Called respectively the Synagogue de la Rue de la Victoire, that of Tourneville, that of Notre Dame de Nazareth, and that of the Rue de Buffault (the Portuguese synagogue).

† Of the interior we will give a view next week.



it was a want of common justice which took the audience by surprise. But where M. Édouille was warmly applauded was when, after having referred to the incontestable superiority of the English architects in all matters which concerned the design and construction of the private house,\* the "home," he sarcastically referred to the "decennial outrage" of scraping and washing to which the houses in Paris were subjected at stated intervals. What would now remain, he asked, of the interesting examples of Middle Age or Renaissance works, or even of the splendid Hôtels of the seventeenth century, if these barbarous regulations of the "Voirie" department had been in existence and been insisted on in former times? It was necessary, he said, in the interests of art and of history, to demand a prompt revision of the Act of March 26, 1852, which pitilessly prescribed those measures for the pretended preservation of property.

Following on this came the distribution of the honours decreed by the Société Centrale des Architectes. M. Echernier, architect of Lyons, and M. Gaillard, architect, of Paris, obtained the "grandes médailles d'argent" for domestic architecture. The medal of jurisprudence, also a silver one, was adjudged to M. Guadet, the architect of the new Hôtel des Postes, and that for archaeology to M. Charles Lucas.

The schools at Athens and Rome have obtained two bronze medals, one going to M. Maurice Helleu for excavations of the Temple of Apollo in Boeotia, the other to M. Victor Blavette, whose restoration of the sacred enclosure of Demeter at Eleusis we have already mentioned.

M. Hey (pupil of MM. Train and André), and M. Léon Margot (pupil of M. Guadet), then each received a silver medal founded in connexion with the Ecole des Beaux Arts. Similar rewards were shared by the Ecole des Arts Décoratifs, the Ecoles Privées d'Architecture, and the Ecoles d'Apprentissage. M. Désiré Hayon, the *doyen* of French ornamentists, who was the zealous collaborator of Viollet-le-Duc in the restoration of the Château de Pierrefonds and of the Église Notre Dame, obtained this year the medal given for Art-Industries, and the remainder of the meeting was devoted to the honours decreed to "vétérans du travail," who, in the midst of loud applause, came forward in turn to receive the reward of their unostentatious labours of a lifetime. The list was a long one, and the enumeration of this band of devoted working men, who have been untempted by demagogues and leaders of strikes to leave their work, would be the best practical answer to the falsely humanitarian theories which excite "le peuple" to revenge for imaginary injuries. In seizing the occasion for an energetic protest against a dangerous utopianism, M. Paul Wallon achieved a legitimate success.

In the evening, according to custom, a dinner brought all the members of the Congress together for the last time at the Hôtel Continental, and brought to a close a session which has pleasantly united for a few days those whose multiplied labours and special circumstances usually keep them at a distance from one another.

#### SCULPTURE AT THE PARIS SALON.

THE sculpture at the Salon is, as a whole, much more interesting this year than last, and it may be said that the sculptors bring, in the main, more serious thought and effort to their art than the painters. It may be that the latter, producing their work with less difficulty and at less cost, address themselves more to the question of saleable work, of *genre* of a light and graceful type, and neglect the pursuit of the ideal to confine themselves to the more popular and remunerative types of realistic art; for painters have suffered as much as other artists under the industrial crisis, and a large easel picture is as difficult to dispose of just now as a work in bronze or marble. The general result is in favour of the sculptors, for while private purchasers hesitate at the cost of an important picture, the Municipalities, the State, and the bodies of public subscribers continue to give good commissions to sculptors for the decoration of public buildings and for the

continually increasing number of statues in honour of eminent men.

We may first notice the fine marble group commissioned by the Comte de Paris from M. Mercié for the funeral chapel of the Château de Dreux.\* The sculptor had a difficult task. Popular caricature has dealt so hardly with Louis Philippe that no ordinary talent was necessary to idealise in any way the somewhat bourgeois personality of the last reigning sovereign of the House of Bourbon. The king, standing and draped in his mantle, leans one hand on the shoulder of his queen, who kneels in prayer. The whole aspect of the group is very dignified, and the figure of the queen treated with much feeling, and the thin and almost transparent hands are beautifully modelled. The lace and other accessories are sufficiently rendered, without that over-wrought realism which annoys one in much modern Italian sculpture, and the whole goes to confirm the author of the celebrated "Gloria victis" in his position of a master among modern sculptors. Of this work we give an illustration in the present number.

The monument which M. Dalou has designed to the memory of Victor Hugo is another remarkable work, of a very different type. Under an arch, flanked by columns supporting an entablature, the figure of the poet reposes on a funeral couch draped with a cloth covered with crowns and palms. A group of allegorical figures, including a Pegasus, surmounts this triumphal arch, the tympanum of which is decorated with garlands. Two other groups flank the composition; on the right, Eviradnus, from the "Légende des Siècles"; on the left, Quasimodo rescuing Esmeralda. The rays of a setting sun form an aureole round the head of the poet, and the background beneath the arch is occupied by a relief personifying his principal works,—"Les Châtiments," "La Légende des Siècles," "Les Rayons et les Ombres," "Les Orientales," &c. Though executed on a reduced scale, the model has been finished with great care, and has a fine decorative effect.

In comparison with this masterly work, the "Apotheosis of Victor Hugo" by M. Lucien Faliez is a disagreeable contrast,—a pretentious and unreal work, produced in response to official command, and not worthy of the occasion. It may be observed, however, that the sculptors generally have shown more reticence in regard to the great event of the year than might have been expected, and that "La Mort de Victor Hugo" has not been so overdone as we feared it would.

The Duc d'Anjou continues to enrich his wonderful palace at Chantilly with works by our leading sculptors. It is for him that M. Paul Dubois has produced his equestrian statue of the Constable de Montmorency, of which he exhibits a model two-thirds the intended scale; of this we give an illustration. It is for Chantilly also that the decorative statue by M. Chapu is intended; a young girl kneeling and plucking flowers; the figure is very beautiful, and the lines of the draperies recall Classic art; but it was a singular and not a happy idea to have covered the figure with a shiny composition, giving it a gray earthy aspect, and bringing out all the spots on the marble.

It is with sad recollections that we notice here two statues by Schenewerk. The first is a seated figure of Lulli, intended for the Opera House. The second, entitled "Un Prisonnier dangereux," is a pleasant bit of mannerism, treated with the charm which characterises the works of this unfortunate artist, whose career came to so sad and premature an end.

We note a statue of "General Chanzy," by M. Croizy, very superior to that exhibited last year by M. Crank, and there is an "Edmond About" by the latter, which, unfortunately, has no resemblance at all to the man of whom it is supposed to be a portrait. The exhibit of M. Longepied is a reproduction in marble of the admirable group entitled "Immortalité," which, four years ago, brought its author the "Prix du Salon." The marble version is even finer than the original model, and counts among the finest works which have figured at the Salon for some time back. Of this also we give an illustration.

We may mention also with praise the "Judith," a group in marble by M. Lanson, the kneeling statue of Cardinal Regnier, commissioned from M. Louis-Noël for the Cathedral of

Cambrai; the figure executed by M. Godemsky for the tomb of Madame Tamberlik, the Japanese figure in marble by M. Aizelin, intended for the Museum of Natural History; and a model of a candelabrum by M. Hugues, symbolising Asia, and which is to ornament a room of the Hôtel de Ville.

For the Hôtel de Ville also M. Blanchard has executed a fine statue representing "Science," and the municipal administration has commissioned also several other important works in the exhibition, especially the "Etienne Dolet going to Execution," by M. Guilbert. Though selected in a competition, we have but a poor opinion of this large statue, which may perhaps look better when cast.

In sculpture of the *genre* class we find also a whole series of works belonging to the Municipality; in the first place, the "Jeune Faune," by M. Charpentier, a very clever and pretty marble figure; then another group, "Daphnis and Chloë," by M. Guilbert; an elegant figure by M. Hercule, entitled "Primevère"; further on, "Le Gué," by M. Lefevre, who exhibits also a good bust of M. Michelin, the Deputy of the Seine; "Le Sauvage" of M. Rolard, and a very well modelled marble group which M. Lange Guglielmo calls "Vieille Histoire," and which represents a young peasant girl seated at the feet of her mother, who is spinning.

Mdme. Marie Cazin, the wife of the painter, has for some years occupied an honourable position as a sculptor of *genre*. She exhibits this year a twin bust of two little girls, and a fragment of bas-relief perhaps rather loose in execution, but of real merit.

M. Albert Lefevre takes us into ultra realism. The peasant woman cutting bread for her children is a figure direct from life, and, in spite of the nature of the subject, has nothing trivial or commonplace about it. The "Mars and Venus" of MM. Zacharie Astruc, in spite of the talent of the artist, is not a success; a nude woman, of very full contours, is seated on the knees of a warrior cased in complete armour, whose helmet she is opening. The juxtaposition in this way of the nude and the clothed figure suggests something akin to indecorum, and the proper title of the work should be "Ribaudes et Soudards." The "Souviens-toi" of M. Allouar is a paraphrase of the line "Grandiose effoiss ossa sepulchris,"—a labourer points out to his son the bones and remains of armour which the ploughshare has turned up from the soil.

We will pause a moment before the exhibit of M. Falguère: two Bacchantes, with contorted bodies and dishevelled hair, are fighting furiously. How can an artist who has reached the height of his reputation descend to such a sorry kind of artistic joke? It cannot be excused on the ground of "furie Française," for not far off is the group of M. Boucher, of three racers, as full of spirit as you please, but quite free from the coarseness of design and execution which characterises this work of M. Falguère's. A fine animal group by M. Caïn is to be noted,—a lioness dragging a wild boar to her den; and another noteworthy work is the "Alteia d'Amour," by M. Destree, an unpretentious but careful and well-studied bit of sculptor's work. As to the "Égalitaire" of M. Captier, which thrusts itself violently on one's attention, it is a personification of "Anarchy," brutal and repelling in style and feeling, which would be more in place at Decazeville than in the Palais d'Industrie.

Among the long series of busts, as numerous as usual, we may mention as a work of the first rank that of Dr. Deschamps, by M. Barrias, a fine marble portrait, full of expression and splendidly modelled. He has substituted for the traditional pedestal a pile of books, negligently posed on some manuscripts. The bust which M. Albert Lefevre has made of M. Louis Ulbach is also a remarkable example; and M. Carrier-Belleuse has given great truth to the head of the historian Henri Martin. M. Crank has been more successful with M. Sarcey than with Edmond About; the bust of the eminent critic is a striking likeness, and the same praise may be given to that of M. Coquelin, jun., by M. Falguère, a work which helps to make us forget the unfortunate "harpies" above referred to. We may mention also the bust of the tragedian Maubant, that of the caricaturist Stop, by M. Moreau-Vauthier, and the head of an old countrywoman in a bonnet, which M. Baffier exhibits under the title of "La Mère Baffier."

\*We hope the wisacres who write leaders in English papers abusing the whole architectural profession will take note of this.

\* This was written before the recent unhappy and ill-advised action of the French Government in reference to the Comte de Paris and his family.



Among medallists M. Chaplain continues to take the lead. Among his works may be noticed the medal commemorative of the Hôtel de Ville, and the two medallion portraits of Gérôme and Baudry. We may single out for mention also a pretty medal in antique style, in very low relief, by M. Peter, which he entitles "L'Age Heureux," and a fine frame of medals by M. Roly.

We have necessarily omitted mention of many works, but it may be confidently said that even among those works which leave something to be desired in regard to taste, choice of subject, &c., we find evidence not only of serious study but of strongly marked character and individuality. The sculptors constitute the chief artistic honour of France at present.

#### A POINT IN THE REPORT ON THE VENTILATION OF THE HOUSES OF PARLIAMENT.

In the above-named Report, on which we have already commented, the Committee attribute much of the evil which has of late assumed intolerable proportions to "the absence of proper ventilation in the Low-Level Sewer," and "venture to think his Board will not long be able to adhere" to a statement by the Chairman of the Metropolitan Board of Works to the effect that it was not necessary to ventilate the Low-Level Sewer.\* But at the same time that they express this opinion they cite a fact which in itself is hardly reconcilable with it, viz., that "a very strong smell of sewage of an intermittent character, both inside and outside the building, occurred, especially at the time of high water." This, they add, "conclusively proves that the pent-up gases are forced out of the Metropolitan Sewer into those connected therewith." We need not entertain much doubt of the fact that sewer gas formed in the 8½ miles of this Main Sewer does, from time to time, force its way into the Westminster Palace, and other buildings. So far, no doubt, the Committee do no injustice. The point to which we demur is that such effect is due to the rise of the tide.

What is called the Low-Level Sewer has, been, in point of fact, so constructed as to be cut off from any direct connexion with the river, and thus from any effect of rising and falling tide. It is not only an artificial outfall, but one which has been before now pointed out in the columns of the *Builder* to have been laid at a level which there is much reason to regret. The drainage of 14½ square miles of the western suburbs of London, collected in what is called the Western Sewer, is pumped up at what is called on Sir J. W. Bazalgette's plan (*Proceedings of the Institution of Civil Engineers*, vol. xiv., plate 14), the Chelsea Lift, to a height of 17 ft. 6 in. Starting at this artificial level, the sewer falls at between 2 ft. and 3 ft. per mile to Abbey Mills; where its contents are pumped up, for another 96 ft., into the Northern Outfall Sewer.

In consequence, in the vicinity of the Houses of Parliament the surface of the liquid in the Low-Level Sewer, supposing it to run half full, is intermediate between high and low water mark; or about 6 ft. 6 in. above the latter. The variation in depth of flow during the day, in dry weather, is stated by the Committee at a foot. But in heavy storms the water rises up the shafts and sewers connected with this sewer to 13 ft. above Ordnance datum. This, no doubt, is a serious evil for Westminster. But it has no connexion whatever with the height of the tide.

At the same time the statement of the Committee, that the offensive smell which has recently become so intolerable as actually to put a stop to the business of the House of Commons on the 27th ultimo, was most perceptible at high water, is to be received with due consideration. On the day in question high water at London Bridge occurred, according to the tables at 5½ p.m., so that the action of the House supports the view of the Committee. The only point is that, so far as this aggravation of the malaria was due to the tide, it rose from other sources than the contents of the Low-Level Sewer, which is carefully disconnected from the tide.

If there really is this connexion between the state of the tide and the smells in the House,

it is important to consider how such connexion can take place. Those who were familiar with Westminster, underground as well as above ground, before (and, for that matter, during) the construction of the Thames Embankment, will have little difficulty in tracing this evil to its source. Before the construction of the Main Drainage Works so much of Westminster as lies below the 10 ft. contour line was in a highly unsanitary condition. In houses of some importance,—we can cite Chapel-place, Spring-gardens, and many other spots,—the occupants of the basement stories were but too well aware of the time of high water. They needed no calendar. The nose gave the information. The drains of these houses so closely skimmed the level of high water,—then not so high as it is now,—that no outflow took place at the top of the tide, even if the sewage did not filter into the cellars and kitchens. On the other hand, as the drains were originally laid so as to get as much fall as the ebb of the river would allow, at low water, especially at spring tides, they became, to some extent, cleared out. The effect was bad, but not so intolerable as a penning-up of sewage, with no escape.

But with the construction of an intercepting drain, when half full is 6 ft. or 7 ft. above the old level of automatic drainage at low water, the case is very different. Much, no doubt, may have been done by way of fitting the street and house drains to the new outlet. But the question is: how much was not done? How much of the original drainage construction, even if not used at present, has been left undisturbed, and unfilled up? And where—over any such neglect has occurred,—and it would not be difficult to point out glaring examples,—a fertile nucleus of disease and nuisance must have been left festering under foot.

It must be remembered that much of this low-lying district, recovered, within the last 800 years, from the sands and marshes of the Thames, is pervious and water-logged. The experience attained in getting in the foundations of the quay wall attests this. A solid wall, built on and founded in the solid clay, would no doubt cut off such a sponge from the river. But if the committee are correct as to the fact of tidal influence, evidently no such complete diaphragm has been everywhere made. Any subterranean connexion, through pervious soil, between the river and the mislaid water, would allow the water to ebb and rise as it did in the old days before the construction of quay wall or intercepting sewer. The detection of tidal action by increased activity in foul smell is thus highly instructive. The palace of Westminster may have, as the committee say, sewer gas poured into it from the metropolitan system; and this is especially likely to occur after rain. But if bad smells are propelled by the rising tide they must arise from that subterraneous system of sewers and drains which ought to have been thoroughly rooted out when the level of their discharge was raised.

On this view, which we think few persons familiar with Westminster can hesitate to accept, the expedients recommended by the committee cannot be expected to command more than a partial success. Let us suppose that the forcing of 84,000 gallons per day of not very foul sewage into the Low-Level Sewer can be so conducted as to avoid any back flow of gas; that process can have no effect on the tidal vomit. From which source the greater part of the evil arises it is highly desirable to ascertain. The Committee have not ascertained it, because they have failed to recognise that there may be two sources; at all events, they are evidently not aware that the tide cannot affect the Low-Level Sewer itself.

**Lynton.**—Mr. S. J. Smith, C.E., Local Government Board Inspector, held an inquiry at the Local Board Office at Lynton, on the 26th ult., respecting the application of the Local Board for a loan for carrying out drainage works, erecting a sea wall and slipway, and forming an esplanade, and constructing a swimming bath at Lynton and Lynmouth. Mr. T. V. H. Davison, C.E., of Windsor, the engineer for the works, attended the inquiry and explained the drawings to the Inspector, who approved of the plans, &c. At a meeting of the Local Board on the same day, Mr. Davison was instructed to obtain tenders for the works forthwith so that they may be commenced as early as possible.

#### NEW HEAD-QUARTERS FOR THE LONDON SCOTTISH VOLUNTEERS.

The finishing touches are now being put to the new head-quarters for those physical "stalwarts" who compose the London Scottish Volunteer Rifle Corps. The building, which is situate in James-street, Victoria-street, Westminster, consists of a large hall for drill and gymnastic exercises, surrounded by two galleries, and well-lighted by a double range of clearstory windows on each side and by the glazed screens which form the end gables of the roof. Over each end of the hall are a number of rooms,—at one end being the committee-room, officers' room, and commanding officer's room, and at the other end the canteen, reading-room, &c. In order to get as large an area of unobstructed space as possible for the floor of the great hall, the galleries and the rooms referred to are very ingeniously suspended from main girders carried at a higher level. The hall is 120 ft. long in the clear by 62 ft. wide, the ends at the back end of the hall being canted off. The hall is laid with Mr. Roger L. Lowe's admirable wood-block flooring, the construction of the floor itself being of iron and concrete, there being a large basement below it. The whole of the ironwork in this floor, and in the roof and galleries, has been supplied and fixed by Messrs. Matthew T. Shaw & Co., from the architect's designs. The roof-principals are light but not wiry in appearance, and they are so designed as to dispense with tie-rods. They are painted a dark chocolate colour, gilding being sparingly introduced. The roof is boarded. The effect of the ironwork of the roof is very pleasing, and the same may be said of the gallery fronts. The height of the hall from floor to apex of roof will be 62 ft. A dado of "teapot-brown" and sage-green, made of glazed bricks of those colours supplied by Messrs. Wilcock & Co., of Burmantofts, runs all round the hall, the large fireplaces (one on each side of the hall) being also in the same material. The effect of the fireplaces and dado is extremely good. The walls above are of stock bricks relieved with red. The lower gallery will be used by spectators of the gymnastic and other exercises which will take place in the hall, and contains a number of lockers arranged along the wall so as to serve as seats when the lids are shut down. The upper gallery will also be available for spectators, but contains a large number of dressing compartments (across the ends of which curtains can be drawn), each containing four lockers. These compartments and lockers are intended for the use of members who need to change their dress. The committee and officers' rooms are at the Brewer's-row end of the hall, and are provided with parquet floors, Indian matting dados, &c. There is a commodious and pleasant reading-room on the second floor of the James-street end of the building, and a non-commissioned officers' room; both these rooms can be thrown together for concerts or dramatic entertainments for small audiences. On the first floor at this end of the building is the canteen, having a drinking-bar at one end and a grill at the other. The greater part of this room will be furnished with tables and chairs for the use of members requiring refreshment. All these rooms have parquet floors and matting dados, this part of the work, and the upholstery and furniture, being by Messrs. Shoobred. The basement contains a lock-up armoury for 1,000 stand of arms, with armourer's room, and store-rooms for seats, tables, &c., required for use on the occasion of meetings or entertainments in the large hall. There is also a large kitchen, the fittings of which are by Mr. Boulting, of Union-street, Middlesex Hospital. From the kitchen there is a lift to the canteen. The inventories have been supplied by Messrs. Steven Bros. & Co. The urinals are on the continuous trough system, with automatic flushing arrangements. These and the whole of the plumbing work are being done by the North British Plumbing Company. There are four staircases, all executed in breeze concrete. The iron balusters to the stairs and the gearing for opening the ranges of clearstory windows before referred to are by Mr. Shrivell, of Castle-street, Long Acre. The white glazed bricks extensively used in the basement are by Messrs. Wilcock of Burmantofts. The sun-burners and other gas fittings are by Messrs. Strude & Co., of Osna

\* The Board have, in fact, already, on the proposal of their Chairman, relegated the consideration of the subject to a committee.

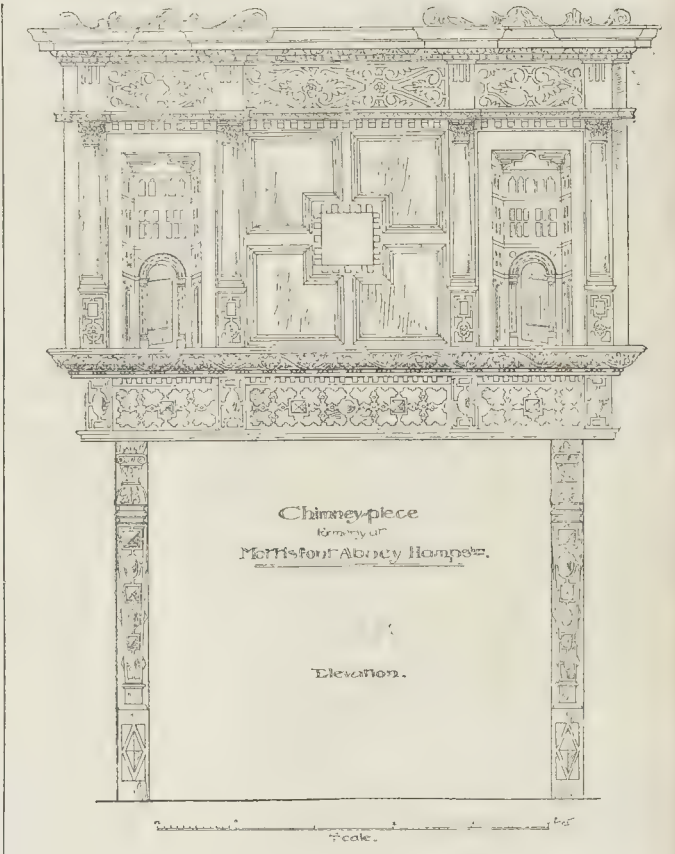


burgh-street. Hayward's prismatic pavement lights have been largely used, and are specially introduced into the flight of seven steps, 12 ft. wide, at the "march-out" doorway in Brewer's-row. The principal elevation is towards James-street. It is mainly of stock bricks relieved with red brick and terra-cotta, and with Douling stone doorway, the pediment of which contains the Scottish arms and national emblems. The total cost of the building will be from 13,000*l.* to 14,000*l.* It has been erected from the plans and under the supervision of Mr. John Macvicar Anderson, architect, Mr. Thomas Gamage being the clerk of works. The general contractors were Messrs. Lawrance & Son, of Wharf-road, City-road, whose foreman was Mr. Williams. The building will be formally opened in a few days, and the members of the corps are to be congratulated on having obtained such admirable quarters.

#### DUST-BINS.

NEXT to the disposal of sewage, the removal of household refuse should certainly occupy a prominent place in the science of house building. In those proverbially "good old times" when cesspools were universally employed in default of better sanitary arrangements, little, if any, attention was bestowed on the subject now alluded to. A cursory glance at any old house now standing intact will reveal this fact. In such places the repositories for dust and garbage are to be found in all their old-fashioned primitiveness. Small and confined in themselves, they are furthermore hidden away in some dark, obscure, and awkward corner, invariably at the back of the house. The heterogeneous matters brought from the house were piled up in the interior of the wood or brick cavity month after month, until the whole germinated and became one huge bed of festering disease. In due course the mass settled down, some portions dissolving and being absorbed by the soil, through the medium of which the poison-laden fluids percolated into the foundations of the adjoining premises with disastrous effects. Local boards and vestries were then in a chrysalis stage,—their development was a matter of after years,—consequently it devolved almost entirely on the enterprise of private individuals to accomplish the periodical clearing of these domestic Augean stables. The unpleasant business was naturally performed as unfrequently as possible, for the simple reason that in order to reach the street the putrefying mass had to be conveyed through the interior of the house. What disease and sickness these hotbeds of living germs must have created it is, of course, impossible to guess. But it is safe to assert that some ill results must have resulted from this flagrant abuse of the rudiments of sanitary science.

Everything has materially improved since then, and the situation and construction of dust-bins now receive more attention. In a large number of modern houses the dust-bins are placed in front and in close proximity to the roadway, so that the operations of emptying and removing the contents can be effected with ease and rapidity and without causing inconvenience to the occupants. It is ridiculous, however, to place a receptacle for dust immediately in front of a basement window. Unfortunately this situation is too often selected. Leaving alone the subject of "appearance" and the fumes arising at all times and especially during the summer months, the constant passage of servants to and fro for the purpose of filling, and of men to empty the bin, cannot be anything but disturbing and annoying. Moreover, a window cannot be opened for ventilation without the danger of stray particles being wafted into the room. In every way it is an error of judgment to place a dust-bin in too prominent a position. It is true these receptacles should be situated so as to be easily "get-at-able," but, at the same time, all offensive conspicuousness should be carefully avoided. What should be the proper form of a dust-bin circumstances and experience must alone dictate. A brick structure with a small door in front is, perhaps, the most ordinary arrangement. This style of bin is, however, both difficult to fill and empty, and, in consequence of this difficulty, it is natural to conclude that the last-named operation is rarely, if ever, performed with thorough completeness. This drawback has led to the adoption by some of



a bin with a wooden or iron front capable of being removed bodily. The interior is by this means laid bare, and the consequent result is apparent. Still, this method possesses a drawback. The refuse has to be shovelled into baskets to be conveyed away, and this process is a work of time and a work full of unpleasantness. To avoid all this, and make the cleaning-out easy and speedy of achievement, has led some people to abolish the fixed bin altogether, and to substitute a portable box, basket, or, better still, galvanised iron cylinder, all of which can be conveyed away and thoroughly cleaned in one operation, without fear of any residue remaining, to decompose and contaminate soil and atmosphere.

There is much to commend this method, and the builder should take kindly to it, for its general adoption would save him a good deal of the time and trouble now expended on brickwork arrangements which, at their best, are far from perfect.

But it must be added that the offensiveness of dustbins, whatever their form, is largely the fault of their users, who should remember that a dustbin is not a fit receptacle for fish-bones, cabbage-leaves, potato-parings, tea-leaves, and other house refuse, which can generally, with a little management, be dried at the back of, and burned in, the kitchen fire. The good housewife and the tidy domestic may be known by the state of the dustbins under their control.

**The Cavendish Memorial Fountain** at Bolton Abbey, erected as a memorial of the late Lord Frederick Cavendish, was publicly inaugurated on the 11th inst. The work has been carried out from designs by Messrs. T. Worthington & J. G. Elgood, architects, Manchester, by Messrs. Stephenson & Co., Manchester, for whom the carving has been executed by Messrs. Karp & Hobbs, London and Manchester. A view and description of the fountain appeared in the *Builder* for Oct. 24th last.

#### CHIMNEYPIECE FROM ROMSEY.

This chimney-piece has been brought from Mottisfont Abbey, near Romsey, and stood in the dining-room there. The whole is of oak, parts being carefully carved, but the general effect is rather spoiled by the distorted perspective of the side panels, which are traditionally said to represent part of the Priory. Colour has been extensively used, the columns having been painted to imitate marble, and the ground of some of the panels retains traces of red and blue. The whole is about 10 ft. high and 8 ft. broad. It is now in the possession of Mr. Blount, of 47, Southampton-street, Camberwell, by whose kind permission the sketch was made.

#### OBITUARY.

**Mr. T. G. Andrews.**—The death is announced of Mr. T. G. Andrews, architect, Bradford, after a short illness. He was the son of the late Mr. Andrews, who for many years carried on the business of an architect in conjunction with the late Mr. Delaney. That firm had charge of a large number of important building operations from the time when Bradford began to develop into a town of importance, and subsequently their professional connexion was carried on by Messrs. Andrews, Son, & Pepper in the Old Bank Buildings, of which they were the architects. After the death of Mr. Andrews, sen., the business was continued for some years by Mr. T. G. Andrews and Mr. Pepper, and latterly by the former gentleman. The extensive premises of Messrs. S. C. Lister & Co., at Manningham, the Fever Hospital, and the Mechanics' Institute were among the principal works designed and superintended by his firm. The illness which caused his death followed upon a fall which he sustained while walking towards his home in Horton-lane on the evening of the 4th inst.

**Mr. James Hall, C.E.,** Borough Surveyor of Stockton, died early on Monday last, after a very short illness.



Mr. Llewellyn Jewitt, F.S.A., died on the 5th inst. at his residence, Duffield, Derbyshire, in his seventieth year. He was born at Kimberworth, near Rotherham, and was the youngest son of Arthur Jewitt, the topographical writer. In 1838 he settled in London, where he remained for a few years, and during that time was mainly engaged in illustrating many leading works of the day. At this period, too, he published his "Handbook of British Coins," which has since passed through several editions. Subsequently, at Oxford, Mr. Jewitt greatly assisted by his pencil in the admirable labours of his brother, Mr. Orlando Jewitt, the eminent architectural engraver, in Parker's "Glossary of Architecture," and in many other works. At a later period, he was appointed chief librarian of the Plymouth Public Library. In 1853, Mr. Jewitt removed with his family to Derby, where he continued to reside till 1867, when he took up his residence at Winstler Hall. In 1880, Mr. Jewitt removed to "The Hollies," Duffield, the home of his early years. He was for a long time hon. curator and hon. secretary of the Town and County Museum, and also took an active part in amalgamating with it the Derby Philosophical Society (founded by the celebrated Dr. Darwin) and the Town and County Library, for which, with princely munificence, the late Mr. Bass erected a commodious building. Mr. Jewitt was well known as the projector and editor, for more than a quarter of a century, of the *Reliquary*, an illustrated antiquarian magazine, besides being a writer upon kindred subjects for the *Art Journal* and many other periodicals. In this month's *Antiquary* there appears an interesting article from his pen on "Some Derby Streets and their Historical Associations." He was recently awarded, on the nomination of the Prime Minister, one of the Queen's Civil List pensions for distinguished literary services,—a deserved reward, which, unfortunately, he has not lived very long to enjoy. Mr. Jewitt was buried at Winstler on June 9th, exactly three months after the interment there of his wife.

#### A NEW NAIL.

This patented nail, which we are told is the invention of a lady, is intended to obviate the leaving of nail-holes and the necessity for putting up. The *modus operandi* is as follows: suppose the case of flooring boards,—the nail is driven into the joist first in the direction shown by the arrow, by hammering on the head A; the corresponding portion



belonging to the other half of this twin nail at B, is cut wedge-shaped, and bites into the wood. The point C is thus left projecting, and the flooring-board is hammered on to it, instead of the nail being hammered into the board in the usual manner; the same system applying, of course, to any other case in which two pieces of wood have to be connected by nailing.

The idea is very ingenious, but we should wait to see it tested in practice before ordering a large job to be nailed up in this way. Except in the case of decidedly soft wood we should expect to find a good many of the nails turning in hammering the wood on to them, as there cannot be the same power of directing the course of the nail, and the direction of the blow on it, as when each nail is hammered down separately.

**International Hydrological and Climatological Congress at Biarritz.**—Arrangements are being made by the officers of several French societies for holding an international congress for discussing papers upon climatology, mineral and thermal springs, and allied subjects. A letter has been received from the Foreign Office transmitting copies of documents, and stating that the French Government is anxious that members of scientific societies in this country should assist. The co-operation of the Royal Meteorological Society has also been specially asked by the President of the Congress, Dr. Durand Pardoil. The sittings at Biarritz will occupy the first week in October, and be followed by a three weeks' tour to the principal watering-places of Southern France.

## Illustrations.

### ARTISANS' DWELLINGS, VICTORIA SQUARE, LIVERPOOL.

THESE dwellings, which were opened in the autumn of last year, have been erected by the Corporation of Liverpool from designs by the City Engineer (Mr. Clement Dunscombe, M.A., M. Inst. C.E.), and under his superintendence.

The designs, as well as others for dwellings suitable for the poorer classes, capable of being let at rents of 1s. and 1s. 3d. per room per week, were exhibited at the International Health Exhibition in London two years ago; the Corporation of Liverpool was awarded a diploma of honour for the exhibit, and Mr. Dunscombe was awarded a gold medal for the designs.

The buildings occupy part of a site formerly known as Nash Grove, situated in Scotland Ward, in the parish of Liverpool. The area was cleared under the Artisans and Labourers' Dwellings Act, 1875. It comprised 22,487 superficial yards, of which 3,717 superficial yards were occupied by public streets, and the remainder by low-class, unhealthy dwellings and buildings and yards in use for trade purposes. The population displaced by the carrying out of this scheme was 1,310, of which population 1,100 were of the working classes, and the number of people living on this area, under the worst sanitary conditions, was at the rate of 282 per acre.

After the site was cleared and filled up to a proper level it was laid out for the erection thereon of artisans' and labourers' dwellings, and offered by auction, but no bids could be obtained for it, and, as private enterprise could not be induced to take the matter up, the Corporation were therefore reluctantly compelled to erect these dwellings on a portion of the site. Again, in November, 1884, the remaining area unbuilt upon was offered by auction, and, although an extremely low reserve price was fixed so as to admit of buildings being erected upon it to pay a moderate rate of interest, this further effort on behalf of the Corporation was likewise unsuccessful.

**Site.**—The site upon which the dwellings have been erected is bounded on every side by streets, and contains 9,195 superficial yards, of which 3,924 superficial yards are occupied by dwellings, and 5,271 superficial yards in approaches, and in a quadrangular open space suitably laid out. Tramways, affording cheap means of communication with all parts of the City, pass along two of the streets.

The entire area occupied by buildings, after being excavated to the requisite depths, was covered with a layer of Portland cement concrete, averaging 9 in. in thickness, the concrete foundations for the walls being carried to a greater depth, and for a width of from 3 ft. to 5 ft., to receive the various footings to the brick walls.

Above the ground level a damp-proof course of asphalt is laid over all the walls throughout.

The quadrangle is laid out with wide footwalks, and a 15-ft. carriageway round the buildings. The central portion of the quadrangle is enclosed by a low wall and iron railing, provided with entrance gates in convenient positions. On the inside of this enclosure a border for shrubs has been reserved. The remainder is laid out as a playground, and finished in Portland cement concrete.

The footways are likewise laid with 6 in. Portland cement concrete, and the carriageways are formed with a similar foundation, the surface being finished in compressed natural asphalt.

All the streets surrounding the dwellings have a 6 in. Portland cement concrete foundation, and are paved with granite sets, the joints being filled with dry shingle, and grouted with a mixture of pitch and creosote oil, the footwalks being finished in compressed asphalt. The site is, therefore, practically impervious.

The buildings are five floors in height, and divided by party-walls into thirteen separate dwellings, each of 75 ft. frontage, and 36 ft. in depth, outside measurements. They are arranged so as to admit of a free circulation of air around them.

There are five entrances to the quadrangle, provided with ornamental wrought-iron gates, approached from the surrounding streets.

Two of the blocks have shops on the ground-floor, with spacious basements, lavatory, and w.c. connected with the shops by staircases. These blocks have only four floors of tenements above them. All the other blocks are entirely devoted to dwellings, and have no basements.

Each dwelling has a separate entrance from the quadrangle and common staircase, giving access to the corridors and tenements right and left on each floor.

There are in the thirteen dwellings 271 tenements and a superintendent's house, made up as follows:—

	No. of rooms.
68 Three-roomed tenements.....	268
184 Two-roomed tenements.....	328
21 One-roomed tenements.....	21
Superintendent's house.....	4
Total No. of rooms.....	611

The three-roomed tenements are arranged as a living-room, 13 ft. by 12 ft. 4 in.; one large bedroom, 15 ft. 3 in. by 9 ft. 7 in., capable of being divided into two bedrooms by a movable screen, with separate entrances to each half; one bedroom, 13 ft. by 8 ft. 6 in.

The two-roomed tenements are arranged as a living-room, 13 ft. by 12 ft. 4 in., and one bedroom, 15 ft. 3 in. by 9 ft. 7 in., capable of division as above described.

The one-roomed tenements are arranged as a living-room and bedroom combined, 12 ft. by 12 ft.

All the rooms are 9 ft. in height.

The twelve shops have a frontage of 12 ft. 6 in. each, and a depth of 32 ft., and an average height of 11 ft., with basements, 9 ft. in height, under the entire area of the shops.

**Water Closets.**—Entering from a lobby out of the corridors, and adjacent to the sculleries, water-closets, slightly projecting beyond the main line of buildings, are provided, two on each floor for the joint use of the four tenements.

These water-closets are thoroughly disconnected from the tenements; they have constant through ventilation and pivot-hung windows, and are fitted with Bristol glazed flush-out closets of the best construction, and water-waste preventing cisterns.

**Staircases, Lobbies, and Floors.**—There are thirteen staircases, one to each dwelling.

The stairs and landings are of stone. The landings to the stairs are open to the quadrangle front for their entire height, and project from the main building, forming a balcony protected by a wrought-iron railing. The stairs and corridors are amply lighted by the windows of the sculleries and by these openings, thus affording thorough ventilation from front to back of each dwelling.

The floors of laundries, sculleries, corridors, and water-closets are of Portland cement concrete; the floors to living-rooms and bedrooms are boarded, but are specially constructed to prevent, as far as possible, the spread of fire.

A granolithic washable dado, finished terracotta colour, is formed for a height of 4 ft. round the staircases and corridors, above which the walls are plastered and coloured in a suitable tint. The walls of the laundries and water-closets are fair pointed and lime whitened.

**Receptacles for Dust, Ashes, and other Refuse.** The dust and ashes only on each floor are disposed of through a ventilated shoot formed in the angle of the lobby leading to w.c. This shoot terminates in a receptacle placed in position on the ground-floor, and there are two connections in this shoot in the corridors on each floor. Provision is made for all other refuse being deposited in special orderly-bins external to the building, and placed in the railing of the enclosure in the quadrangle.

**Laundry.**—In addition to the above accommodation, each tenant will have the sole use, for a fixed day, or portions of days, of a spacious laundry placed centrally on each floor, with two entrances from the corridors, and intended for the use of the four tenements on that floor. The laundry is lighted by a large bay window, which is divided into several pivot-hung sashes all opening for ventilation. By the proposed arrangements each tenant will have for the day, or portions of days, the privacy that would attach to a laundry within his own tenement, without any of the disadvantages arising from conducting washing operations therein. It is fitted up with double wash-troughs and a copper, water being laid on to each. A galvanised iron hood is placed over each copper and connected with the flue, so that the steam may be speedily carried away.



**Sculleries.**—On each side of the laundry on every floor immediately leading from the corridor is provided a double sink of Bristol glazed ware with hardwood drainers, with water laid on to each, being one sink for the use of each tenant. An additional water-tap is placed in the corridors on each floor near the sculleries.

The interior of the tenements is made as attractive and cheerful as possible. The walls of all the rooms are plastered and finished in distemper. Around the living-rooms there is a dado of a dark tint, surmounted by a neat stencilled border, above which the walls are finished in a lighter colour.

Special care has been exercised in selecting serviceable and pleasing tints for the finishing colours of the woodwork and distempers. The fittings to each tenement comprise a series of useful articles, thus dispensing to the fullest extent with movable furniture.

A special combination dresser, larder, coal-bunker, and closet are provided in each living-room. The larder is fitted with slate shelves, meat-hooks, hangers, &c., and is ventilated by openings into the corridor filled in with terra-cotta ventilators, covered on the inside with perforated zinc. There are also attached cup rails, small and large cupboards, drawers, &c., and underneath a coal-bunker with sliding doors in the living-room, and fitted with a small door in the corridor, through which the coals can be delivered.

Hat and coat rails are fixed in all the rooms, and in the bedrooms shelving and hanging closets, and in the divisible bedrooms, which are provided with two entrances, one of which forms a convertible closet when not required as an entrance.

The sashes of all the windows throughout open for their entire area. They are divided into three parts, the lower sashes being double-hung, and the upper sash pivot hung. The lower portion of each window is divided into small squares, and is glazed with cathedral tinted glass, giving both a cheerful appearance, and at the same time acting as a window blind. The windows of all the living rooms and bedrooms are fitted with Venetian blinds, stained and varnished.

Adequate provision has been made for the admission of fresh air through the ventilators in external walls and corridors, and the extraction of foul air is provided for through flues in the chimney breast fitted with mica flap ventilators.

Each living-room has a specially designed cast-iron combination mantel and over-mantel and a cooking range fitted with oven, plate-rack, and other useful accessories. All parts liable to heavy wear are made in wrought-iron, such as the fire bars and fall-down bars of fire-grate and draw-out fret, &c. At the back of the fire-grate a hot-air chamber has been constructed which is supplied with cold fresh-air through perforated terra-cotta air bricks fixed in the external walls and thence through a cavity formed in the wall leading to the air-chamber. The air when warmed passes through pipes leading to the living-rooms and bedrooms, the supply being regulated by cast-iron hit-and-miss ventilators placed in the walls of these rooms.

The whole of the door furniture and fittings and general ironmongery is specially designed and made of malleable iron, the cost being less than the commoner furniture generally used.

The outer door of each tenement is furnished with a malleable iron knocker, representing "The Liver" (which forms part of the Corporation crest), a door-handle forming a knocker capable of being used by children, and an enamelled iron number. The keys to all locks throughout each dwelling vary.

**Elevation of Buildings, &c.**—The buildings have been erected in Liverpool grey common bricks, with splayed red pressed brick arches and window jambs, moulded labels over windows and panels under same, cornices and bands, and red pressed bricks used sparingly in a few other places. Red terra-cotta has been used in the main entrance doorways and dormers. Wrought-iron balconies are introduced in connexion with the main staircase of each dwelling in the quadrangle front. The roof is covered with Welsh slates from a selected quarry, and there are Yorkshire stone sills to all windows projecting 1 ft. from the face of the wall for plants in pots or window-boxes, each being fitted with neat wrought-iron guard-rails.

The buildings have practically double elevations, requiring careful treatment. The wall-

surface has been broken by slight projections surmounted by dormers. The extra cost incurred by this mode of treating the elevations, by the introduction of terra-cotta and the materials already described, over elevations of the plainest character, is inappreciable in so extensive a block of dwellings.

**Sewerage and Drainage.**—The sewers in the streets surrounding the dwellings are 3 ft. by 1 ft. 10 in., brick sewers. They are of recent construction, and thoroughly ventilated at frequent intervals by means of open grids. They receive all the waste and soil pipes from the buildings, with the exception of the block fronting Cazneau-street.

The drains in the quadrangle consist of glazed earthenware socket-pipes, caulked and jointed in Portland cement, 6 in., 9 in., and 12 in. in diameter respectively. One of these takes the waste and soil pipes from the closets of the shops above referred to, and eventually discharges into the main sewer. The others only receive the water from the roofs, and the surface water of the quadrangle. The former drain is ventilated by a special 6 in. ventilating shaft fixed to the building, discharging well above the roof-line, and is furnished at its highest point with an automatic flush-tank of 300 gallons capacity, constructed in brickwork.

The remaining drains in the quadrangle are also ventilated. The whole of the waste-pipes from the buildings are disconnected from the drains, and discharge into ventilated 4 in. by 4 in. cast-iron pipes attached to the buildings, and they are caulked and jointed in red lead. These pipes again discharge over the water line of a trapped gully at the foot of same, fixed in the footpath within the building line, and covered with a grating acting as an air inlet.

The closets discharge into an external 6 in. socketed and lead-jointed cast-iron soil-pipe, with special junction cast on, of sufficient length to reach inside the wall of the building to receive the outlet from the closet, the joint being made within the wall-line. These soil-pipes continue above the roof-line the full diameter, and terminate with a cowl on top, and are supplied with fresh-air inlets. Both the syphon and improved flush-out closet are of Bristol glazed ware, the former having an air-tight inspection cover.

The waste-pipes from the sculleries, sinks, wash-troughs, &c., are formed entirely of Bristol glazed pipes, 1½ in. in diameter, thus dispensing with lead piping. They are fitted underneath with a syphon of the same material, furnished with an air-tight inspection inlet, with the requisite piping, and discharging external to the buildings, as already described.

The public drains are flushed at frequent intervals, and all the private drains within the city are flushed twice annually, free of cost, by the Corporation, and oftener, on payment of a small fee by the owners of the property. These regulations will equally apply to this block of buildings.

**Water Supply.**—A constant-service supply is laid on to every floor of the dwellings, to sinks and laundries, and in corridors. The taps in the corridors are provided with half-coupling on nose for hose-pipe, rendering them capable of being used in case of fire on any floor. Fire hydrants are also fixed around the quadrangle, and two double drinking-fountains are provided. All water for domestic use is drawn direct from the mains. A 500-gallon slate storage-cistern fixed in the roof of each dwelling supplies the 6-gallon flush regulating cisterns fixed over each water-closet. All taps used are screw-down bib taps.

The whole of the fittings are of the best description, stamped and approved by the Water Department of the Corporation of Liverpool.

**Gas Supply.**—Gas is laid on to the buildings through an independent 3-in. cast-iron main laid around the quadrangle. The outlet from the street main leads into the meter-house in the basement of the superintendent's house, in which are fixed two 200-light meters discharging into the 3-in. main.

The gas supply is under the control of the superintendent in his general office by means of a wheel attached to a valve on the main.

Pressure gauges are also fixed in his office to facilitate the adjustment of supply, and a ¼-in. by-pass is fixed on the valve to prevent the total extinction of the lights.

Branches to each of the thirteen blocks are laid from the main with a stop-cock fixed on same on

the outside of the building inclosed in a suitable iron box. The corridors and sculleries are provided with glazed lanterns of suitable design affixed to the walls, and in each of the living rooms and laundries an ornamental iron pendant with ball joint is fixed. Over the entrance door to each dwelling a bracket lamp of ornamental design has been fixed, also lamps to main entrance in Cazneau-street.

The fittings throughout are of the best description of their class, and every precaution is taken to avoid the waste of gas and ensure its economical consumption. To each of the burners in the corridors, sculleries, and laundries a special cock is fixed capable only of being opened or shut by a key in the possession of the superintendent, also separate main cocks to the supply-pipes laid to each of the tenements and fixed in the corridors. These are also under his control.

Governors are fixed to all the lights limiting the consumption to 3 cubic feet per hour of 20-candle gas, with the exception of the outside lamps, which are rated at 4 cubic feet per hour.

**Cost of Dwellings, and Estimated Returns.**—The total estimated cost of the dwellings, including the market value of the site, viz., 9,195 yards of land, is 70,000l. It is estimated that at least the following moderate rents will be readily obtained, viz.:

Three-room tenements, 6s. per week.  
Two-room tenements, 4s. 6d. per week.  
One-room tenements, 2s. 3d. per week.

These rents are exclusive of the charge for gas if used in the living-room, but inclusive of all rates and taxes, which will be paid by the Corporation. These rents are well within the means of those of the artisan class who require to reside near their work, and for whom these dwellings have been erected. They compare favourably with the average rents generally paid for the inferior accommodation now provided in cottage houses in Liverpool.

On this basis, and a moderate estimated rental for the shops, after allowing ample margin for all leakages, such as rates, taxes, insurance, superintendent's salary, empties, and repairs, the buildings only should yield a net return of 4½ per cent. on their estimated cost of 55,000l., and still leave a balance of rental which, if capitalised on a 3½ per cent. basis, will represent the full market value of the site for this purpose.

In judging the financial result of this scheme it has to be borne in mind that the object of the Corporation was not to cover this site to its full capacity with dwellings, but to erect buildings of the best class for their purpose and of the highest sanitary standard, thus affording an example to be followed in the future by private enterprise, while, at the same time, providing a large unbuild-upon space in this densely-populated district.

The unbuild-upon open space attached to these dwellings over and above that required by the Liverpool Building Act is 2,845 square yards.

The value of this land, as well as the cost incurred in laying it out is included in the total cost upon which the above percentage returns have been calculated.

Messrs. Hughes & Stirling, of Liverpool, were the contractors for the buildings.

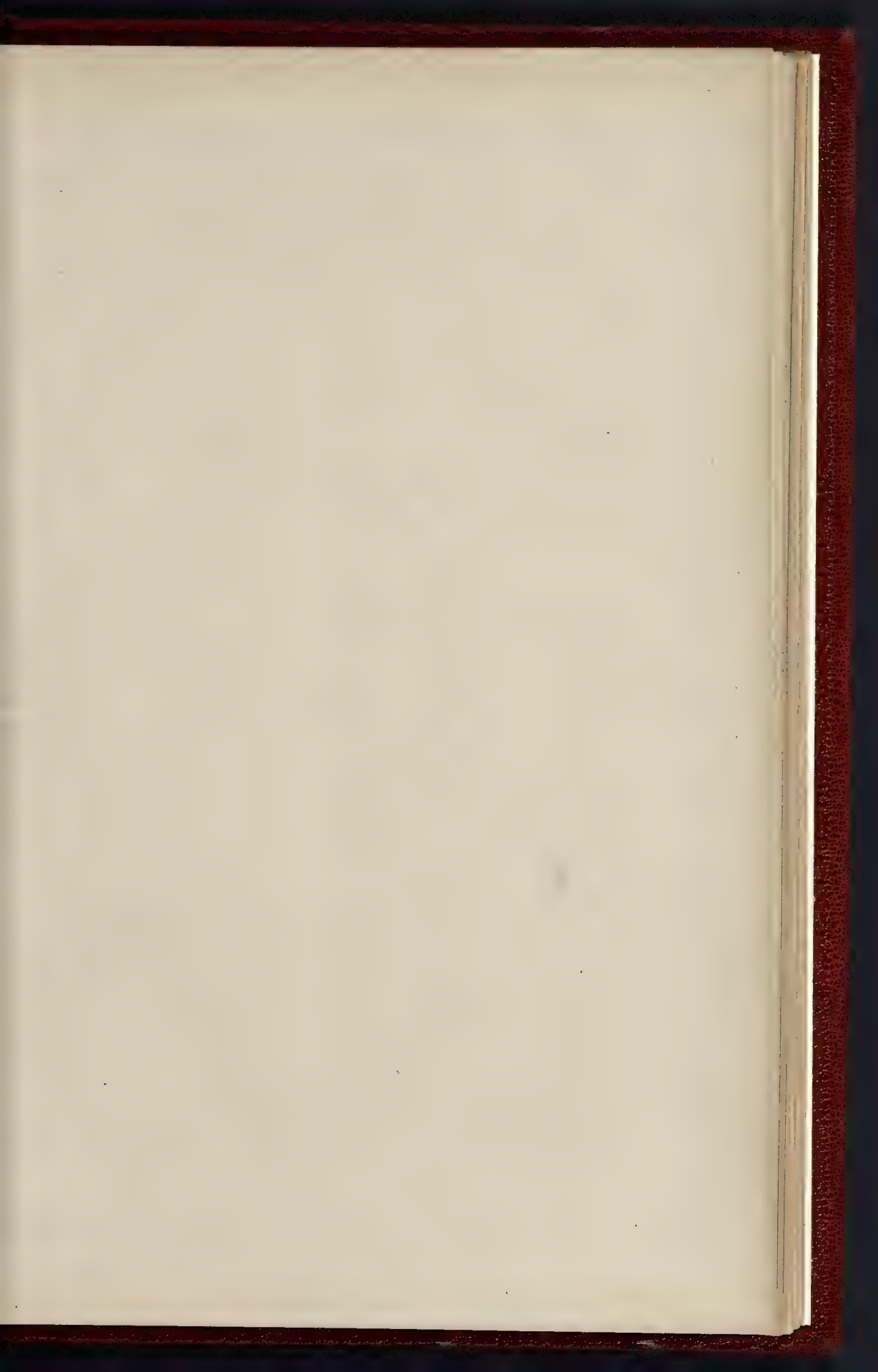
The Corporation supplied the ranges, grates, and ironmongery to be fixed by the contractors. They have also executed certain other works in connexion with the buildings, viz., the external gas supply and the granolithic dado, by contract, and the external drainage, laying out, and paving of the site and the paving of the abutting streets and other minor works by Corporation workmen.

Mr. John G. Garthwaite acted as chief architectural assistant both in connexion with the preparation of the contract and the detail drawings, and during the execution of the works. Mr. Augustus F. Scott acted as clerk of works.

#### SCULPTURE AT THE PARIS SALON.

For some particulars regarding the three works in sculpture which form the subjects of part of our illustrations this week, see the article "Sculpture at the Paris Salon" (p. 878 in the present number).

**British Museum.**—Mr. J. A. P. MacBride's next lecture on "The Succeeding Greek Sculptors after Pheidias," is fixed for the 22nd inst., at 2.30 p.m. precisely.





THE BUILDER, JUNE 19, 1886.



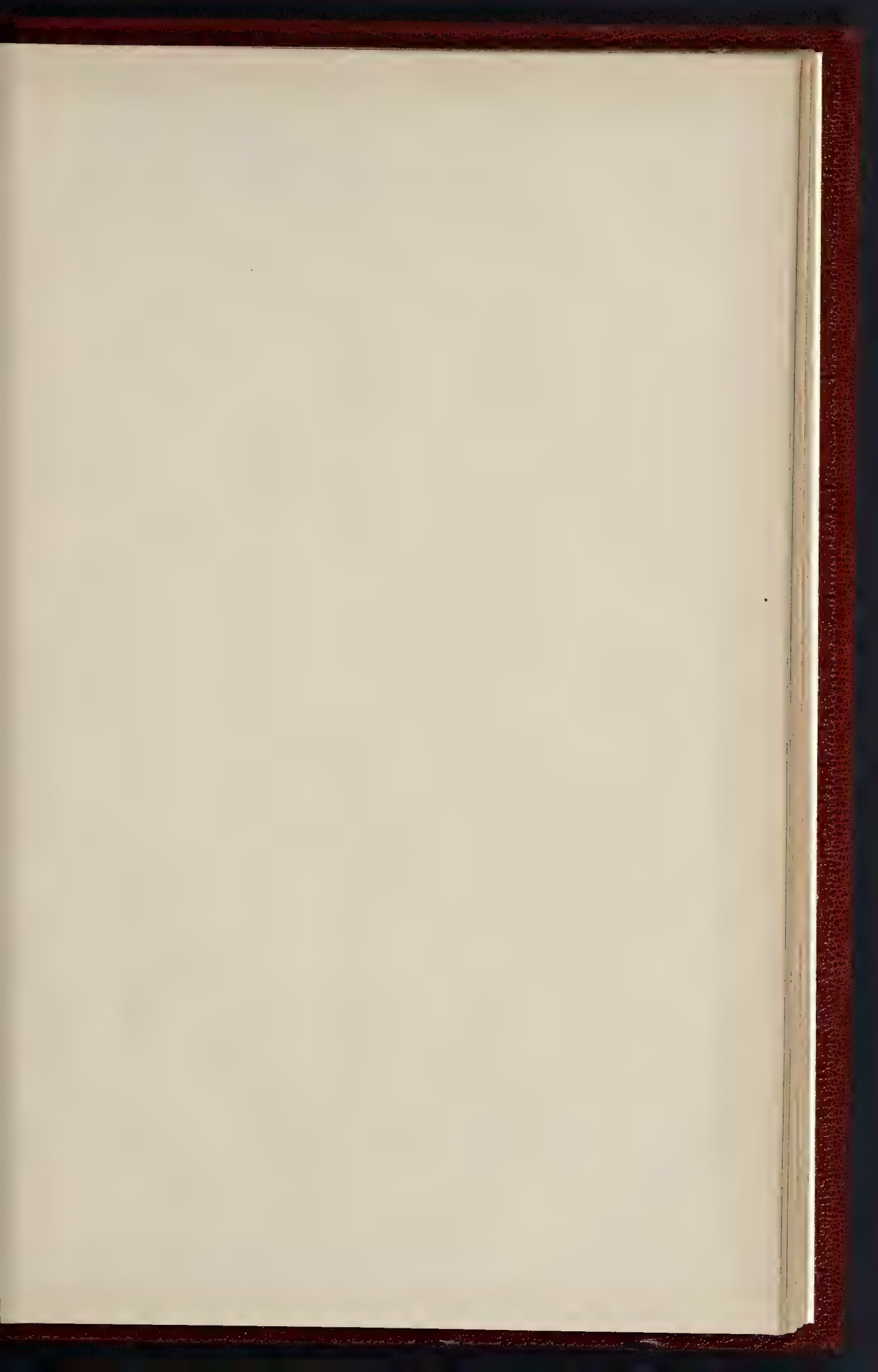


SCULPTURE AT THE PARIS SALON : MEMORIAL STATUE OF LOUIS PHILIPPE AND HIS QUEEN.

M. MEYER, SCULPTOR.



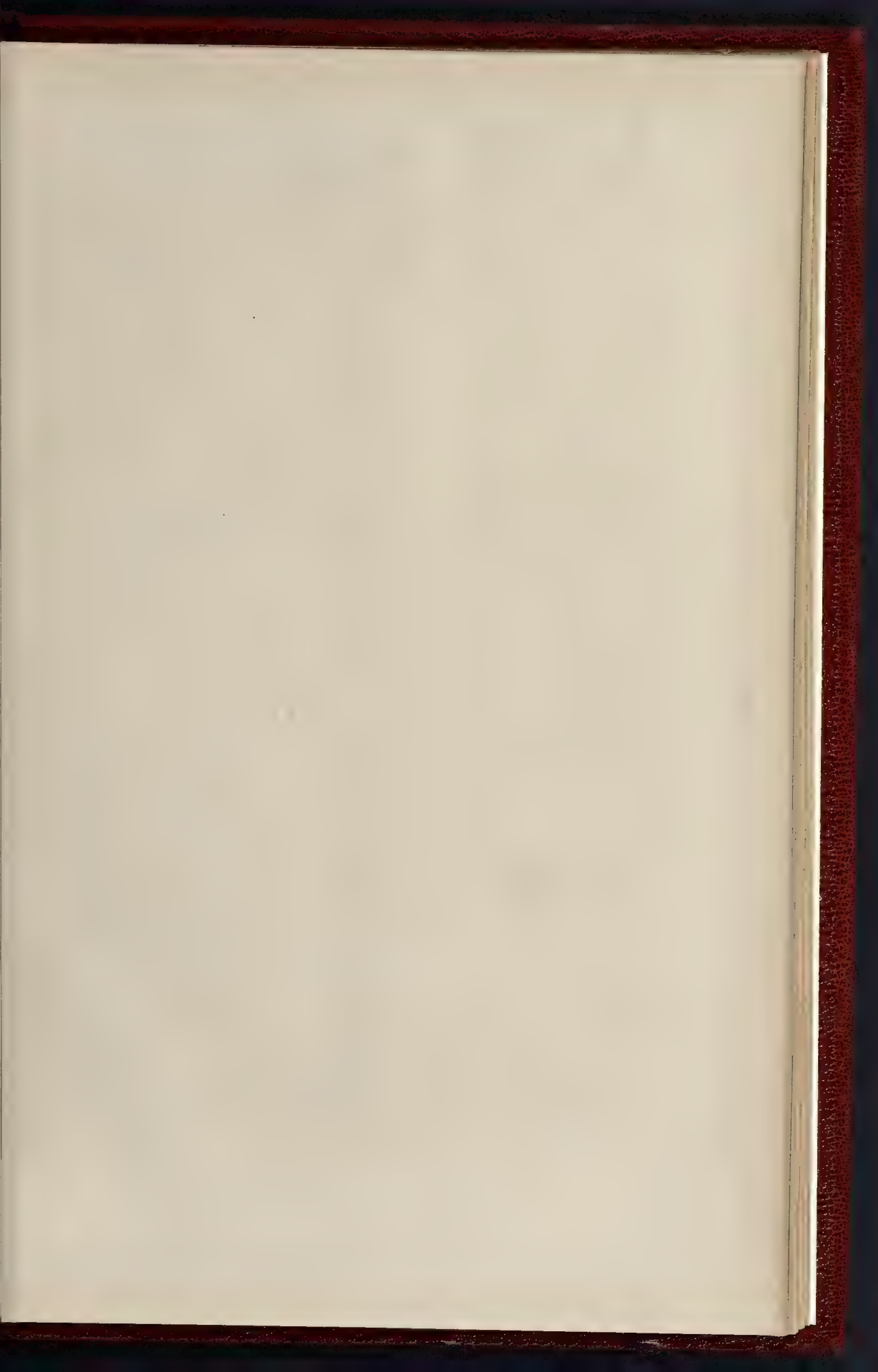






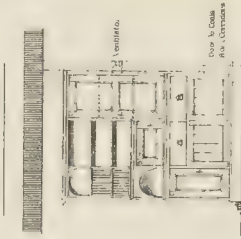


SCULPTURE AT THE PARIS SALON: "THE CONSTABLE DE MONTMORENCY."  
M. PAUL DUBOIS, SCULPTOR.

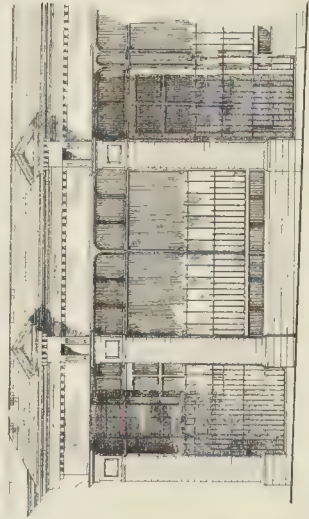




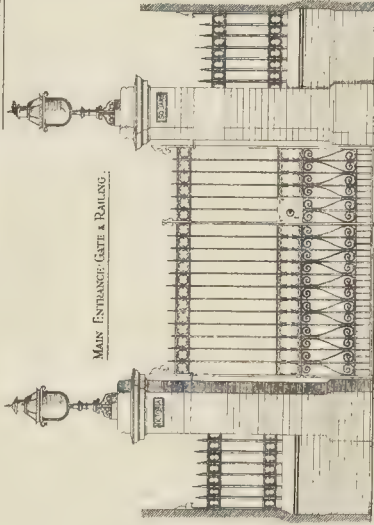
COMBINATION LARDER  
IN EACH LIVING ROOM.



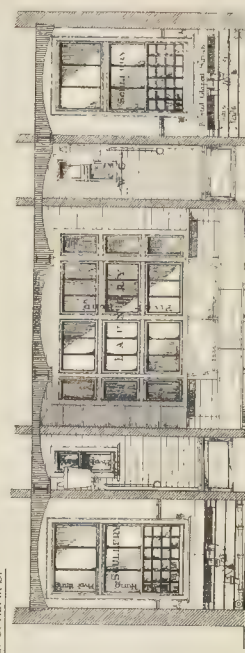
DETAIL OF ENTRANCE DOORWAYS & BALCONIES OVER



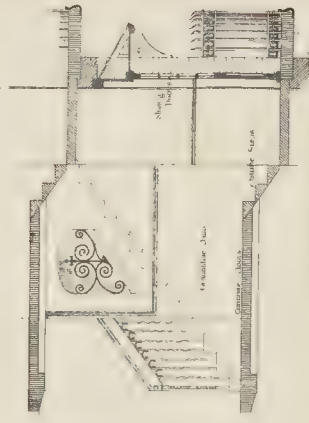
PART ELEVATION OF SHOPS ON PRINCIPAL ST.



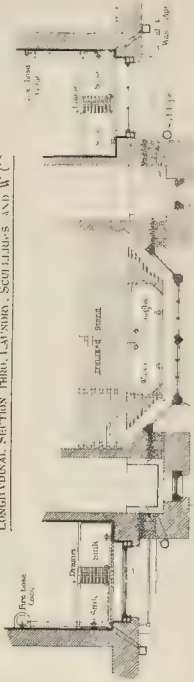
MAIN ENTRANCE GATE & RAILING



LONGITUDINAL SECTION THRU LIVING ROOM, SCULLERIES AND W.C.



SECTION THRU STAIRCASE



PLAN

Scale of Feet  
0 1 2 3 4 5 6 7 8 9 10



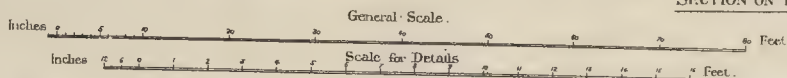
PLAN



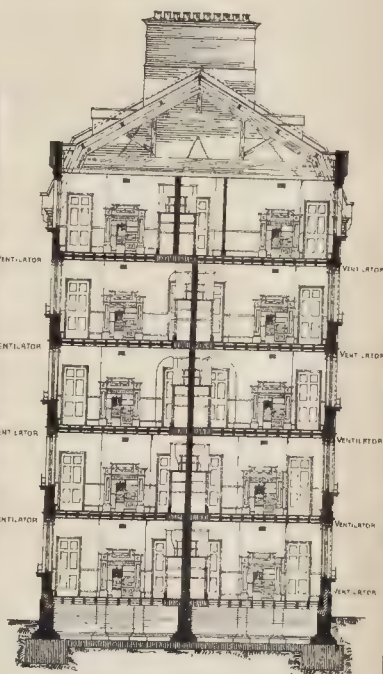
ELEVATION OF A BLOCK.  
(FACING STREETS.)



SECTION ON LINE A.A.



ELEVATION OF A BLOCK.  
(FACING QUADRANGLE.)



SECTION ON LINE B.B.

BY OTTO LITKE, SPRINGFIELD, MASS.; MARTIN, LANE, LONDON, W.; DUNN, E.C.

ARTIZANS' DWELLINGS, VICTORIA SQUARE, LIVERPOOL.  
DESIGNED BY MR. CLEMENT DUNSCOMBE, M.A., M.I.C.E.





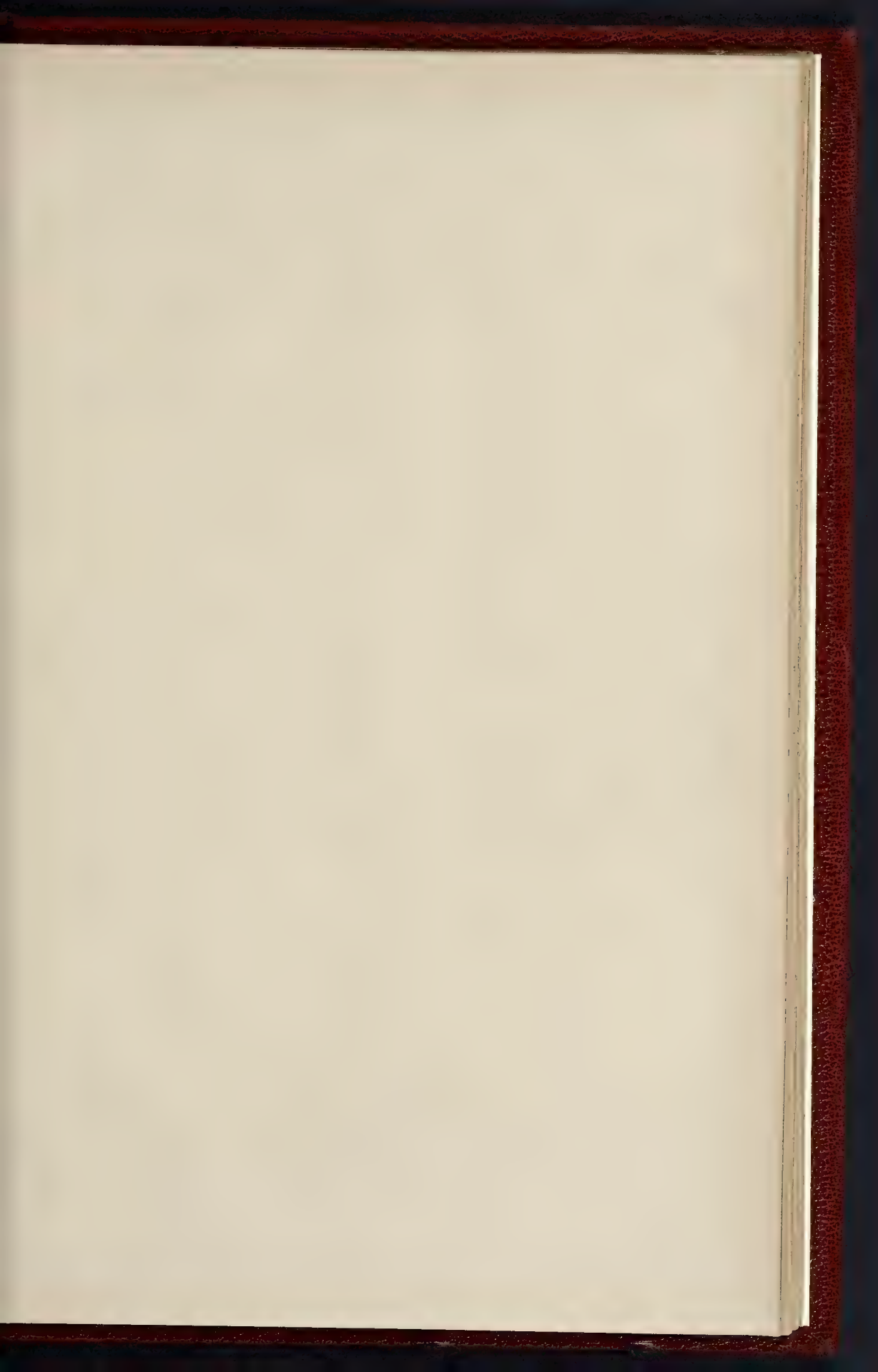


SCULPTURE AT THE PARIS SALON: "L'IMMORTALITÉ."

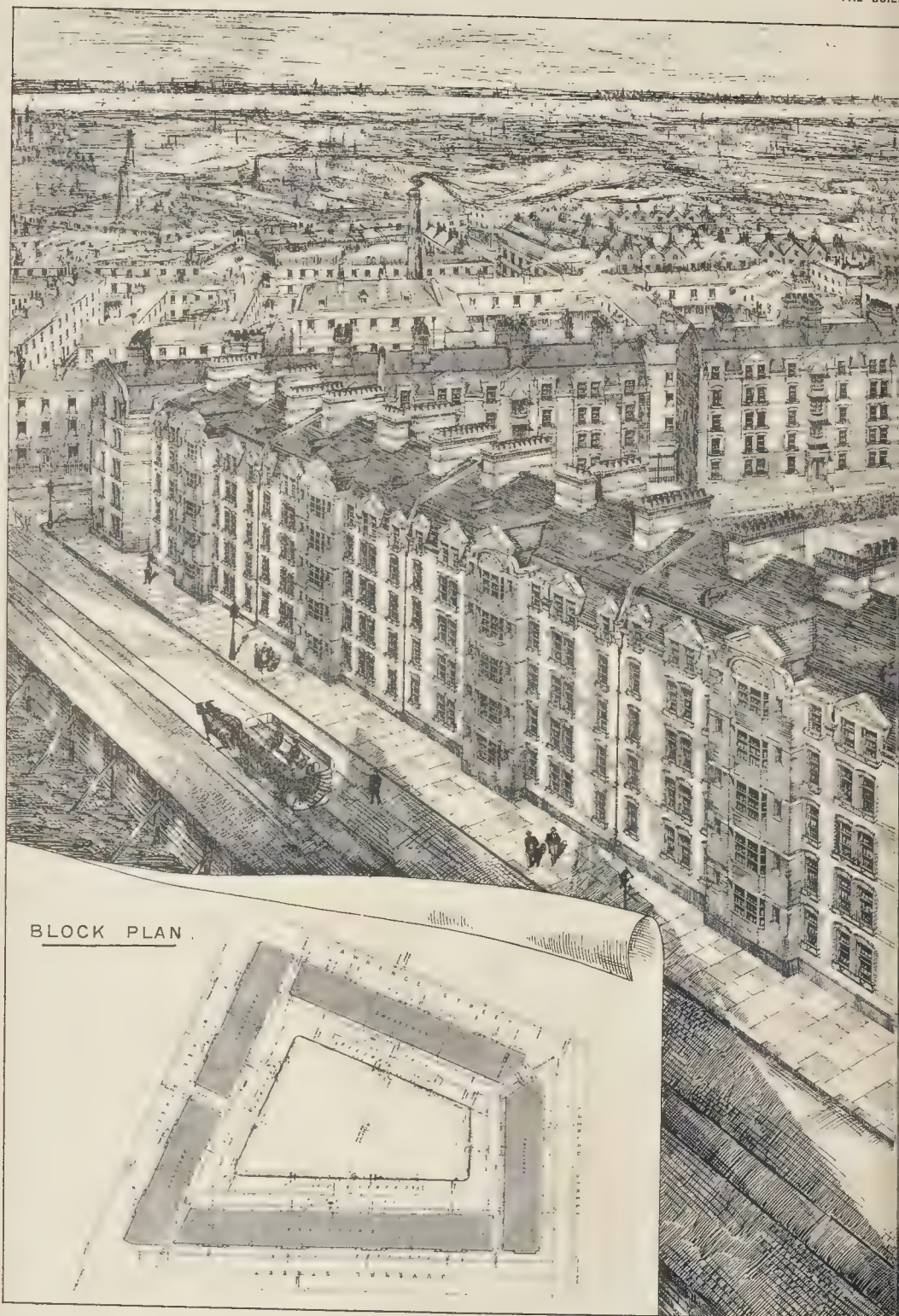
M. LONGEPID, SCULPTOR.











ARTIZANS' DWELLINGS, VICTORIA SQUARE, L.

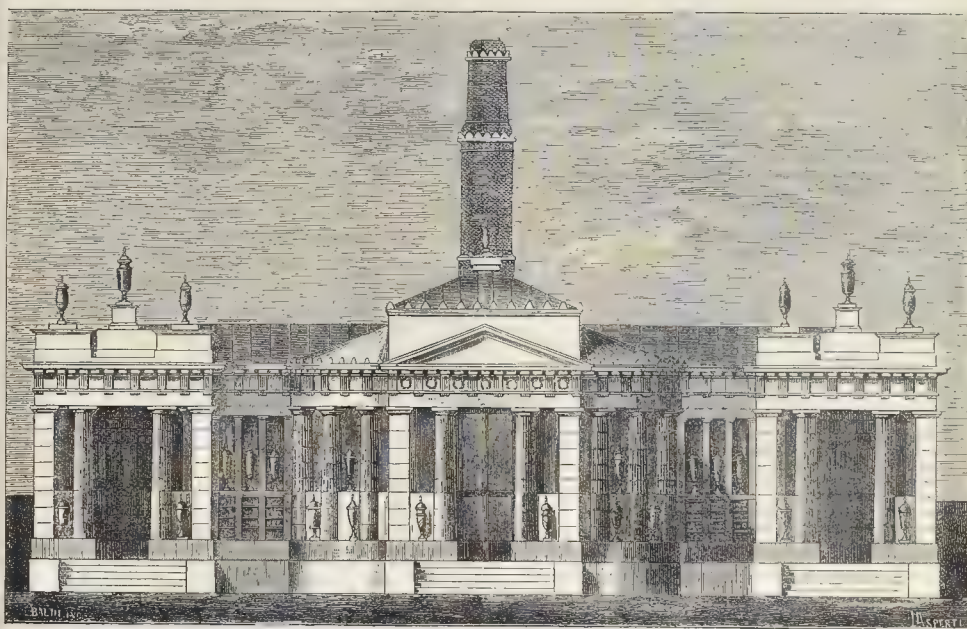




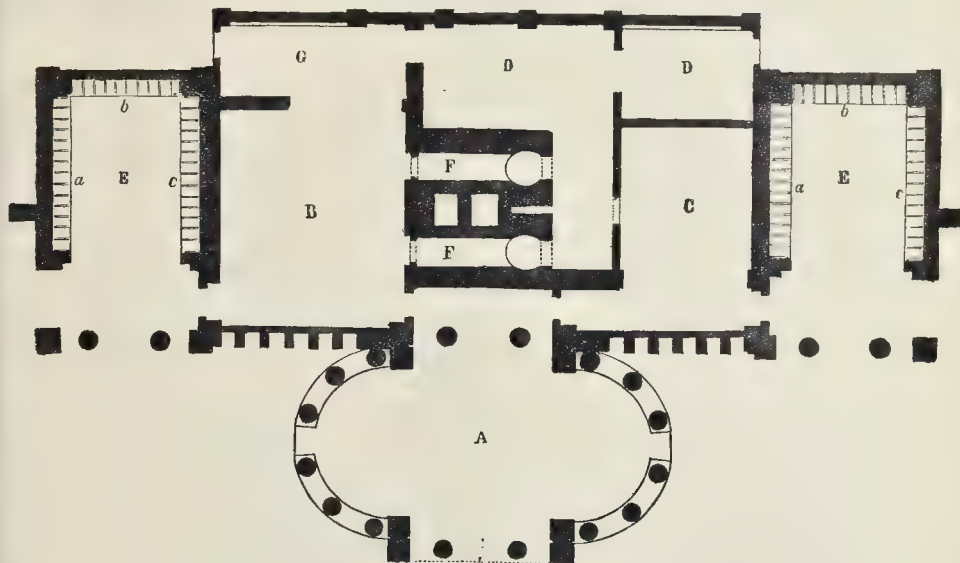
SCHOOL.—DESIGNED BY MR. CLEMENT DUNSCOMBE, M.A., M.I.C.E.







10 5 0 10 20 30 40 50  
Scale of Feet



THE CREMATORIUM AT MILAN

#### THE CREMATORIUM AT MILAN.

The practice of burning the dead does not appear to be making much progress in this country, although a crematorium has been for some time established at Woking Cemetery; on the Continent the formalities and difficulties attending cremation are less onerous, and the practice is gaining in popularity both in France, where it has only recently been legalised, and in Italy, where this method of burning the dead has been carried out since 1880. Several of the Italian cities have crematoriums. Perhaps the best example is the one at Milan, which was

carefully designed for the purpose. It is a single-storied building, constructed of white marble, and situated at the extreme end of the Campo Santo or cemetery of Milan. The general arrangement is shown in the accompanying illustrations. The funeral service takes place in the entrance-hall, marked A, the body usually lying on a bier; a closed coffin is only required when the death occurred from a contagious disease. After the rites of the churchyard, G, where the attendants place it on an iron shell, which is supported by a carriage on small wheels, and this also is held by a

framework, with other rubber-covered wheels running on two iron rails, which are laid parallel to the cremators, F.F. The apparatus is thus noiselessly brought in front of one of these previously-heated chambers, the shell on its carriage is quickly run into the cremator, where it is left supported when the carriage is withdrawn. An air-tight door is now closed, the gas fully turned on, and in from forty to fifty minutes, the ashes are all that remain of the corpse, and these are collected in the iron shell, which is removed in a similar manner. The mourners can either witness the operation through a sight-hole, or may wait in the room



marked C. The cremator generally employed is that marked F, which is heated by gas specially made in a Siemens producer fixed below. The old plan, for which F is fitted, was to heat with wood, in which case two hours were required to reduce the body to ashes; after considerable trial with both systems, the gas plan is always adopted, and is said to be far preferable. The ashes are placed in a terra-cotta box or cineraria constructed to fit one of the niches shown at a, b, c in figs. E E, a marble tablet with name closing the openings; these are of similar size, larger tablets being used when it is desired to place several boxes together.

The expense at Milan is very small, the fee for cremation being 50 francs, and the charge for the cineraria and niche is 40 francs in perpetuity. The poor are cremated free of charge, their ashes being placed in plain boxes in the vaults under E.

The cremation takes place on an average four days a week, but on some days several funerals occur, in which case the cost of the operation to the society who carry it out is very trifling, the greatest expense with the gas system being the heating of the furnaces, which should, if possible, be not allowed to cool. An inscription in front of the building states that it is dedicated to Paolo Gorni, who was the first to introduce cremation into Italy, and whose remains were thus disposed of in 1863. The Campo-Santo is well worth a visit, as it contains many handsome and artistic monuments, both of old and recent date, and the general arrangements of the cemetery are exceedingly well planned.

#### AMERICAN CEMENT TESTS.

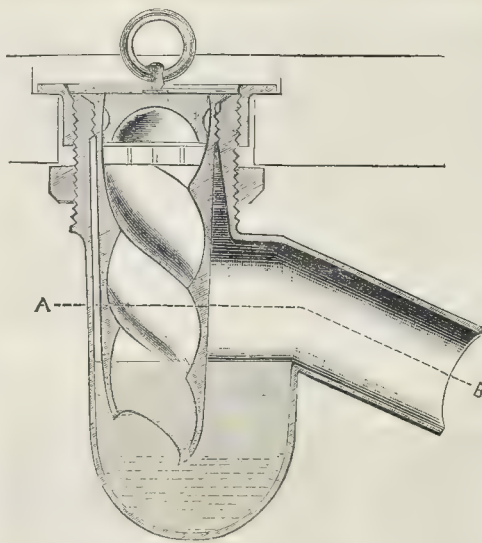
In the construction of the extensive main drainage works which have recently been carried out at Boston, Massachusetts, a large quantity of cement was used, about 180,000 barrels being required in all. In order to find what was best suited for the purpose, a large number of tests of natural and artificial cements were made, which are quoted in the Proceedings of the Institution of Civil Engineers. The briquettes for testing tensile strength were of the usual shape used in this country; the breaking section at first was 1 in. square, but in the later tests it was increased to 2½ square inches. For ascertaining the weight per cubic foot, a box which would contain one-tenth of a cubic foot was placed 3 ft. below a coarse sieve, with which it was connected by means of an iron tube. The cement was shaken through and struck off level. The weights were found to vary considerably; for instance, Rosendale cement weighed from 49 lb. to 56 lb. per cubic foot, while an American Portland cement weighed 95 lb. The more coarsely ground the cement the greater was its weight, but no direct ratio could be discovered between weight and strength, although, as a general rule, heavy cement, if thoroughly burned and finely ground, was preferred to lighter kinds. Colour also was found to be of little use for indicating quality, except in the case of some Portland cement, in which a yellowish hue denoted lack of sufficient burning.

Great importance was attached to fineness, standard sieves varying from No. 50 to No. 120 being used in testing. The former was found to be too coarse, and the latter was adopted as a standard, but was considered quite as fine as would be practically useful. The difference in price between two cements, in one of which 70 per cent. and in the other 88 per cent. passed the sieve, was 88 cents. (3s. 8d.) per barrel, but it was found to be cheaper to use the dearer and finer of the two. Tests were made with neat cement and cement and sand, the latter being found preferable. The strength of neat cement briquettes did not always indicate a capacity of the cement to bind with sand. The usual proportions used were one of cement to three of rather coarse sea-sand. The proportion of water used in making the briquettes varied with different brands, and was so arranged that the mortar was somewhat stiffer than that commonly used by masons. The mortar was rammed into the mould, and the time of setting was determined by noting the time elapsed before the cement would bear a wire 1-12th in. diameter loaded with a ½ lb. weight, or a 1-24th in. diameter wire loaded with a pound weight. If it would bear the latter test the setting of the cement was assumed to be complete. No direct relation was estab-

lished between initial energy and subsequent strength. To make a satisfactory trial, not less than a month was required. In one case briquettes showed a strength of 207 lb. in one month and fell to pieces in six months. In one series of tests extending over two years it was found that when ten or more parts of sand were mixed with one part of Portland cement, the strength at the end of the second year was less than at six months. Salt water was found to retard the setting, but it had no important effect upon strength. Although the differences in strength due to the amount of water are considerable at first, they diminish greatly with age,—from 20 to 25 per cent. of water gave the best results for Portland cement. Finely ground cements were found to be weaker than coarsely-ground when tested neat, but with an admixture of sand the positions were reversed. German cements were found to be more finely ground than English. Ten per cent. of loam in sand reduced the breaking load by about one half when tested at one month, but at six months and one year little difference was found. For stopping leaky joints a mixture of clay with cement mortar was used, and tests made showed that clay in moderate quantities does not weaken cement mortar, and such mortars were found not to suffer from exposure to the weather during a period of two years and a half. Another mixture used for the same purpose was composed of melted tallow mixed with Portland cement and sand in equal parts. The tensile strength of this compound after one week was 40 lb. per square inch, but it did not increase in a year.

Tests of transverse stress were made with concrete beams 10 in. square and about 6 ft. long, which were broken after being buried in the earth for six months. They were found to have a rather low modulus, and it was considered desirable to give concrete ample time to harden when transverse stress is to be opposed.

Tests were made to show the resistance of cement mortars to abrasion. Blocks were moulded 1½ in. square, and were allowed to harden eight months. They were then pressed against a grindstone with a pressure of 20 lb. The largest quantity of sand that the cement would bind without allowing the grains to be pulled out when grinding gave a mortar that opposed the greatest resistance. Cement, both neat and mixed with sand, was filled into lamp-glasses, in which they were allowed to set, and afterwards were immersed in water. In three days all the glasses began to crack. An attempt was made to measure the expansion, the result being that 10-in. cubes expanded linearly 0.001 as a maximum. A mortar of one of Portland cement and two of sand was allowed to harden for a week when it was pulverised and again made into briquettes. After two years the strength was 93 lb. per square inch. Silicious cement was not found to have superiority over



Durrans's Patent Scour Trap.

the ordinary kinds sufficient to compensate for increased cost.

The paper from which these brief quotations are made contains many other details of considerable importance, and those of our readers who are interested in these matters would do well to refer to the original communication, which was contributed to the American Society of Civil Engineers by Mr. E. C. Clarke, and is to be found in the twenty-fourth volume (1885) of the Transactions.

#### DURRANS'S PATENT SCOUR TRAP.

This trap, of which we give a section, is the invention of an architect, Mr. Thomas Durrans, A.R.I.B.A., and it is being introduced by the Honsé Sanitation Company, Upper Baker-street. The special advantages in this new trap over existing devices are thus summarised by its manufacturers:—

1. Freedom of access to and perfect command for cleansing purposes of the trap and waste-pipe leading from same.
2. A good scouring wash-out is effected in the usual action of the trap, thereby avoiding settlement of deposit therein and preventing corrosion.
3. It is a readily accessible and perfect trap, and it will be seen that on removal of swirl dip every facility of access is obtained to the waste-pipe leading from the trap (which no other trap offers) for the removal of deposit which so often occurs in the pipe.
4. The momentum of the water is checked by the scouring arrangement in the dip, thereby avoiding all possibility of syphoning, which is so often the cause of untrapping in other traps.
5. The dip seal is not too readily separated by the domestic or user, which facility in existing traps is the frequent cause of the introduction of sewer gas, and consequently of ill health to houses.
6. The obstructive screw cap which collects deposit is avoided, and better access provided to all parts of the trap and waste-pipe from the top of the sink, instead of, as now, to the trap only in an awkward position underneath the sink, and usually requiring skilled labour to cleanse the same.

We briefly referred to this trap in our notice of the recent Building Trades' Exhibition. We may add that only one metal joint is required to fix it, and that the outlet connexion can be adjusted to any angle.

#### The Sites of the Clerkenwell Prisons.

At the meeting of the Metropolitan Board of Works, on the 11th inst., Mr. Selway reported, with reference to the suggested erection of artisans' dwellings on the sites of Coldbath-fields and Clerkenwell prisons, that the Works and General Purposes Committee had informed the Secretary of State that the committee did not think it expedient to enter into negotiations for purchasing the sites for the erection of artisans' dwellings, and were of opinion that the ground would be of more service as open spaces.



## ARBITRATION CASE: INGESTRE HALL AND STABLES, STAFFORDSHIRE.

HICOK v. EARL OF SHREWSBURY AND TALBOT.

This matter in arbitration has recently been brought to a close. The case as stated for the plaintiff was that, having been appointed architect for the restoration of Ingestre Hall, and for the new stables at Ingestre, he made certain arrangements with the defendant as to remuneration, and had conducted the works up to an advanced stage of completion, when he was summarily dismissed without any cause being assigned. Under these circumstances he considered himself entitled to send in his account in the usual manner, and in accordance with the customs of the profession; and that, notwithstanding his having in the first instance agreed to forego remuneration for certain services, under the altered circumstances this was now fairly chargeable, owing to the course adopted by the defendant, no charge of professional neglect or misconduct having been alleged against the plaintiff.

The defence was that the plaintiff was not entitled to these charges, nor to any percentage beyond 5 per cent. on the sum actually expended up to the date when his services were dispensed with; that he was not entitled to 2½ per cent. on the cost of works which had not been actually completed under his supervision; and that the sum paid into court was sufficient.

Evidence for the plaintiff as to the fairness of his (the plaintiff's) charges and the customs of the profession was given by Mr. Charles Barry and Mr. W. Young. Representatives of Messrs. Maple, of Tottenham-court-road, and Messrs. Jennings, sanitary engineers, of Lambeth, were then called by the defence to prove having prepared designs and executed works independent of the plaintiff's supervision, and subsequently to the termination of his services.

At this stage the proceedings were closed by the defendant offering to augment the sum already paid into Court to a satisfactory amount, and to pay all costs of the action. This was agreed to by the plaintiff, and the arbitrator, Mr. F. A. Bosanquet, Q.C., was requested to make his award agreeably therewith.

Mr. Charles, Q.C., and Mr. F. Radcliffe were counsel for the plaintiff, the solicitors being Messrs. Radcliffe, Cator, & Martineau. Mr. Witt was counsel for the defendant, and Messrs. Woodward, Macleod, & Blyth, solicitors.

## BISHOP DE MARCHIA'S TOMB.

SEE.—From the notes accompanying the very beautiful drawings of the tomb of Bishop Wm. de Marchia in Wells Cathedral, which appeared in the *Builder* of last week, it seems that Mr. R. W. Paul is not aware of the existence of documentary evidence existing in the hands of the Chapter, proving that, though the death of the bishop was in 1302, the monument was only erected during the time of the great dean, John de Godeley (see from 1305 to Feb. 4, 1332); and further, that its execution probably was a little before 1326, immediately after which time the dean seems to have pulled down the older chapter-house, as it is stated and built up that now existing, it being from this circumstance that the stone floor yet exists of the first, and presents that wonderful collection of full-sized Medieval drawings now seen on the pavement stones, a discovery made by Mr. J. O. Scott,—and the largest room existing in England of such things, certainly deserves more consideration than it has yet received.

JAS. THOS. IRVINE.

## PROVINCIAL NEWS.

**Carlisle.**—The Border Counties New Home for Incubables, Carlisle, was formally opened on the 10th inst. in the presence of a large company. The Lord Bishop of Carlisle conducted the dedication service, after which Lady Vane declared the building open. The building was designed by Mr. Geo. Dale Oliver, architect, of Carlisle, whose plans were selected in competition, and carried out under his superintendence.

**Chester-le-Street (County Durham).**—A large extension of the Chester-le-Street Co-operative Store has just been opened, having been erected at a cost of about 6,000. The contractors are Messrs. Joseph Burnett & Son, of Birtley; and the architects are Messrs. Septimus Oswald & Son, of Newcastle-on-Tyne, whose designs were selected in public competition. The work just finished is only a portion of the entire building scheme contemplated, and further works will be commenced forthwith.

**Turnbridge Wells.**—Mr. Elphicke is preparing drawings for the erection of a brick church mission-room, to seat 300 people, at High Brooms, Turnbridge Wells. The High Brooms Brick and Tile Co. have kindly given a site, besides a handsome donation, for this purpose.

## CHURCH-BUILDING NEWS.

**Aylesbury.**—It is proposed to add a tower, baptistery, and porch, to insert a new west window, and to reseat Walten Church, Aylesbury. Mr. Brett A. Elphicke is preparing plans for the above additions and alterations.

**Blackburn.**—A new church, built throughout of stone, has been recently erected in Blackburn, from the designs of Mr. W. S. Varley, of that town, and will be opened very shortly. The order for the choir-stalls, altar-table, pulpit, and rails was entrusted to the firm of Messrs. Jones & Willis, and carried out by them under the superintendence of the architect.

**Cheadle.**—A carved oak pulpit, in the Early Decorated style, has been erected in Cheadle Church, which is shortly to be opened. It has been made by Messrs. Jones & Willis, and was carried out under the superintendence of the architect, Messrs. Lewis & Son, of Newcastle, Staffordshire.

**London.**—Considerable alteration and enrichment has been made to the chancel of Christ Church, Lancaster Gate, lately. The old stone steps have been removed, and polished green granite substituted for them. The Communion-table has been raised, and the step under same enriched with a representation of the passion-flower in ceramic mosaic. All the remaining space inside the altar-rail, which is of polished brass, is laid with Godwin's encaustic tiles, of a rich design. It is also intended to relay the remainder of the chancel with tiles, and to add marble steps at the entrance from the nave. Lady Brabazon has kindly offered to give a new pulpit in polished alabaster and marble of very rich design, and which is now being prepared; and another member of the congregation has also promised to defray the cost of a baptistery at the west end of the church, and within which will be placed an inlaid marble and alabaster font. The whole work has been designed and executed by Messrs. J. Underwood & Son, to whom the pulpit and baptistery have also been entrusted.

**Paignton (Devonshire).**—The church accommodation of Paignton being somewhat limited, steps have just been taken to provide a new church in that district. Having obtained a grant from the Ecclesiastical Commissioners towards the endowment, in addition to the gift of the site, the committee invited a limited number of architects to send in designs, and unanimously decided in favour of the one submitted under the *nom de plume* "Red Rock." This proved to be the joint work of Mr. Edward Gabriel and Mr. W. G. Couldrey, who have now been instructed to prepare the working drawings for same. The style of the church is Early English, and the well-known red sandstone of Devonshire is to be used both for the exterior and interior, with Bath stone dressings. The plan consists of a nave 30 ft. wide, with narrow aisles to be used only as passages, north and south transepts, chancel 24 ft. wide, with apsidal end, organ-chamber, and vestry. A narthex is provided at the west end, which gives access both to the nave and aisles. The tower, which is at the south-west angle of the building, serves as a baptistery, and is finished with a lofty spire, 180 ft. high. Accommodation is provided in the nave and transepts for 550 persons.

**Streatham.**—The memorial stones of the Eardley Memorial Church were laid on the 3rd inst. The church, which is to be erected in memory of the late vicar of Emmanuel Church, Streatham-common, the Rev. Stenton Eardley, will be built of red brick, with stone facings. The site is at the south end of Ellison-road. The cost of the building will be about 8,000. Mr. Ernest George is the architect, and Mr. Nightingale is the builder.

## STAINED GLASS.

**Bangor.**—Through the munificence of Mrs. Symes, of Bangor, a large Munich window has lately been erected in the south transept of Bangor Cathedral, to the memory of the late Dean Edwards. There are two two-light windows, with a circle above each, a large rose above all uniting the whole into one grand window. The Rev. Owen Evans, M.A., Professor of Welsh at St. David's College, Lampeter, and Minor Canon of Bangor, has worked out the idea of representing Christ as the Centre and Interpreter of all things. This is illustrated by subjects from the lives of Moses

and Elijah in the Old Testament, and from St. Matthew and St. Paul in the New. In the large rose above is a figure of Christ enthroned in glory, while in the small circles are adoring angels. The artists to whom the carrying out of this elaborate scheme has been entrusted are Messrs. Mayer & Co., of Munich and London.

**Dalston.**—A large east window has lately been erected in St. Philip's Church, Dalston. The subject, which is carried through the three lights composing the window, represents the Ascension of Our Lord. The work has been carried out by Mr. R. Morris, of Kennington-road, from the designs and cartoons of Mr. O. J. von Holtrop, of Forest-road, Dalston.

**Knobbury.**—The three-light east window of Knobbury Church, Ludlow, has lately been filled with Munich stained glass. The centre compartment contains the Crucifixion; the left-hand light a Jewish priest sacrificing a lamb as a burnt offering; and the right-hand light a Christian priest offering the Holy Eucharist, the whole being intended to convey the idea of the connexion of the sacrifices of the Old and New Testaments by the sacrifice of Our Saviour on the cross; the quatrefoil above containing a slain lamb. The work has been designed and executed by Messrs. Mayer & Co.

## The Student's Column.

## OUR BUILDING STONES.—XV.

## ARTIFICIAL STONES.

ARCHITECTS and builders have had to give considerable attention of late years to the question as to whether it is better to construct edifices with natural or artificial stones. Some of the kinds of stone artificially made are unquestionably more durable than the ordinary natural stones used in building, and if they can be produced at a reasonable cost they should on that account be utilised where practicable.

One of the principal of these is

## Terra Cotta.

As its name implies, this material is "burned earth." In the strictest sense of the term, bricks and pottery should be included under the same heading, but terra cotta is generally understood to mean that kind of burned earth which has been carefully prepared, the clay being of better quality, besides being more skilfully manipulated and fired than ordinary pottery ware.

Terra cotta is made in the following manner. The clay is first thoroughly mixed by passing through what are called "pugging-mills." Finely-ground burned clay, in certain proportions, is also mixed with it to prevent it from warping and twisting in the after stages of manufacture. The mass should be as perfectly homogeneous as it is possible to make it, and, in particular cases, after undergoing a process which expels any air that may be present, it is pressed carefully into moulds, precaution being again taken to prevent any accumulation of air in the corners and crevices of the moulds. The reason why these points are so carefully attended to is because the heat of the kiln would cause the air to expand, and the work in consequence would be cracked. In pressing the material into moulds, it is necessary to keep it the same thickness throughout, as when the burning causes the clay to contract, any variation in thickness would distort it. The moulded clay is afterwards dried very gradually and with extreme care. If the operation is carried on too quickly, or if any draughts of cold air are admitted, the stone becomes warped and useless. The final burning is, perhaps, the most important part of the process, as the quality of the terra cotta is greatly dependent upon it. Its ordinary colours, when well burned, are red, blue, and buff. They may be considerably modified by the amount of heat used; and if other colours are desired, foreign matter must be added. If the clay used contains much oxide of iron, lime, magnesia, or other impurities, it will not burn well. White clay is sometimes used with only enough iron mixed to colour it.

Terra cotta is very durable; but it is not from the fact that monuments of high antiquity made of this material in Eastern countries have been handed down to us in such an excellent state of preservation, that we should judge of its durability when utilising it in this country; for



the climate of those countries is often quite different from that of our own, and the monuments under consideration have, in many instances, not been exposed to the action of the weather. We know the durability of terra cotta, because it has been tried in this country for many years, and the rate of its decay has been shown to be almost *nil*. Thus it has an immense advantage over those other artificial stones but recently introduced into the market, for we know next to nothing, from experience, of the durability of the latter.

Like almost everything else, however, there are both good and bad kinds of terra-cotta. Those of bad quality have usually resulted from defective burning; and when that is the case it disintegrates very shortly after being built up.

It is very difficult to produce blocks of burned clay which shall have a greater thickness than 1 in., so the ordinary method of making the blocks for building is to construct a shell of terra cotta 1 in. thick strengthened with cross-webs, which also help to preserve its shape in the burning. The spaces are then filled up with concrete, according to whether it is required to be extra strong or not.

This concrete is mixed rather weak to prevent it swelling and thus bursting the sides of the block.

The better kinds of terra-cotta are capable of taking a great thrusting stress, but, of course, the actual weight required to crush it depends on the thickness of the walls of the blocks experimented upon, and whether they are filled with concrete or hollow. The kind of concrete used must also be taken into account.

A block of terra cotta about 1 ft. cube, which had no cross-webs or concrete in it, splintered at the edges at 40 tons and broke at 100 tons. Its resistance when solid is said to bear a compression nearly one-third greater than ordinary Portland stone.

Terra cotta when used hollow is very light, not weighing more than 60 lb. to 70 lb. per cubic foot. This is a source of economy, as much saving is effected in carriage and labour.

It is a good material for resisting the action of fire. Mr. James Doulton, speaking on this subject at Carpenters' Hall a short time ago, said that heat has merely the effect of burning off the dirt from terra cotta, making it look fresh. This was exemplified by the fire at his own premises not long since. After the fire, which, though of short duration, was terrifically fierce, on examination the sills of windows and copings of walls, which were of stone, were found to be destroyed, but the dressings of the windows, which were of terra cotta, were perfectly sound, the great heat merely brightening them up, and making them look like new.\*

One of the disadvantages of using terra cotta for building walls is that the unequal shrinkage causes the blocks occasionally to be twisted; thus the long lines of the building become uneven. To set such uneven blocks right, they are often chiselled. This should not be too frequently resorted to, as it takes off the outer surface of the material,—the part, in fact, that is the chief cause of the preservation of it from the attacks of the atmosphere. This outer surface is formed in the burning.

An inferior kind of terra cotta is made by coating a rough indifferent clay with one of a much more expensive nature, but unless these two bodies have been most carefully prepared, they are sure in course of time to destroy one another; that is, the inequality in their shrinkage will cause air cracks in the fine outer skin, which will inevitably retain moisture, and cause the surface layer to drop off in scales after the winter frosts.

Terra cotta is largely used in architectural ornamentation, and especially where the designs have to be repeated several times.

Buildings exist with terra-cotta mouldings and ornaments which were erected between the thirteenth and fourteenth centuries. The use of the material appears to have been discontinued shortly afterwards, and it was not until the latter end of last century that it again came into use.

#### Slag.

Where ordinary stone is not easily obtainable, slag proves to be a most useful substitute. It has not been used in this country to any great extent, but in places where it has been employed the results have been perfectly satisfactory.

\* See the *Builder*, p. 539, ante.

All kinds of slag are not suitable for manufacturing into building stones; those which contain too much lime fall to pieces on exposure. In general, it may be said that slag should contain from 38 to 44 per cent. of silica, and that the furnace whence it is obtained should be working continuously.

According to experiments made at the Conservatoire des Arts et Métiers in Paris, slag when made while the furnace was running on white iron, never became fissured under a pressure of less than 242 kilogrammes the square centimetre, and was crushed at a pressure of 886 kilogrammes as a minimum.

#### Basalt Stone.

The lava known as basalt has been experimented with, on rather an extensive scale, to discover whether it cannot be utilised for mouldings and the like.

The rock is melted in a furnace, after which it is received into moulds of the required shape. It needs to be cooled very slowly, or it turns into a glassy substance. The tendency of basalt to assume a columnar structure when under treatment is rather a drawback, according to some French authorities, but we are of opinion that by mixing different substances with it the difficulty could be overcome.

#### VARIORUM.

FROM Messrs. Crosby Lockwood & Co., Stationers' Hall-court, we have received No. 255 of "Weale's Rudimentary Series" viz., "Locomotive Engine Driving," by Michael Reynolds. We are not surprised to find that this excellent manual, which is dedicated to "the engineers and firemen of locomotive engines throughout the United Kingdom," and which has on previous occasions been favourably noticed by us, has reached its seventh edition. Messrs. Crosby Lockwood & Co. also send us No. 256 of the same series, which is by the same author, its subject being "Stationary Engine Driving." This work, which is in its third edition, revised and enlarged, fully maintains its claim to be "a practical manual for engineers in charge of stationary engines." If its precepts were known to and practised by people who own or who are placed in charge of steam-engines and boilers, there would be a marked diminution in the number of breakdowns and explosions, and we should not hear of such strange things as have been sworn to in the case of the recent catastrophe at Limehouse. The author is an advocate for the adoption of a system of examination and certificates for engineers, and pending the adoption of such a system, he has certainly done his part in contributing to their technical education and capability.—"The Twenty-sixth Annual Report of the Amalgamated Society of Carpenters and Joiners" (Manchester: Co-operative Printing Society) covers a period of twelve months, from December, 1884 to December, 1885. It includes the financial reports of the branches, income and expenditure at the general office, the number of members, addresses, and nights of meeting of branches, and a mass of other information of interest. It appears from the "General Secretary's Remarks," which serve as a preface to the volume, and which are brought down to the end of March of the current year, that owing to the prevailing depression of trade, 180 members per 1,000 were unemployed on the 31st of January last. Mr. Murchie, however, does not think that there is any serious falling-off in the general volume of the building trade. The net income of the Society for the year was £3,121. 10s. 7d., and the net expenditure 75,663l. 9s. 3d. Unemployed benefit, the largest item in the Society's expenditure, cost £3,909l. 18s. 10d., or 1l. 7s. 0½d. per member, as against 18s. 9½d. per member in 1884. In sick benefit the Society expended 16,719l. 9s. 8½d., or 12s. 11½d. per member, as against 11s. 11½d. in the previous year. The report, which consists of nearly 400 pages, appears to have been carefully compiled.—"A Discourse on the Principles of Domestic Fireplace Construction," by T. Pridgin Teale, M.A., F.C.S. (London: J. & A. Churchill), is a re-publication, in pamphlet form, with illustrations, of Mr. Teale's lecture at the Royal Institution on February 5th last, which was reported in our columns at the time.—"The Insurance Year Book, 1886" (London: Simpkin, Marshall, & Co.), gives such information as to the position of the many offices mentioned as to justify its claim to be

"a guide for persons effecting insurances."—"Loss of Life and Property by Lightning, at Home and Abroad," by W. McGregor, Member of the Society of Telegraph Engineers and Electricians (Bedford: W. J. Robinson, Silver-street), is avowedly a plea for inaugurating a new and responsible "Society for the Protection of Life and Property from Lightning." It is proposed to collect and to collate information as to disasters caused by lightning, and to endeavour to educate public opinion to the pitch of demanding municipal or other inspection and control of lightning conductors. The Society is to be cosmopolitan in its scope, and the proposal for its formation is based on the conviction of the author that so-called "accidents" by lightning have no right to be included in the chapter of accidents at all. The pamphlet is a suggestive one, and will well repay perusal.—"Mathieson's Highest and Lowest Prices and Dividends Paid for the Past Six Years, 1880-85" (London: Effingham Wilson, Royal Exchange) is a compilation which will be found very useful for reference.—"The Camera, a Monthly Magazine for those who practise Photography" (London: Wyman & Sons), is a new aspirant for favour. It is edited by Mr. T. C. Hepworth, and contains interesting articles by Mr. R. A. Proctor, Mr. J. S. Hodson, Mr. T. H. Joyce, Dr. G. Lindsay Johnson, and the Editor.—"The last volume issued of the 'Transactions of the National Association for the Promotion of Social Science' (London: Longmans, Green, & Co.) is wholly occupied with a report of the 'Conference on Temperance Legislation,' held in London in February last. Both parties to the controversy,—the followers of Sir Wilfrid Lawson and the representatives of the beer, wine, and spirit trades,—seem to have left off where they began: neither succeeded in convincing the other, which is just what might have been expected.—"The English Illustrated Magazine, for June (London: Macmillan & Co.), contains an interesting paper, by Mr. Joseph Hutton, on 'Yarmouth and the Broads,' and there is a well-illustrated paper on 'Umbria,' by Katharine S. Macquoid, the illustrations being by Mr. Thomas Macquoid.—"Messrs. Cassell & Co., of La Belle Sauvage-yard, send us a parcel of their popular magazines for June. The *Quiver* contains a sensible article, by Lord Brabazon, on 'The Welfare of Young Men.' *Little Folks*, a magazine ever popular with the children, completes a volume of its new and enlarged series. In *Cassell's Family Magazine* the first article takes the shape of 'An Interview with the Rev. S. A. Barnett,' of St. Jude's, Whitechapel, who discourses to 'our special correspondent' of 'The Dwellings of the London Poor.' Mr. Barnett's views are pretty well known to our readers. He considers that the good management and administration of tenement houses are much more important and infinitely more likely to produce the wished-for results than new legislation; and that Sir Richard Cross's Act, properly worked, is amply sufficient to meet all needs. He sums up the two essentials of amelioration as consisting in improved local administration and the development of the sense of duty on the part of the landlords. 'The Practical Dictionary of Mechanics,' another serial work published by Messrs. Cassell, has now reached its 114th part, and brings us down to the word 'Siphon.' It is very fully illustrated, and copious references are given.—"The Religious Tract Society (London: 56, Paternoster-row) send a number of their well-known magazines. The *Leisure Hour* continues 'The Story of the English Shires,' by the Rev. Professor Creighton, of Cambridge, Cumberland being dealt with in the June number; this is a very readable chapter. 'Life in the Backwoods of Wisconsin' gives some account of the 'lumbermen's' camps of that state. In the *Sunday at Home*, Mr. Henry Harper continues 'An Artist's Jottings in the Holy Land,' the illustrations clearly exhibiting the rugged and barren nature of some parts of that country. The same Society issue the *Boy's Own Paper* and the *Girl's Own Paper*. In the former, the illustrated papers on 'Our Great Public Schools' are continued, Westminster and Eton being treated of in the current number, in which Captain W. de W. Abney, F.R.S., contributes illustrated articles on 'Photography for Boys.' In the *Girl's Own Paper* Mr. H. W. Brewer concludes his papers on 'Architecture,' and Mr. Richard Taylor commences a series on 'Wood Engraving as an Employment for Girls.'—Several trade-books and catalogues lately received deserve



mention. Messrs. Hamilton & Co., of Greek-street, Soho, have sent us an illustrated catalogue and price list of their well-known "Semper Idem" painting-brushes, graining tools, &c. From Messrs. J. Arthur Young & Co., of Victoria Chambers, Westminster, we have received a useful illustrated catalogue of iron constructions, fittings, and utensils requisite in "the field, the farm, the garden, and the stable." Messrs. A. Ransome & Co., of Stanley Works, Chelsea, send us their price list of patented and improved woodworking machines; and Messrs. W. E. Smith & Co., of Gremore Works, Chelsea, send us some illustrated sheets also referring to machinery for working in wood. Mr. Thomas Fletcher, of Warrington, sends us a very useful illustrated catalogue of gas-heating apparatus, which he claims to be unique in illustrating all the purposes for which gas is applied as a fuel; but he does not appear to include gas engines, in which, perhaps, he would say that the gas is used as a "motive-power" and not as a "fuel." Messrs. Merryweather & Sons, of Long Acre, send us a very complete catalogue of fire engines and other apparatus used in connexion with the extinction of fires and the preservation of life and property. It contains a great deal of useful information with reference to the powers of Town Councils and other authorities in regard to the protection of their respective localities from fire, as well as rules and suggestions for the formation and working of fire brigades. Messrs. Charles Williams & Co., of Ferry Iron-works, Cubitt Town, have issued a new and useful sheet of sections of iron joists and girders, with dimensions, weights, and loads figured. It will be found handy hung on the office wall. Mr. Roger L. Lowe, of Farnworth, Bolton, has issued a new catalogue illustrating the applications of his excellent system of wood-block flooring. It is well worth the notice of architects. "Fosnic's History of the Iron Trade" (London: E. & F. N. Spon), is a very useful coloured and figured diagram, compiled and designed by Mr. R. B. Matheson, F.R.S., showing the production of iron in the United Kingdom since the year 1830, with the weight of iron and steel exported, and the prices of typical descriptions of iron during the same period. "The Colonies and India" (London: C. Mitchell & Co., Red Lion-court, Fleet-street) is a reprint (published at la.) of the very useful "Colonial Supplement" issued with Mitchell's "Newspaper Press Directory" for the current year. It contains fifty-two large and closely-printed pages of statistical and other information of special interest just now, with regard to India and our colonies, their commerce, industries, &c.—Messrs. Jarrold & Sons, of Norwich, have issued a cheap illustrated "Guide to Norwich," which may be found useful by visitors. The same firm also send us cheap illustrated guides to "Great Yarmouth" and "The Rivers and Broads of Norfolk and Suffolk." These guides are very creditably got up, and cost only a few pence.

## RECENT PATENTS.

## ABSTRACTS OF SPECIFICATIONS.

6,813, Improvements in Cement. C. Kingsford.

This is an apparatus designed to utilise more economically and advantageously the waste heat from coke ovens by providing an apparatus which comprises within itself means for making coke in combination with means for utilising the heat generated in the manufacture of coke for generating steam and for drying purposes. The most important application or use of the improved apparatus, however, is the drying of "slurry," i.e., a mixture of chalk and clay mud, used in the manufacture of cement, and this is greatly hastened by the arrangement for utilising all the heat and constructing the apparatus with drawers or trays placed above the boiler.

8,357, Improvements in Metal Roofing. O. Holden.

The flange at the top of the roll cap and the stop end at the bottom of the roll cap are connected by means of grooved and welded seams. Modifications of existing methods are also made by attaching a holding-down clip to the roll cap by means of a slot and welt, which does away with the use of solder, and, at the same time, allows for free expansion and contraction. The flange is attached to the roll cap by means of a double fold, one fold being made on the roll cap and the other on the flange. The fold on the roll cap is formed by turning up an edge three-eighths of an inch at the end of the roll cap and down again three-sixteenths of an inch. The flange has an edge three-eighths of an inch turned out of

the internal part and turned up again three-sixteenths of an inch, thus forming a fold on the flange, the flange then being placed on the roll cap, and, by means of a grooved tool, securely fixed together. The stop end is stamped out somewhat similarly, and the clip, which is a piece of metal  $\frac{1}{4}$  in. by  $\frac{1}{2}$  in., is passed through the slot in the roll cap and fastened down in such a manner as to prevent it moving.

8,490, Improved Ventilated Water-closet Basin. F. W. Holloway.

One or more additional arms or apertures are provided above the level of the surface of the water forming the trap and above the level of the valve. The enlargement of the supply arm or pipe provides also for ventilation in the basin itself, which it is claimed is always kept pure, the ventilation being entirely distinct from any ventilation of the soil-pipes or traps or any contrivance attached to or connected with any part other than the basin itself.

2,639, Imitation of Inlaid Wood. J. Ritzdorf (Bonn).

The surface of the wood to be treated is smoothed and then impregnated with a solution of (approximately) one-third boiled linseed oil and two-thirds turpentine mixed with benzine. A stencil plate is then used, and a solution of ozokerite and benzine is brushed over. After this is done the design is brushed over with a mordant or stain dissolved in water, which only affects that portion of the design not stencilled. It is rubbed over with glass paper and then retouched, after which it is again painted over with a light white or yellow solution, and when this has become dry it is rubbed over with glass paper and lightly ground over, then rubbed over with wax or merely polished. In this way may be produced to represent inlaid or marquetry executed in several kinds of wood. It may also be shaded or burned with a burning instrument.

## NEW APPLICATIONS FOR LETTERS PATENT.

June 4.—7,501, E. Bailey and C. Mackay, Attaching Door and Other Knobs to Spindles.—7,513, P. Gay, Apparatus for Cutting, Dressing, and Polishing Marble, Stone, &c.—7,519, E. Salondre, Apparatus for Cutting, Dressing, or Polishing Stone, Marble, &c.—7,541, M. Brophy and J. Archer, Transparent Material for Roofing, &c.

June 5.—7,563, J. Hookham, Locks and Latches.—7,572, J. McConnell, Soldering.—7,587, J. & J. Crombie, Concrete Pavement, Floors, &c.

June 7.—7,630, J. Bettelley, Sliding Window Sashes to Retain same in any Position.—7,635, A. Clark, Ventilators.—7,647, H. Dadrich, Tiles.

June 8.—7,670, G. Mason, Fastenings for Window Sashes.—7,674 and 7,675, H. Mathey, Manufacture of Cement.—7,676, H. Mathey, Colouring Cement.—7,683, J. Fawcett, Weather Bar for Doors and Windows.—7,684, L. Wall, Connecting Knobs to Spindles.—7,708, H. Lake, Draining of Houses, &c.—7,712, H. Deane, Window Fastener.

June 9.—7,726, J. Horrocks, Trapping and Ventilating Water-closets and Drains.—7,745, H. Poole, Compositions for Artificial Stone, Cement, &c.—7,754, E. Parkes, Urinals.—7,769, G. Smith, Coupling for Gas Pipes.

June 10.—7,789, W. Beames, Water-closet Apparatus or Fittings.—7,797, C. Elliott, Glazing.

## PROVISIONAL SPECIFICATIONS ACCEPTED.

4,378, J. Barnes, Siphon Cistern.—5,197, F. Powell, Heating Apparatus for Buildings.—5,820, J. Warwick, Manufacture of White Lead.—5,838, H. Turner, Gas Kitchen-ranges.—5,916, S. Best and C. Horner, Door Knobs or Handles, and Attaching same to Spindles.—6,336, W. Chambers, Screw-driver.—3,109, J. and O. Cunningham, Jointing Gas or Water Pipes.—4,779, J. Bolding, Water Waste Preventer.—5,324, G. Oulton, Siphon Cistern for Flushing.—5,357, R. Broadshaw, Carrying-off Table for Brick and Tile Machines.—5,516, A. White, Roads, Pavements, and Paving Blocks.—5,787, S. Stott, Fireproof Buildings.—6,033, R. Owen, Lock or Latch and Catch.—6,103, E. Flint, Locking and Latching.—6,162, H. Hennes, Self-Acting Fastener for Double Doors.—7,133, N. Greening, Apparatus for Screening and Carrying Lime.

## COMPLETE SPECIFICATIONS ACCEPTED.

Open to opposition for two months.

8,622, R. Lee, Electrical Communications between Doors, Letter-boxes, and Bells.—9,731, W. Westlake, Brickmaking Machinery.—9,738, W. Gordon, Chimney Cows, &c.—12,470, T. Murphy, Whitewash or Distemper Brush.—12,656, E. Martyn, Forming Letters or Designs upon Glass.—15,776, C. McWhirter, Steam Ventilating Apparatus.—1,907, E. Penfold, Opening and Closing Gates.—7,705, G. Stanley, Handellers and Pendants.—2,255, L. Nash, Water Meters.—7,862, W. Parrall, Shop Counters.—8,772, E. Wobly, Attaching Door Knobs to Spindles.—9,972, J. Royle, Suspended Gas Lights.—10,021, W. Lake, Revolving Shutters.—73, C. Watkins, Graining Tools.—3,733, J. E. Elam and E. Adams, Pipe Joint.—5,749, J. Howarth, Ventilators.—6,337, W. Hulse, Spirit Levels.—6,360, H. Haddon, Burglar Alarms.

## RECENT SALES OF PROPERTY.

## ESTATE EXCHANGE REPORT.

JUNE 7.	
City, Turnmill-street—Ground-rent of 60l. a year, reversion in 88 years	21,230
By FLETCHER & SON.	
Harrow, Wealdstone—The freehold residence, Trinity House	390
Stepney, Mile-end—161, Siddons-street, 27 years, ground-rent 2l. 10s.	165
Kenington—9 to 14 and 19a, James-street, freehold 1 to 5, Alms-place, freehold	1,830
By BRAY, BURNETT, & CO.	
City—10 and 12, Hearn-street, freehold	950
Commercial-road, E.—13, 14, and 15, Station-place, and 46 and 48, Dean-street, freehold	630
By THOMAS WAREFIELD.	
Brixton, Hinton-road—A plot of freehold land	420
By E. E. CROUCH & CO.	
Dalston-lane—No. 201, freehold	610
By TOWLE & HARDING.	
Edmonton—A plot of land, 2a, 2r. Op., freehold	800
By FULLER, MOON, & FULLER.	
North Cheam—The Elms, with grounds, freehold	600
JUNE 8.	
By TWYLER & MOORE.	
Hackney—25 and 37, Wall-street, copyhold	600
4 and 5, Jerusalem-square, freehold	450
209, Dalston-lane, freehold	460
By W. T. GRAY.	
Hackney—155 and 157, Benthon-road, 88 years, ground-rent 8l.	520
By J. S. GOMME.	
Kennington-road—Nos. 98 and 100, term 32 years, ground-rent 15l.	800
By C. & H. WHITE.	
Wandsworth—64, Alma-road, freehold	300
Lambeth—168, Upper Kennington-lane, 80 years, ground-rent 11l. 10s., with the goodwill of the business	600
By J. DYRELL.	
Camden-road—12, Hilldrop-road, 75 years, ground-rent 9l.	885
By DUBERNHAM, TWISSON, & CO.	
Hants, Alresford—Three freehold enclosures of land, 13a. 2r. 37p.	990
Two enclosures, containing 20a. 6r. 12p.	660
By EDWIN BATH & CO.	
Lambeth—17, 18, 19, and 30, Rosette-street, 56 years, ground-rent 14l.	740
Hamstead Heath—Ground-rent of 6l. reversion in 30 years	
Peckham—Ground-rent of 62l. 1s. 4d., reversion in 48 years	1,360
Ground-rent of 74l. 10s., reversion in 44 years	1,720
Ground-rent of 48l., reversion in 44 years	519
Newington Butts—69 to 77 old, Edward-street, 37 years, ground-rent 30l.	1,420
15 and 17, Albert-street, 68 years, ground-rent 12l.	570
Clapham-road—2 to 9, Love-lane, freehold	1,660
By H. RUTLEY.	
Hamstead-road—27, Edward-street, 38 years, ground-rent 8l. 8s.	655
By ROBERTS, GRAYMAN, & THOMAS.	
Easton-road—37, Judd-street, 20 years, ground-rent 31l. 10s.	330
Brunswick-square—28 and 34, Compton-street, 21 years, ground-rent 40l.	645
Islington—7 and 9, Northampton-street, 33 years, ground-rent 8l.	600
St. John's Wood—6, New-street, 41 years, ground-rent 8l.	350
By F. JOLLY & CO.	
Bow—12, Wellington-road, 43 years, ground-rent 8l.	410
Mile-end—24, Bancroft-road, 71 years, ground-rent 5l. 6s.	565
By H. G. KIVORST.	
Spalding, Bourne-road—Freehold house and foundry	610
JUNE 9.	
By W. HALL.	
Islington—33, Northampton-street, 31 years, ground-rent 31l. 5s.	265
By C. R. CROSS.	
Edgware—The White Lion Inn, freehold	1,810
Sheerness—13, Chapel-street, freehold	200
By C. D. FIELD & SONS.	
East Ham, Gladding-road—Three plots of freehold land	285
Bermondsey—135, Alcock-road, 47 years, ground-rent 4l. 7s.	300
By A. SEAIN & SON.	
Gravesend—65, Parrott-street, freehold	510
By LEARD & DAVIS.	
Hoxton—Improved rental of 62l. 8s., term 33 years	460
By FULLER, ROBERTS, SONS, & CASSELL.	
Headley—Hants—The Barford Flock Mills, copyhold	1,000
Two copyhold cottages	150
A plot of land, 2a. 1r. 28p., copyhold	90
By BAXTER, PAYNE, & LAFRANCE.	
Knockholt, Kent—Scott's Lodge, and 1a. 2r. 14p., freehold	870
Three enclosures of land, 20a. 1r. 3p., freehold	1,040
By W. A. BLAKEMORE.	
Pimlico—4 to 10 acre, Cornwall-street, 47 years, ground-rent 34l.	2,470
By JONES & SON.	
Poplar—2, Paris-terrace, 62 years, ground-rent 2l. 10s.	170
26, Oriental-street, 74 years, ground-rent 12l.	380
Bow—13, Coburn-street, 31 years, ground-rent 12s.	500
By DUBERNHAM, TWISSON, & CO.	
Harpender—A Plot of land, 4a. 3r. 1p.	421.10s.
Three enclosures of land, 24a. 3r. 11p., freehold	820
JUNE 10.	
By MESSRS. LEACH.	
Chelsea—16, Upper Cheyne-row, and stabling, &c., freehold	3,000



By A. WALTON.	
Sidenp—Two freehold houses and building land, 40s. 1r. 11p.	20,920
By NEWSON & HARRIS.	
Hornsey—45, Shaftesbury-road, 89 years, ground-rent 7s. 7d.	453
Holloway—13 and 15, Victoria-road, and the reversion to three freehold houses in 48 years	935
New North-road—61, Rushton-street, 49 years, ground-rent 4l. 15s.	335
Canonbury—210, St. Paul's-road, 66 years, ground-rent, 8l. 6s.	305
By B. BROWN.	
Clacton-on-sea, Ellis-road—Four houses, 97 years, ground-rent 20s. 8d.	1,200
Walthamstow—1, 2, and 3, Adelaide-villas, freehold	770
Hoxton—17, Forston-street, 17 years, ground-rent 4l. 10s.	175
By M. MILLS.	
Kentish-town—139 and 141, Carlton-road, 71 years, ground-rent 12l. 12s.	650
By E. STRIMSON.	
Walworth—64 to 70 even, South-street, 65 years, ground-rent 17l. 10s.	1,176
61 and 63, Inverle-road, 65 years, ground-rent 10l. 8s and 87, Thurlow-street, 66 years, ground-rent 11l.	675
8 to 16 even, Thurlow-street, 49 years, ground-rent 25s.	650
9, 9 and 10, Shaftesbury-road, 24 years, ground-rent 6l.	1,270
20 to 38 even, Kingston-street, 73 years, ground-rent 35l.	410
Old Kent-road—16 and 18, Kingslake-street, 21 years, ground-rent 6l.	2,250
Southwark—47 and 50a, Trinity-square, 9 years, ground-rent 12l. 10s.	240
Brixton-road—No. 335, term 64 years, ground-rent 17l.	1,330
Brixton-hill—62 and 64, Edymion-road, 93 years, ground-rent 22l.	1,370
Walworth—62 to 68 even, Inverle-road, 65 years, ground-rent 24s.	1,015
3 to 21 odd, Forland-street, 15 years, ground-rent 50l.	870
JUNE 11.	
By A. JACKSON.	
Old Southgate—The College House Academy, freehold	1,080
By MESSRS. CHADWICK.	
Bournemouth—The Mont Dore, freehold	49,000
By RICH BACS.	
Dulwich, Alleyne-park—Ravenswood, 71 years, ground-rent 50s.	1,500
By HARVAY BROS.	
Holloway—12 to 14, Medina-road, 74 years, ground-rent 136l. 10s.	825
Kilburn—2, Canterbury-road, 73 years, ground-rent 5l.	360
By ROBINSON & FRANK.	
Lancing—The Stork's Nest, and 4s. 1r. 10p., freehold	2,610
Freehold building estate, 38s. 2r. 35p.	4,360
Two plots of freehold land, 4s. 1r. 82p.	480
Hampstead—102, Adelaide-road, 69 years, ground-rent 15l.	600

## MEETINGS.

SATURDAY, JUNE 19.	
Architectural Association.—Visit to Waltham Abbey and Cross. Train from Liverpool-street Station at 2:40 p.m.	
MONDAY, JUNE 21.	
Royal Institute of British Architects.—Ordinary Meeting. Presentation of Royal Gold Medal and other Medals and Prizes. 8 p.m.	
Durley Institute of Architecture.—Business Meeting. 7 p.m.	
TUESDAY, JUNE 22.	
British Museum.—Mr. John A. P. MacBride on "The Works of Greek Sculptors Subsequent to Phedias." 2:30 p.m.	
Statistical Society.—Sir Francis Dillon Bell, Agent-General for New Zealand, will read a paper by the Hon. Sir Robert Stout, K.C.M.G., Premier of the Colony, entitled "Notes on the Progress of New Zealand for Twenty years, 1864-1884." 7:45 p.m.	
THURSDAY, JUNE 24.	
Society for the Encouragement of the Fine Arts.—Mr. T. H. Maguire on "The Importance of the Fine Arts to Humanity." 8 p.m.	
Society of Antiquaries.—8:30 p.m.	
FRIDAY, JUNE 25.	
Junior Engineering Society.—General Meeting. 7:45 p.m.	

## Miscellaneous.

**Home Arts and Industries Association.** The annual exhibition of this Association will be opened by H.R.H. the Princess Louise on the 22nd of June. This year it will be held at the East End, and the large iron room at St. Andrew's, Bethnal-green, has been lent for the purpose. The exhibition will include specimens of wood carving, metal work, and of other hand arts taught in the classes of the Association. H.R.H. the Princess of Wales has kindly promised to visit the exhibition.

**Clocks.**—A large church clock has just been erected at Southey, Norfolk, by Messrs. John Smith & Sons, Midland Clock Works, Derby. It strikes the hour, and shows time on two dials, each 4 ft. across. All the wheels are of hard hammered brass, and the pendulum-bob weighs 1 cwt. A large clock has also been fixed at the parish church of Mendlesham, Suffolk, by the same makers. It strikes the hours and half-hours, and has one 5-ft. dial.

**Insanitary Venice.**—With rather more than her proper share of the unhealthy conditions that seem inseparable from Mediterranean seaports, Venice has refrained from sanitary reform until three years of epidemic disease, with its consequent scaring off of visitors and of the advantages they bring, has aroused her to a sense of duty. Instead of reassuring proclamations by prefects or protests of injured hotel-keepers, it is edifying to read such a letter as that which Signor C. Castellani addresses to the Italian Government through the columns of the *Venezia*. "We must frankly confront the fact," he says in effect, "that Venice invites epidemic disease, and that Italy must interpose to save her most picturesque city from ruin. We must subject to the most vigilant surveillance the water-supply, the drainage, the canals, the dwellings of the poor, the food-markets, the hospital service, the subsoil, the lagoons, the streets, the whole ensemble of Venetian life. Cleanliness, public and private, must be the order of the day, and until it is practically observed our economic kitchens and free dormitories do little more than parley with the enemy instead of expelling it. Money, however, is wanted, and the Italian nation must do for Venice what she has done on so grand a scale for Naples and other cities. The Government which obtained from Parliament so many millions for Neapolitan rehabilitation, could it not spare a few for Venice, which has hitherto asked nothing? What Italian city has stronger claims on the national benevolence than the 'pearl of the Adriatic'? Like her sisters of the seaboard, in fact, Venice is now the scene of something like an epidemic of cholera, and having ignored the admonitions given her to stamp out the malady during its early insidious stage, she is making tardy amends for past remissness by an impassioned appeal for help from without.—*Lancet*.

**The Hardening of Plaster.**—Some time since\* attention was called in these columns to a communication on this subject made to the French Academy of Sciences by M. Juhe, who advocated the use of hardened plaster for flooring. The *Chemiker Zeitung* has since quoted a statement of Herr Denstedt, who claims priority in the idea thus demonstrated, and refers to a French patent obtained by him in October, 1884. Baryta water is the agent he mentions, but he remarks that this process has the defect that, when drying takes place, all the baryta is brought to the surface with the evaporating water, being changed into carbonate by the carbonic acid in the air; a thin insoluble layer being formed. On the other hand, a heated solution of baryta, completely saturated, gives very satisfactory results, if the substances used are first heated to 140°–176° F., in order to prevent baryta crystals being developed. By external air-pressure the solution is pressed down to a certain depth, and when cold, baryta crystals are formed inside the mass. These remain, however, inside, and are changed into insoluble combinations by the carbonic acid of the air, or by the substances added to the plaster. For producing a greater degree of hardness, free silicic acid is added to the plaster, or such metallic salts (sulphates) as react with baryta, forming insoluble barium salts and insoluble hydro-oxides. In place of silicic acid, it is possible to use glaze sand (made by the pulverisation of burned quartz). The sulphates which are most suitable are those of zinc, cadmium, magnesium, copper, aluminium, chromium, cobalt, and nickel. Some of them produce colourings which can be preserved uniform if the baryta is replaced by lime. The plaster is stirred with milk of lime, and after drying, the objects formed are saturated with the sulphates in question.

**Slaithwaite.**—The Providence Baptist Chapel, after being rebuilt, has been reopened. The whole of the work has been carried out from designs prepared by and under the superintendence of Mr. J. Berry, architect, of Huddersfield. The excavators', masons', and slaters' work has been executed by Messrs. E. Eagland & Sons, Slaithwaite; carpenters' and joiners' work by Mr. James Christie, Huddersfield; plumbers' and glaziers' work by Mr. F. Goodall, Slaithwaite; plasterers' and painters' work by Mr. R. W. Sutcliffe. The hot-water engineer was Mr. R. Rundle, Shipley, Leeds. The organ has been built by Messrs. P. Conacher & Co., Huddersfield. The chapel will accommodate 490, and has cost 1,660l.

**The Widening of the Charing Cross Railway Bridge and Station.**—The works at the widening of the South-Eastern Company's bridge across the Thames at Charing Cross are so far advanced that the Middlesex side of the river has now been reached, the works having been commenced on the Surrey side. The girders of the bridge will rest on iron cylinders, having a total depth of 96 ft., and descending 32 ft. below the bed of the river. When completed, the bridge will be widened to the extent of 48 ft., admitting of the laying down of four additional lines of rails. Messrs. J. Cochrane & Sons, of Westminster, are the contractors. The widening of the bridge has necessitated the removal of the Charing Cross Swimming-bath, which was moored immediately to the west of the bridge. The undertaking includes the enlargement of the Charing Cross Station by widening it to a considerable extent on the west side. This involves the removal of the recently-erected Avenue Theatre, together with the demolition of a large number of houses on the east side of Craven-street, and we are informed that this portion of the work will shortly be commenced.

**The Volumes of Cements.**—Dr. Böhm publishes some particulars respecting the constancy of volumes of cements, which appear in the "Transactions of the Institution of Civil Engineers." For determining the constancy of volume the standard Prussian test is as follows:—Pure cement is mixed with water to a stiff cream, and formed into a thin cake on glass or metal plates. After setting, cake and plate are placed under water. If after one or more days the cake shows crumpling, or cracks at the edge, the "flying" of the cement is indicated. Another test is known as the "baking proof." The cement is mixed with water to a syrupy consistency, and is poured on a gypsum plate covered with damp filter-paper. In about ten minutes the cake is placed on a heated iron plate, and baked for an hour. If the cake remains sharp-edged and free from cracks, the cement is constant in volume. A third test proceeds on the hypothesis that the quick hardening of cement in boiling water proceeds just as in water of mean temperature. The cakes formed on glass plates are hardened twenty-three hours in air, and then placed in boiling water. The least tendency to flying of the cement is shown in from ten to sixty minutes.

**The Printing Machine Managers' Super-annuation Fund.**—The annual excursion to Hastings and St. Leonards in aid of the funds of the above charity will take place on Saturday, July 3. The committee say that they are again enabled, through the kindness of the Brighton Railway Company, to provide accommodation on a most liberal scale. The excursion will be from Saturday to Monday, one, two, or three days, at the option of the ticket-holder, starting from either London Bridge or Victoria Stations, and the fare, there and back, is 6s. for three days, or 5s. for one day. The fund was established thirteen years ago to provide a small allowance to printing machine managers who, from age or blindness, become incapacitated from following their trade. We trust that the excursion will be well patronised by the public, and that it will result in substantial help to the finances of the charity. Printing machine-managers are a hard-worked body of men, to whom every newspaper reader is indebted. Further particulars concerning the charity may be had of Mr. D. D. Leahy, secretary, 134, Salisbury-square, E.C.

**Metropolitan Board of Works.**—At the meeting of this Board on the 11th inst., a letter was read from the St. Saviour's District Board of Works stating that Mr. T. F. Rider had been appointed their representative at the Metropolitan Board. Mr. Rider is a builder, and a member of the well-known firm of Rider & Sons, Union-street, Southwark.

**New Dwellings for Artisans at Hoxton.** The Prince of Wales has consented to open Bleyton's Industrial Dwellings, Chatham-avenue, Nile-street, Hoxton, on Monday, July 5. These dwellings are the work of the trustees of the joint charities of St. Giles, Cripplelegate, and St. Luke, Middlesex.

**Fire.**—The Directors of Wilkes's Metallic Flooring and Eureka Concrete Company, Limited, announce that the fire which occurred at their works, West Kensington, on the 8th inst., will in no way interfere with the conduct of their business.

\* See *Builder*, vol. xlix., p. 355 (Sept. 12, 1885).



**Ecclesiastical Art Exhibition at Wakefield.**—The annual exhibition of Ecclesiastical Art will take place as usual during the Church Congress, which is to be held this year in the diocese of Ripon, at Wakefield, and from the historic wealth of the diocese it is expected that the loan collection will be more than usually interesting. The exhibition will be held in the spacious Drill Hall, which is within easy reach of the Congress Hall. Many of the leading church furnishers, embroiderers, silversmiths, and glass-painters will be represented, and educational works and appliances will also be included in the exhibition. It is hoped that the clergy of the diocese and others possessing interesting objects, suitable for the loan collection, will assist in making the exhibit of ecclesiastical art a representation capable of sustaining the high repute the diocese enjoys in the estimation of antiquaries and archaeologists. The loans will embrace goldsmiths' and silversmiths' work, ancient and modern, and ecclesiastical metal-work in general, embroidery, needlework, tapestry, wood and ivory carving, ecclesiastical furniture, paintings, drawings, architectural designs for churches and schools, photographs, books and MSS., and other objects of archaeological interest belonging to the churches of the diocese.

**The Associates' Sketching Club, Leeds and Yorkshire Architectural Society.**—A monthly meeting of the members of this club was held at the Rooms, Albion-street, last week, when the drawings produced during the previous month were exhibited. Some of the best are Mr. F. W. Bedford's "Lees Hall," a fine pencil sketch nicely shaded; and a coloured drawing by Mr. H. P. Buckley of the wood lectern from St. John's Church; Mr. A. E. Dixon exhibited a measured drawing of the old Norman porch at Adel; and other interesting exhibits were—Drawings of Italian carved wood panels, by Mr. J. S. Preston; Calverley Church porch, Mr. G. Rhodes; north aisle of the choir, Selby Abbey Church; Mr. J. W. Twist; and Kiddal Hall, Scholes; Mr. Alf. Whitehead. There was a large attendance of members.

#### PRICES CURRENT OF MATERIALS.

TIMBER.	£. s. d.	£. s. d.
Greenheart, B.G. .... ton	6 5 0	7 0 0
Teak, B.I. .... foot load	11 0 0	15 0 0
Sequoia, U.S. .... foot cube	0 2 4	0 2 8
Ash, Canada .... load	8 0 0	4 10 0
Birch " " " " " "	2 10 0	4 0 0
Elm " " " " " "	3 10 0	4 10 0
Nir, Dantac, &c. ....	1 10 0	4 0 0
Canada " " " " " "	2 10 0	5 0 0
Pine, Canada red " " " "	2 10 0	4 0 0
Lath, Dantac " " " " " "	8 0 0	5 0 0
St. Petersburg " " " " " "	3 10 0	5 0 0
Waincoat, Riga " " " " " "	4 0 0	5 0 0
Odessa, crown " " " " " "	2 15 0	4 10 0
Deal, Finland, 2nd and 3rd " " " "	3 7 6	0 0 0
" " 4th and 3rd " " " " " "	7 0 0	0 0 0
Riga " " " " " " " "	6 0 0	7 0 0
St. Petersburg, 1st yellow " " " "	8 0 0	14 0 0
" " 2nd " " " " " "	7 0 0	12 0 0
" " white " " " " " "	7 0 0	10 0 0
Deal, 5th " " " " " " " "	8 0 0	16 0 0
White Pine " " " " " " " "	7 0 0	17 0 0
Canada Pine, 1st " " " " " "	17 0 0	30 0 0
" " 2nd " " " " " "	12 0 0	17 0 0
" " 3rd, &c. " " " " " "	8 0 0	10 0 0
" " Spruce 1st " " " " " "	8 0 0	11 0 0
" " 3rd and 2nd " " " " " "	5 0 0	7 10 0
New Brunswick, &c. " " " " " "	5 0 0	7 0 0
Battens, all kinds " " " " " "	4 0 0	12 0 0
Flooring Boards, sq. 1 Bay, Free		
pared, first " " " " " "	0 9 0	0 18 0
Second " " " " " "	0 7 6	0 8 6
Other qualities " " " " " "	0 5 0	0 7 0
Cedar, Cuba " " " " " "	0 0 3	0 0 4
Honduras, &c. " " " " " "	0 0 2	0 0 4
Australian " " " " " "	0 0 2	0 0 3
Malagasy, Cuba " " " " " "	0 0 2	0 0 3
St. Domingo, cargo average " " " "	0 0 5	0 0 7
Mexican " " " " " "	0 0 3	0 0 4
Tobacco " " " " " "	0 0 3	0 0 4
Honduras " " " " " "	0 0 2	0 0 3
Maple, Bird's-eye " " " " " "	0 0 6	0 0 8
Rose, Rio " " " " " "	7 0 0	10 0 0
Bahia " " " " " "	8 0 0	10 0 0
Box, Turkey " " " " " "	5 0 0	17 0 0
Batin, St. Domingo " " " " " "	0 0 7	0 0 11
Porto Rico " " " " " "	0 0 8	0 0 12
Walnut, Italian " " " " " "	0 0 4	0 0 5

METALS.	£. s. d.	£. s. d.
Iron—Pig in Scotland .... ton	0 0 0	0 0 0
Bar, Welsh, in London ....	4 10 0	4 17 6
" " in Wales " " " "	4 5 0	4 10 0
" " Staffordshire, London " " " "	5 5 0	6 10 0
Sheet, single, in London " " " "	8 15 0	9 10 0
Hoops " " " " " "	6 0 0	7 0 0
Nail-roads " " " " " "	5 10 0	6 10 0
Copper—		
British, cake and ingot .... ton	42 10 0	43 0 0
Best selected " " " " " "	44 0 0	44 10 0
Sheets, strong " " " " " "	49 0 0	50 0 0
" " India " " " " " "	49 0 0	47 0 0
Australian " " " " " "	0 0 0	0 0 0
Chili, bars " " " " " "	39 10 0	39 17 6

METALS (continued).	£. s. d.	£. s. d.
Yarrow Metal " " " " " "	0 0 4	0 0 4
Lead—Pig, Spanish " " " " " "	12 15 0	0 0 0
English, common brands " " " " " "	13 2 6	0 0 0
Sheet, English " " " " " "	13 15 0	14 0 0
SPRITES—		
Plinian, special " " " " " "	14 0 0	14 2 6
Ordinary brands " " " " " "	13 15 0	14 0 0
Tin—		
Banca " " " " " " " "	0 0 0	0 0 0
Billion " " " " " " " "	0 0 0	0 0 0
Straits " " " " " " " "	101 15 0	102 5 0
Australian " " " " " " " "	102 10 0	103 0 0
English ingots " " " " " "	104 0 0	106 0 0
Zinc—		
English sheet " " " " " "	18 0 0	18 5 0

OILS.	£. s. d.	£. s. d.
Linseed " " " " " " " "	21 5 0	21 7 6
Cocoon, Cochiti " " " " " "	32 0 0	0 0 0
Ceylon " " " " " " " "	25 15 0	26 0 0
Copra " " " " " " " "	0 0 0	0 0 0
Palm, Lagos " " " " " "	23 10 0	24 0 0
Palm-nut Kernel " " " " " "	0 0 0	0 0 0
Rapeseed, English " " " " " "	23 0 0	23 0 0
" " brown " " " " " "	21 15 0	0 0 0
Cottonseed, refined " " " " " "	18 10 0	19 5 0
Tallow and Oleine " " " " " "	26 0 0	46 0 0
Lubricating, U.S. " " " " " "	6 5 0	10 0 0
" " Refined " " " " " "	8 0 0	13 0 0
TERPENTINE—		
American, in casks " " " " " "	1 4 6	1 5 0
Tax—Stockholm " " " " " "	0 17 0	0 17 6
Archangel " " " " " "	0 10 6	0 11 3

#### COMPETITIONS, CONTRACTS, & PUBLIC APPOINTMENTS.

Epitoms of Advertisements in this Number.

##### COMPETITIONS.

Nature of Work.	By whom required.	Premium.	Designs to be delivered.	Page.
Infectious Diseases Hospital	Liverpool Corporation	57l. and 25l.	August 10th	i.

##### CONTRACTS.

Nature of Work, or Materials.	By whom required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Erection of Mortuary Buildings	St. Luke's Vestry	Official	June 22nd	ii.
Making-up Streets	Wandsworth Bd. of Works	do.	do.	ii.
Road Making and Paving	Willenden Local Board	O. Clando Robson	do.	ii.
Widening North Union Railway	Lon. & N. W. Ry. Co.	Official	June 23rd	ii.
Granite Carriage-way Paving	Hackney Board of Works	J. Lovegrove	do.	ii.
Erection of Ten Houses, Forest Gate	Henry Bushell	do.	do.	ii.
Erection of Houses, Angle	Admiralty	Official	June 25th	ii.
Amphitheatre Paving	Com. of Sewers	do.	do.	ii.
New Church of St. Peter, Acworth	The Building Com.	H. Ross	June 26th	xviii.
Additional do., to Owens College, Manchester	School Bld. for London	A. Waterhouse	do.	ii.
Repairs to the Shire Hall	County of Hertford	Official	June 29th	xviii.
Repairs to Apparatus, &c.	City of Liverpool	U. A. Smith	do.	ii.
New Vicarage and Church, Llanwddyn	F. U. Hulme	Official	July 2nd	xviii.
Repairing Footways, Duke-street, S.E.	St. Olave Bd. of Wrks.	Official	July 5th	ii.
New Schools	Basingstoke Sch. Bld.	C. Bell	do.	ii.
New Postal Sorting Office, Streatham	Com. of H.M. Works	Official	July 6th	ii.
Paving Works	Brentford Local Board	Lacey	do.	xviii.

##### PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page.
Surveyor	Southend Local Board	250l.	June 22nd	xvi.

##### TENDERS.

**BATTERSEA.**—For repairs and decorative works at the Houses' Arms and Rock Taverns, Battersea Park-road, S.W., for Messrs. Parish & Bertram. Mr. Chas. Jones, architect, Liberty-street, S.W. —

Warwick & Osborn	£1,329 13 6
J. P. White	1,313 0 0
G. Harrison	1,285 0 0
H. Adams	1,261 0 0
Haynes & Son	1,260 0 0
Watson & Walker	1,255 0 0
T. Spencer	1,240 0 0
J. Smith	1,238 0 0
S. Foster (accepted)	1,213 0 0

[All of Bedford.]

**BEDFORD.**—For rebuilding a shop in Harpur-street, for Miss Cowley. Mr. John Day, architect, Bedford —

Haynes & Son	£245 0 0
J. P. White	241 0 0
H. Adams	216 0 0
H. Graham	189 15 6
J. Smith	189 0 0
Warwick & Osborn	196 0 0

[All of Bedford.]

**BRISTOL.**—For restoration of, and additions to, house at Hales, for Messrs. H. W. C. Messrs. J. W. Trew & Sons, architects, Broad-street, Bristol. Quantities by Mr. Wm. L. Bernard —

J. Veals	£299 0 0
J. Wilkins	870 0 0
E. Love	885 14 0
R. W. Harris, Westbury	885 0 0
J. James	783 0 0
D. Morris	770 0 0
T. Thomas	750 0 0

Second Scheme.

D. Morris	£210 0 0
T. Thomas	688 0 0
J. Wilkins	645 0 0
E. Love	419 15 0
J. Hill, Westbury	399 0 0
J. James (accepted)	392 0 0

[The others of Bristol.]

**FARNINGHAM, Kent.**—For rebuilding farm house near Farningham, Kent. Mr. St. Pierre Harris, Basinghall-street, architect (in conjunction with Mr. Wm. Hodgson) —

Nightingale, Gravesend	£2,678 0 0
P. Cooper, Beckenham	2,650 0 0
Dunnell, Bristed (too late)	2,493 0 0
T. Cressley, Bromley	2,126 0 0
W. & F. Crocker, Great Dover-street	2,733 0 0
F. Wood, Chislehurst	1,987 0 0
D. Payne, Bromley	1,960 0 0
Somerford & Son, Clapham	1,740 0 0

\* Accepted.

**FINSBURY.**—For pulling down and rebuilding No. 42, Wilson-street, Finsbury, for the Royal Maternity Charity, under the superintendence of Messrs. William Reddall & Son, the architects and surveyors to the Charity —

Heath	£280 0 0
Moreland	948 0 0
Hepe	920 0 0
Woodward	9 0 0
Fritchard	877 0 0
Kilby & Gayford	820 0 0

**HAGGERSTON.**—For extension to hall of the Borough of Hackney Workmen's Club and Institute, 27 and 29, Haggerston-road. Mr. H. Bradley, surveyor —

Hardman & Watts	£228 0 0
W. S. Whitcher	168 0 0
H. Dillway	163 0 0
J. & T. Collins	147 0 0
J. McClean	147 0 0
Steel Bros.	143 0 0
Building Trades' Society (accepted)	140 10 0
Eds & Sons	135 0 0
H. S. Stephens	119 10 0
A. Saunders	117 0 0

[Surveyor's estimate, 145l.]

**HOLLOWAY.**—For alterations to the Queen's Arms public-house, Bawell-road, Holloway, for Mr. Shoebridge. Mr. Herbert Paine, architect, Bedford-row —

Nicholls	£375 0 0
Ballantine	375 0 0
Ward & Lambie (accepted)	369 0 0
ILFORD.—For repairs and alterations to dwelling-house, Rabbit's Farm, Manor Park, for Mr. J. Kinney. Mr. R. Roper, architect —	
Lusk	£216 0 0
Buckley	135 0 0
Brickell	198 0 0
Watson (accepted)	181 0 0
Whitehead	161 0 0



**KENSINGTON.**—For alterations at No. 14, Church-street, Kensington, for Mr. J. Robinson:—  
A. M. Foster, Kentish town..... £142 0 0  
C. Frost, Kensington (accepted)..... 108 0 0  
W. Triggs, Whitechapel..... 108 0 0

**LONDON.**—For alterations at the Carpenters' Arms public-house, King's Cross-road, for Messrs. Bacon Bros., Mr. Charles Young, architect, Strood-hill, Rochester:—  
*Garfield's.*  
W. Winn..... £111 0 0  
Buckley & Beach..... 106 0 0

*Pecterny.*  
Buckley & Beach..... 175 0 0  
Sanders & Sons (accepted)..... 151 0 0

**MANCHESTER.**—For high altar at the Church of the Holy Name, Oxford-road, for the Very Rev. Joseph Jackson, S.J., Mr. Joseph Stanislaus Hansom, F.R.I.B.A., architect, Palace-gardens-terrace, Kensington:—  
R. L. Boulton, Cheltenham..... £1,185 0 0  
Hardman, Powell, & Co., Birmingham, for tabernacle, safe, and door..... 50 0 0  
[Both accepted.]

**ORPINGTON, Kent.**—For the erection of twenty workmen's dwellings at Orpington, Kent, exclusive of boundary walls and fences, Mr. St. Pierre Harris, architect and surveyor:—  
Somerford & Son, Clapham..... £4,090 0 0  
F. Wood, Chislehurst..... 4,540 0 0  
Taylor & Son, Bromley..... 4,400 0 0  
W. & F. Croaker, Great Dover-street..... 3,880 0 0  
T. Knight, Sidcup (accepted)..... 3,657 0 0

**PLAISTOW.**—For the making of roads and sewers on the Hemetide estate, for Mr. Henry Haig, Messrs. R. L. Curtis & Sons, surveyors, London-wall:—  
Jackson..... £9 0 0  
Trueman..... 889 0 0  
Pitney..... 884 0 0  
Bell (accepted)..... 793 0 0

**PUTNEY.**—For proposed stabling, Bective-road, Putney. Mr. Charles Jones, architect, Ebury-street, Finsbury:—  
James Hill, Barnes..... £453 1 8  
Robt. Ayres & Co., Putney..... 430 0 0  
John Clemence, London..... 410 0 0  
Ayres, Putney..... 390 0 0  
Duck, Putney..... 385 0 0  
Davis, Barnes (accepted)..... 385 0 0

**SOUTHWARK.**—For granite carriageways and York stone footways, &c., for the new line of thoroughfare from Southwark-bridge-road to Great Dover-street, Borough, for the Metropolitan Board of Works:—  
Williams, Son, & Wallington..... £18,100 0 0  
Charles Wall..... 13,857 0 0  
J. W. & J. Neave..... 13,338 15 0  
W. T. Chadwick..... 13,029 3 4  
W. Webster..... 13,000 0 0  
G. G. Ratty..... 12,900 0 0  
Thomas Turner..... 12,652 0 0  
J. Mowlem & Co..... 12,250 0 0  
Hindle & Morrish..... 11,849 0 0  
Richard Mayo..... 10,394 0 0  
\* Accepted provisionally.

**TOXTETH PARK.**—The following tenders have been accepted by the Local Board for the ensuing year, commencing on the 1st of July, 1886:—

*Removal of Midden Refuse.*  
Isaac Garnet, Toxteth Park..... £583 0 0  
[There were seven tenders received varying from 525l. to 867l.]

*Teamwork on Roads.*  
1 horse team..... 7s. per day  
2 horse team..... 13s. per day  
Joseph Dyson, Liverpool..... 13s. per day  
[Lowest of 12 tenders received.]

*Macadam and Chippings.*  
For 1,000 tons of Macadam broken to a 2½ inch ring gauge:—  
Liverpool Select Vestry, at 8s. per ton hand broken.  
For 600 tons of Macadam broken to a 1½ inch ring gauge:—  
The Welsh Granite Co., Ltd., at 9s. per ton hand broken at the Docks, Liverpool.

For stone chippings to pass 1 inch meshed riddle:—  
The Welsh Granite Co., Ltd., at 7s. per ton at the Docks, Liverpool.  
[13 tenders received.]

**TOXTETH PARK.**—For the completion of streets, for the Toxteth Park Local Board. Quantities supplied by the engineer, Mr. John Price, Assoc. M. Inst. C.E.:—

*Greenleaf-street.*  
Hayes & Son, Bolton..... £258 16 2  
McCabe & Co., Liverpool..... 232 0 9  
Chas. Burt, Toxteth Park..... 227 0 0  
L. Marr, Toxteth Park..... 196 7 6  
Anwell & Co., Liverpool..... 187 9 8  
W. F. Chadwick, Liverpool..... 183 16 1  
Walkden & Co., Bootle..... 178 0 0  
R. Lomax, Eccles (accepted)..... 178 1 6  
[Engineer's estimate, 1891.]

*Callen-street.*  
McCabe & Co., Liverpool..... £232 18 2  
Chas. Burt, Toxteth Park..... 227 0 0  
Hayes & Son, Bolton..... 270 13 4  
L. Marr, Toxteth Park..... 195 5 6  
Anwell & Co., Liverpool..... 186 16 3  
W. F. Chadwick, Liverpool..... 183 15 9  
R. Lomax, Eccles..... 177 11 11  
Walkden & Co., Bootle (accepted)..... 178 0 0  
[Engineer's estimate, 1891.]

*Longfellow-street.*  
Chas. Burt, Toxteth Park..... £238 0 0  
Hayes & Son, Bolton..... 284 8 6  
McCabe & Co., Liverpool..... 278 12 4  
Anwell & Co., Liverpool..... 278 6 10  
L. Marr, Toxteth Park..... 229 14 4  
W. F. Chadwick, Liverpool..... 227 15 9  
R. Lomax, Eccles (accepted)..... 227 14 2  
Walkden & Co., Bootle\*..... 198 0 0  
[Engineer's estimate, 1891.]  
\* Withdrawn owing to error.

**TEDDINGTON.**—For the construction of about 200 ft. run of campshedding, &c., at the Rectory Ground, Manor-road, for the Teddington Local Board, Mr. Henry York, surveyor to the board:—  
A. T. Tough, Teddington..... £340 0 0  
Thompson & Bates, Clapham, S.W..... 441 0 0  
Colwell & Hazle, Rotherhithe (too late), exclusive of brickwork..... 410 0 0  
W. H. Dearn, Chichester..... 439 0 0  
Hocking & Tuttlebee, Rotherhithe, Road..... 400 0 0  
Wm. Gradwell's Executors, Barrow-in-Furness (accepted)..... 377 0 0

**SPECIAL NOTICE.**—Lists of Tenders frequently reach us too late for insertion. They should be delivered at our office, 46, Catherine-street, W.C., not later than **Four p.m. on THURSDAYS.**

## PUBLISHER'S NOTICES.

Registered Telegraphic Address, "THE BUILDER, LONDON."

### CHARGES FOR ADVERTISEMENTS.

**SITUATIONS VACANT, PARTNERSHIPS, APPRENTICESHIPS, TRADE, AND GENERAL ADVERTISEMENTS.**  
Six lines (about fifty words) or under..... 4s. 6d.  
Each additional line (about ten words) or under..... 6s. 6d.  
Terms for Series of Trade Advertisements, also for special Advertisements on front page, Chaplains, C. ultra, sales by Auction, &c. may be obtained on application to the Publisher.

**SITUATIONS WANTED.**  
FOUR Lines (about thirty words) or under..... 2s. 6d.  
Each additional line (about ten words) or under..... 6s. 6d.  
PREPAYMENT IS ABSOLUTELY NECESSARY.

\* Stamps must not be sent, but all small sums should be remitted by Cash in Registered Letter or by Money Order, payable at the "Post-office, Covent-garden, W.C. to DOUGLAS FOURDRINER, Publisher.

Addressed to No. 46, Catherine-street, W.C. Advertisements for the current week's issue must reach the Office before THREE o'clock p.m. on THURSDAY. The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c. left at the Office in reply to Advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

**SPECIAL—ALTERATIONS IN STANDING ADVERTISEMENTS OR ORDERS TO DISCONTINUE SAME,** must reach the Office before TEN o'clock on WEDNESDAY morning.

**PERSONS Advertising in "The Builder,"** may have Replies addressed to the Office, 46, Catherine-street, Covent-garden, W.C. free of charge. Letters will be forwarded if addressed envelopes are sent, together with sufficient stamps to cover the postage.

### TERMS OF SUBSCRIPTION.

"THE BUILDER" is supplied twice from the Office to residents in any part of the United Kingdom at the rate of 19s. per annum PREPAID. To all parts of Europe, America, Australia, and New Zealand, 25s. per annum. To India, China, Ceylon, &c. 30s. per annum. Remittances payable to DOUGLAS FOURDRINER, Publisher, No. 46, Catherine-street, W.C.

## TO CORRESPONDENTS.

Registered Telegraphic Address, "THE BUILDER, LONDON."

J. V. (the cuts sent were not of any interest for illustration—C. P. H.—F. G. F.—A. B.—T. D.—R. N. ("vires acquirit eundo," you see)—C. E. H. (shall have consideration)—J. H.—F. Pasha, Cairo (photograph received)—E. B. All statements of facts, lists of tenders, &c., must be accompanied by the name and address of the sender, &c. necessary for publication.

We are compelled to decline pointing out books and giving addresses. Note.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

Letters or communications (beyond mere news-items) which have been duplicated for other journals, are NOT DESIRED. All communications relating to literary or artistic matters should be addressed to THE EDITOR. All communications relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

### Best Bath Stone.

WESTWOOD GROUND.

Box Ground, Combe Down,

Corsham Down, And Farleigh Down,

RANDELL, SAUNDERS, & CO., Limited,

Corsham, Wilts. [ADVT.]

### Bath Stone.

BEST QUALITY OF ALL KINDS.

PICTOR & SONS,

Box, Wilts. [ADVT.]

### Douling Freestone.

THE CHELYNCH STONE. The stone from these quarries is known as the "Weather Bed," and is of a very crystalline nature, and undoubtedly one of the most durable stones in England.

THE BRAMBLEDITCH STONE. Is of the same crystalline nature as the Chelynych Stone, but finer in texture, and more suitable for fine moulded work.

### HAM HILL STONE.

Greater facilities have been provided for working these quarries, and the stone can be supplied in large quantities at short notice.

Prices, and every information given, on application to CHARLES TRASK & SONS, Norton-sub-Hamdon, near Ilminster, Somerset.

London Agent—Mr. E. WILLIAMS, 16, Craven-street, Strand, W.C. [ADVT.]

**Douling Free Stone** For prices, &c., address S. & J. STAPLE,

Quarry Owners, Stone

BLUE LIAS LIME and Lime Merchants,

Stoke - under - Ham,

(Ground or Lump), Ilminster. [ADVT.]

**Ham Hill Stone!** Ham Hill Stone !!!

For Ham Hill Stone of best quality and workmanship, apply to JOHN HANN & SON, Quarry Owners, Montacute, Ilminster. Established 1837. Agents, MATTHEWS & GEARD, Albany Wharf, Regent's Park Basin, N.W. [ADVT.]

**Asphalte.**—The Seyssel and Metallic Lava Asphalte Company (Mr. H. Glenn), Office, 38, Poultry, E.C.—The best and cheapest materials for damp courses, railway arches, warehouse floors, flat roofs, stables, cow-sheds, and milk-rooms, granaries, tun-rooms, and terraces. [ADVT.]

### Asphalte.

Seyssel, Patent Metallic Lava, and

White Asphaltes.

M. STODART & CO.

Office:

No. 90, Cannon-street, E.C. [ADVT.]

# BANNER VENTILATORS.

The Strongest Exhaust Ventilators for all Buildings, Public Halls, Churches, Billiard-Rooms, &c.

HIGHEST PRIZES at all the most important Exhibitions.

BANNER SYSTEM OF SANITATION AND SANITARY APPLIANCES

WERE AWARDED AT THE

International Health Exhibition, 1884, One Gold Medal, Three Silver Medals, and One Bronze.

For further Particulars and Prices apply to

**BANNER SANITATION COMPANY,**

Wessex House, Northumberland Avenue, Charing Cross, London, W.C.

# The Builder.

VOL. L. No. 2364.

SATURDAY, JUNE 25, 1895.

## ILLUSTRATIONS.

The People's Palace for East London.—Mr. E. R. Robson, F.S.A., Architect .....	918-919
The New Sorbonne, Paris.—M. Paul Nenot, Architect .....	922
The Rathaus, Limburg .....	923
"The Three Crowns," Wurzburg .....	923
Selected Design for Sunderland Municipal Buildings: Elevation and Longitudinal Section.—Mr. Brightwen Buxton, Architect .....	926-930
Interior of Synagogue, Rue de la Victoire, Paris.—M. Aldrophe, Architect .....	931

## CONTENTS.

Art in the Colonial Exhibition .....	907	Sunderland Municipal Buildings .....	916	A Builder's Claim: St. Patrick's Cathedral, Dublin: Pile v.	938
The New Sorbonne, Paris .....	908	The Antiquities of Paris .....	916	Dean West .....	938
Notes .....	909	M. Charles Garnier, the Institute Royal Gold Medalist, 1886 ..	916	Westminster Abbey .....	938
Architecture at the Royal Academy: Concluding Notice .....	910	"Fictitious York" .....	934	Provincial .....	938
Royal Institute of British Architects .....	911	Colonial Timbers .....	934	The Student's Column: Our Building Stones—XVI .....	939
"The People's Palace" for East London (with Plan) .....	914	Some Artistic Associations of St. Martin's Lane .....	935	Recent Patents .....	940
The New Sorbonne, Paris .....	914	The Royal Holloway College for Women, Mount Lee, Egham .....	936	Recent Sales of Property .....	940
The Rath-Haus, Limburg-on-the-Lahn, and the Three Crowns	914	A Sketch in Bidstone Village, Cheshire .....	937	Meetings .....	940
Inn, Wurzburg .....	914	Architectural Association: Visit to Waltham Abbey and Cross	937	Miscellaneous .....	940
Synagogue, Rue de la Victoire, Paris .....	914	Noble's Patent Expanding Mandrel .....	937	Prices Current of Building Materials .....	940

### Art in the Colonial Exhibition.



WE shall disarm those critics who may feel inclined to criticise this critique on the art-work of the Colonies by saying that we do not judge the Colonial exhibits by their art-work.

They are the producers of the raw material and the raisers of produce, and that part of the exhibit speaks for itself and makes the inhabitants the mother country justly proud of her children. But as the Colonies elect to exhibit the work that comes under the domain of art, using that word in its widest sense, it is only just that we should examine these works, and in forming an opinion on them we must use the same standard of criticism as we expect employed in our own work; for to give the Colonies "points" to bring them level with us, and so compensate them for the disadvantage they naturally labour under, would give a wholly valueless result, for no criticism is worth anything that is not comparative.

Looking at their exhibits generally, it must strike the most casual observer that our Colonies have done very little to win the sympathies of the spectator by that most powerful of the senses,—sight; and this is brought the more prominently before one by the contrast exhibited between the Colonial and Indian Courts, which latter are beautiful to the eye, and arrest the attention by their general effect, before the observer has the opportunity of making himself acquainted with the exhibits in detail. Arches made to look like gold, to show the amount of that metal raised in a certain colony, are, as exemplified in the Colonial Courts, not lovely objects,—far from it,—and yet here was a capital opportunity of exhibiting whatever taste was in the Colony, for the badness of these trophies artistically cannot be excused on the ground of their usefulness, as is the case with many other objects they exhibit. Their cases of stuffed birds, too, are not seen to the best advantage, owing to bad grouping, and the public is no longer content with the taxidermy of twenty years ago, since it has had put before it those splendid cases in the New Natural History Museum. But we will leave the sphere of generalities and look at the "Colonies" in detail.

Although we are not specially concerned here with their pictorial work, we can just take a glance at the Colonial pictures, for this exhibit will detain no one very long. We hardly expected to see such a display of poor, amateurish, uneducated work as is shown. Apart

from an unskilful technique, or a technique that has that fatal facility of the "pot-boiler," the colouring is crude, and the scheme of it disagreeable, and it is hard to distinguish many of the landscapes from bad oleographs. These remarks apply not only to the works exhibited in the main building, but also to those in the gallery of the Albert Hall, where the best pictures are to be seen. The pictures, in fact, exhibit an almost entire absence of anything like Academic training. There is only one name we remember as an exception among dozens in the Australian Courts, that of Mr. P. F. Paterson, whose Colonial landscapes and river scenes show that he has had a fair European training, for his work insensibly reminds us of work we are familiar with here. Canada of all our Colonies exhibits the best pictorial work, and the men who stand out prominently have evidently had a Parisian training, and for that matter, seeing how the Americans patronise the French *ateliers*, some of the Canadian artists may have drifted from America.

There are some English people who imagine that Colonial scenery does not paint well, because the paintings one sees of it are all so inferior, but from a few good pictures in the Colonial Courts it is evident that their artists have plenty of scope, though some of the subjects they elect to paint, especially in New Zealand, strike one as more curious and geologically interesting than beautiful.

India, though not included in our estimate of other work, we may remark, *en passant*, shows pictures by two men, Mr. Horace Van Huth and Mr. John Griffiths, that are worthy of high praise. The water-colour studies by the former of Indian life, on grey paper, remind one somewhat of the work of our own Lewis. Mr. Griffiths's oil pictures of Hindoo life are really fine, and they show what splendid material an artist who has a strong feeling for colour and the requisite amount of manipulative skill has in this wonderful country.\* The pictures, mostly portraits, by native artists, exhibit all that painstaking realism which seems to be the one thing aimed at by native artists, but they are wanting in all those qualities that make a painting a picture. The school of art work exhibited in the Canadian and New Zealand Courts is poor, there being hardly a creditable piece of work in the whole of it.

Leaving pictures, and coming to photographs by a natural transition, we leave failure behind and have undeniable success. Photography seems to have found a congenial home in all our Colonies, and European photographers cannot show better work, especially in land-

scape and out-door work, than even the younger of our colonies. It was natural this should be so, for having nothing but the camera to record matters of interest, they naturally sought to perfect their method, so as to make it yield the best results, and they have brought to bear upon the subject the same mechanical skill which is so strikingly exhibited in their agricultural and domestic machines. We in this country worked, on the contrary, from painting into photography, and the latter has not yet elbowed the former out of the field. We must take exception to those composite photographs exhibited by a Montreal firm, produced by sticking a number of separate photographs together, and painting in a background. This is not the sphere for photography but the province of the painter, and "The Skating Club at Montreal" with its hundreds of figures, and "The Tobogganning" picture, skilful as they are in one sense, are not pleasant possessions, we should imagine. We note a slight hardness and stiffness about some of the Colonial portrait photographs, which it is the aim of the best photographers here to avoid, and which it must be granted they do, but we say again that their out-door work is worthy the highest praise. Their climate, doubtless, helps them here.

We will next take a survey of the furniture exhibited, and in this department we are afraid we can find little for praise. Two Melbourne firms have fitted up rooms, and though, doubtless, the furniture is well made, the design of it would be considered here unworthy a second-rate house. There is a want of restraint and repose about all the Colonial furniture. They apparently do not understand the beauty of simplicity. The general lines are often faulty or bad, and to this they add meaningless and uninteresting ornament, which is as bad as gilding a painted lily. The furniture is heavy and massive, and yet lacks dignity. Grace and refinement apparently are qualities they do not deem essential in furniture. Their furniture, compared with the best of ours made now, leaves the Colonial makers a generation distant, and it is a pity that the best firms pay so little attention to the important,—all-important,—matter of design. The inlaid furniture exhibited in the New Zealand Court is bad.

But the worst features of Colonial furniture are to be seen in the pianoforte and harmonium cases in the Canadian Court. These instruments, with the souls of musicians (the tone of the harmoniums and organs struck us as particularly sweet and mellow) have the bodies of a very low type of animal indeed, and that is a pity, for such a defect could be easily remedied by getting designs for cases made out of the country. The spirit of the Colonists seems rather to be,—We do everything for ourselves

\* The two clever water-colours in this year's Academy attest this.



by ourselves. In some departments the Colonists are *facile principes*: there is, then, little merit in doing for yourself what can be done so much better by another. A harmonium with such a case as one we noticed, brown and shiny with varnish, and elaborately decorated with laid-on carving, common in character, could not be tolerated in a decently-furnished room.

It is evident that our Colonies have main practical requisites at hand for good furniture, viz., a countless variety of good woods and skilful and ingenious workmen. Graft on to this stock good design, and the result cannot but be satisfactory.

Scarcely any native-made china or pottery is exhibited, and what little there is, is of an ordinary description. A few ladies show what they can do in painted china.

Two Canadian firms exhibit some painted glass, both domestic and religious. A buffalo hunt, the subject of one panel, shows how impossible it is to overstep the limit the art imposes upon one without leading to the most disastrous results. If the Colonial work in stained glass is to be gauged by the examples exhibited (though not worse than some of our own firms produce), we trust that they are not filling their public buildings with it.

The Colonies come out strongly in silversmith's work, that is as far as quantity is concerned. Our own work in this department of industry is not of very high excellence, for the best sculptors find it too unremunerative to model and design for high-class metal work, and it needs a sculptor of very great excellence to produce work worthy to be compared to the best work of the fifteenth and sixteenth centuries, when silversmiths' work had a Cellini and a Holbein to design for it. Most silversmiths' work seems too pretentious, too ornate, too overlaid with cheap decoration to be good. The Queen Anne work which commands such high prices now is simple compared even to the work we produce, and simplicity is sadly absent in the Colonial silver-work. Tree ferns and palm trees in silver are about the highest flights the Colonials are capable of, and they occasionally introduce a figure or two (natives usually), and sometimes an ostrich or emu, whose eggs seem to be the nucleus of a good deal of the work exhibited. We must confess that among all the silver work exhibited not one single article arrested our attention by reason of its intrinsic worth, while much of it was, on the other hand, repellent. There are too many examples of misdirected energy, "of the industry without art," which Ruskin tells us is "brutality."

Colonials should take this opportunity of studying the Indian silver work. There is much they might learn from it.

There is a small collection of gold ornaments from the Gold Coast, which, rude as they are, have much more than is pleasant about them than the same class of British or Colonial work; for there is character and individuality in them, and a simplicity that is quite refreshing after silver tree ferns and palms. Our own jewellers might take an idea from it, for some of the brightly-coloured beetles' wings mounted in gold are quite as beautiful as gems.

Material prosperity, we have long since discovered, does not go hand in hand with culture and refinement. Good art can only be produced by a people who are keenly appreciative of the best, and it seems a pity that we English-speaking people should always have to wait until we have grown rich and luxurious, wait until material prosperity is at its zenith, before we think of making those things that environ us worthy of us as thinking beings with souls as well as bodies; for, during the interregnum, there is a mass of bad work produced which unfortunately long survives the occasion that gave it birth.

"A New Nail."—In regard to the new form of nail, which we noticed and gave a sketch of last week, we have received inquiries from one or two building firms as to where it is made or is to be had,—a matter on which we received no information.

#### THE NEW SORBONNE, PARIS.

**T**HE old Sorbonne at Paris, which, we may remind our readers, was the ancient cradle of theological instruction, and whose dicta had once all the authority of an oracle, was founded in 1250 by Robert de Sorbon, Canon of Paris, whose name has thus been perpetuated in the building. At first it was only a humble college for sixteen students. But St. Louis took the modest establishment under his royal protection, and among the chairs of theology so numerous at that time, that of the Sorbonne was soon the most celebrated. Its great extension dates from 1629, the time at which he who was surnamed "the Great Cardinal" became its principal. At a later date the French Revolution caused the absorption by the State of the property of this rich university, with which a royal decree of May 16, 1821, endowed the municipality of Paris, with the charge to preserve in perpetuity this chief centre of the faculties of literature, science, and theology. Thus it happens that the Sorbonne is now a municipal building attached to the State service. The expenses of reconstruction and management are divided between the State and the municipality.

The style of the ancient edifice is not without grandeur, but now that there is an inclination, and a reasonable one, to give a more agreeable and inviting aspect to the exterior treatment of university buildings, the old walls of the Sorbonne appear, in the light of modern taste, very severe and gloomy in expression.

The buildings surround a great rectangular court, at one of the extremities of which rises the celebrated church which contains the marble tomb erected in 1694, by Girardon, over the burial-place of Richelieu, from the designs of Lebrun. Though deprived of much of its once rich decoration, the nave nevertheless preserves considerable vestiges of its ancient splendour, especially the paintings by Philippe de Champaigne. The dome of the church is one of the best works of Lemercier, to whom is also attributed the old church "De la Visitation," now become a Calvinistic temple.

But we will not deal further with what was and what is no more, as we are concerned just now in speaking of what will be, and describing the disposition of the new buildings, the first stone of which was laid on the 3rd of August, 1885, and which is now in a tolerably advanced stage.

When the State and the Municipality decided to rebuild at their common cost the Sorbonne, which had become long since notoriously insufficient for its uses, the work was the subject of a very interesting competition in which twenty-eight architects took part, and in which M. Paul Nenot was the successful competitor. M. Nenot, a pupil of MM. Questel and Pascal, obtained the Grand Prix de Rome in 1877; and during his residence in Italy he also obtained the premium in the competition for the monument to Victor Emmanuel.\* The fact of his being a foreigner did not permit the Italian Government to entrust him with the execution of the work, of which we spoke in our account of last year's Salon.

The Sorbonne comprises, as we have said, the Académie de Paris, the Faculties of Letters, Sciences, and Theology, the University Library, and the Victor Cousin Library. These different departments, though related to one another, were, according to the programme, to be arranged so as to be independent; so the architect had to take into consideration the various needs of each of these departments, and to foresee and provide for their possible future growth and extension without mutual interference. One result of these conditions is that the project has been amplified since the competition, and that instead of the space of 19,776 square metres given for the competition, the actual buildings are to cover a space of 23,000 metres, bounded on the east by the Rue St. Jacques, on the west by the Rues Sorbonne and Victor Cousin, on the south by

the Rue Cujas, and on the north by the Rue des Ecoles, facing which is the principal façade, of which we give in this number the elevation, copied from a photograph of the original drawing, which has been kindly furnished to us for the purpose by M. Nenot.

In the centre of the façade five large arches give access to the ground-floor main vestibule. Above are five windows divided by engaged columns, each supporting an allegorical statue. The wings, as will be seen, are crowned by circular pediments enclosing bas-reliefs, which symbolise Literature and Science. On each side of this main block is a wing of five stories treated in a very simple manner, and the architectural design of this portion is returned along the side façades, which extend to a length of 230 metres.

Internally, a great staircase of twenty-five steps leads to a second vestibule communicating by long corridors with the various departments. This vestibule will be, in some sort, a grand antechamber to the amphitheatre of the Academy, which will contain 3,000 persons. This apartment, intended for university ceremonies, and especially for annual distributions of prizes, will have six tribunes in two stages, and a semicircular parterre. Above this, on the principal floor, will be the "Salle du Conseil Académique," and above that again the "Salle des Archives."

If from the main vestibule we turn to the left towards the Rue St. Jacques, we find the "Amphithéâtres de l'Enseignement libre," the Salles des Compositions, and the examination rooms, to which access is gained direct by the entrances situated in the buildings at the return angle of that street. The buildings situated to the right of the main vestibule are similarly arranged. The offices of the Académie de Paris will be in this quarter, towards the Rue de la Sorbonne. The apartments of the Rector and the Secretary of the Académie, situated on the upper story, will have their own entrances in the angle pavilion.

The Amphithéâtre de l'Académie has a staircase giving access at once to the public tribunes, which will contain 1,100 persons, and to the Salle du Conseil Académique. This large room, with the two committee-rooms and the dining-room adjoining, will form, on the occasion of official receptions, a suite of richly-decorated rooms, in which more than 3,000 persons can be easily entertained.

The literary department and the library of the Sorbonne will have their access direct from the Rue de la Sorbonne. The library will occupy the place of the church, which will thus find itself secularised while still preserving its character as a historic monument. The scientific department, extending along the Rue St. Jacques, will have its distinct entrances from that street and from the Place de Sorbonne.

Independently of the Victor Cousin Library, the University Library has to be in direct communication with the "Ecole des Hautes Etudes" which, in the new plan, occupies a considerable place. It must also be conveniently reached from the studies and lecture-rooms of the Faculty of Literature, of which it is the indispensable complement. This latter department, besides examination-rooms, will include lecture-rooms and five public amphitheatres of seat-room varying from 200 to 1,000. Six amphitheatres are included in the department of the Faculty of Science, and the Faculty of Theology requires two. There are therefore in all no less than twenty amphitheatres in the building, capable of containing about 9,000 persons, without counting the examination-rooms, which are also open to the public.

The building will cost about twenty-two millions of francs, of which the Municipality pays eleven millions. The buildings are being carried on with great rapidity, and as soon as each department of the public service has taken possession of M. Nenot's building, the other portions of the old Sorbonne will be successively attacked in order to substitute the new buildings, so as to cause no serious or general interruption to the regular work of the schools.

\* His design was illustrated in the *Builder* of July 1st, 1882.



The artistic decoration which it is intended to add to the new building claims a word. MM. Chartran, Benjamin Constant, and Flameng are, it appears, designated by the Ministère de l'Instruction Publique to execute the pictorial decoration of the reception-rooms and the Amphithéâtre de l'Académie. On its side, the Municipal Council has been called on to approve of a list of sculptors presented by M. Nenot, and who have been chosen from among the best representatives of the modern French school. Among the number are MM. Chapu, Mercié, Barrias, Dalou, Falguière, Luchet, Lanson, Crank, Marqueste, Hiolle, Albert Lefevre, &c. The sculptural decoration will comprehend, in the first instance, the two large pediments in the main façade, of which we have already spoken. Then there will be eight statues in the attic, over the columns, which will symbolise respectively, Physics, Chemistry, Natural History, Mathematics, Geography, History, Archaeology, and Philosophy. Internally, the main vestibule will be ornamented with two statues in stone personifying the Faculty of Letters and that of Sciences. Six other seated statues, placed in the large amphitheatre, will represent six eminent Frenchmen from among the ranks of science and literature. One other statue, on the great staircase, will personify the University of France; while in the vestibule of the Rector's department will stand the statue of "La Sorbonne" itself, executed in marble.

The foregoing rapid sketch will sufficiently indicate the practical and architectural importance of the building which is destined to change materially the physiognomy of the ancient "quartier des écoles." Some details may be open to criticism. In the principal façade, the mass of the first-floor story rather crushes the ground-floor design; a mistake in regard to balance of proportion which may be also charged against the new Opera House, and which the eighteenth-century architects have carefully avoided in the grand buildings of the Place de la Concorde. This does not, however, seriously detract from the merit of the selected design for the Sorbonne. The nineteenth century has no architectural style properly so called, and the majority of its monuments in France are borrowed from Renaissance or Neo-Greek. Without the pretension to be entirely original, M. Nenot has at least not reproduced in a servile manner any too common type; he has put the mark of his own originality on his work. Let us wait till the great mass of building forming the new Sorbonne has acquired the patine of age, and it will probably be regarded with respect as a building giving evidence of a masterly architectural talent in its plan and design.

## NOTES.

**T**HE memorial stone of the new Tower Bridge was laid on Monday afternoon by the Prince of Wales with due ceremony, and thus was formally commenced the work of bridging the Thames below London Bridge, a work which has long been needed, considering the increasing populations and myriad factories which line the river for miles below London Bridge. After long and wearisome discussions and inquiries, and not without some rivalry between the Corporation and the Metropolitan Board of Works as to which body should carry out the work, the Corporation a year or two ago obtained an Act empowering them to build a bridge across the Thames just eastward of the Tower. After much consideration of the needs of the wharfingers and owners having frontages between the site of the new bridge and London Bridge, a compromise has been arrived at by the decision of the Corporation to construct an opening bridge, on the bascule principle, so as to allow of the passage of shipping at certain times. The bridge, which will cost 750,000*l.*, is the joint design of Mr. Horace Jones, the City Architect, and Mr. J. Wolfe Barry, M.Inst.C.E. We will give some further particulars of the structure, with illustrations, in our next number, but must here congratulate Mr. Horace Jones, not only on his share in the

work, but on the narrow escape from injury which he experienced when making arrangements for the ceremony, as mentioned in the papers of Tuesday.

**A**T a special meeting of the Hellenic Society, to be held in the Rooms of the Society of Antiquaries, at Burlington House, on Friday next, at 4.30 p.m., the remains at Tyrins will form the subject of a discussion which is likely to excite a good deal of interest, as it will really be an exposition of the very opposite views of Mr. Penrose on one side, and Drs. Schliemann and Dörpfeld on the other. The two eminent German archaeologists are coming over to support their views. Mr. Penrose will open the discussion. It is very desirable that the questions which have been raised as to Dr. Schliemann's walls at Tyrins should be brought to some definite issue.

**T**HE discoveries made early in February on the north side of the Acropolis caused naturally a great stir in the archaeological world, but hitherto, though we have had abundant writing on the subject, no illustrations have been publicly accessible. We are glad to find that the widespread desire for fuller details has prompted Dr. Kabbadias, General Director of the Antiquities at Athens, to publish the discoveries in full. He has embarked in an undertaking on a very large scale, and which should be of the greatest value both to artists and archaeologists, *i.e.*, the publication of a work called "The Museums of Athens." The work is to consist of a number of heliotype plates by the well-known photographers the brothers Rhomaides; the descriptive text is to be entirely by Dr. Kabbadias, and is to be in modern Greek, French, German, and English; it is to appear in a succession of volumes, each volume is to have six numbers, and each number is to contain eight heliotypes. The subscriber binds himself only to take one complete volume. The first number contains an instalment of the recent discoveries. Though these recent discoveries and the sensation created by them have been the prime motive to the publication of the work, it will contain also every other piece of sculpture of importance to be found in the Athenian Museums. We hope that, as the volumes can be had separately, the published sculptures will be carefully classified under such heads as votive reliefs, sepulchral monuments. The work is to be published by Karl Wilberg, Athens. We hope shortly to notice the first issue.

**T**HE present age seems to become more and more prolific in big undertakings, and in proportion as the opportunities for carrying them out at home are exhausted, engineers have to seek them in every quarter of the known world. Three fresh ones have been either commenced or proposed within the last few weeks, the fields of labour being respectively Switzerland, Greece, and the Canadian Confederation. The Swiss scheme is that of an Italian engineer, Signor Agudio, of Milan, for making a way through the Simplon, which he declares he can do by a tunnel of only 6,050 metres, the whole of the traction being done by hydraulic power. He considers that by this means from 3,000 to 4,000 tons of goods could be safely transported, without any breaking up or transshipment of trains, while the cost of the entire line would be only 28 millions of francs. The second undertaking is of a rather more practical nature, and consists of the drainage of Lake Copais, near Thebes, in Boeotia, by which an area of 100 square miles will be added to the territory of Greece. Of almost more importance than the acquired land will be the doing away of one of the greatest hot-beds of fever and malaria that is to be found in the whole country, while the rivers which at present feed the lake are to be employed for irrigation purposes. Greece will be more benefited by such works as these than by any amount of wars. The most ambitious of the proposals is one to connect Prince Edward's Island with the Canadian mainland by a submarine railway

tunnel, and thus allow the ice-bound inhabitants of the island to come out into the world for a bit during winter. The distance is but six miles and a half, and the bed of the Northumberland Straits, which is the scene of the operations, shows no great engineering difficulty, the depth of the water being 36 ft. on the Prince Edward's side, 10 ft. 6 in. on the New Brunswick side, and 80 ft. in the middle. The actual tunnel, which is 18 ft. in diameter, is to be made of chilled white cast iron (non-corrosive in sea-water), with the sections bolted together with inside flanges. The cost of the whole is estimated at a million sterling, a pretty handsome sum for the accommodation of the 125,000 persons who inhabit the island. The scheme has, however, been well considered, and will be brought before the Canadian Parliament very shortly. Indeed, by the articles of federation, Canada is bound to do everything that lies within the range of possibility to keep up an open communication with her island clients.

**A**T the meeting of the Gloucestershire Archaeological Society held on Thursday, the 17th inst., the Rev. G. Butterworth, M.A., Vicar of Deerhurst, Tewkesbury, read a paper on the newly-discovered Saxon Chapel which has been described in the last volume of the *Builder* (pp. 712, 819). The conclusion to which the author arrives is that the building is probably a chantry chapel erected by the powerful Earl Oddo in A.D. 1056, and also that it is not unlikely that its erection marks the donation of the Manor of Deerhurst to Westminster Abbey, or, if Leland's statement is to be accepted (which is doubtful), to Pershore Abbey. It is to be hoped that the Society will publish Mr. Butterworth's paper, as it will form a valuable pendant to an exhaustive essay which it is about to print on Deerhurst Parish Church, written some years ago by Mr. J. C. Buckler, which exists among the MSS. at the British Museum, and has never yet been published. The newly-discovered chapel has been already repaired to some considerable extent. In the nave all the modern windows have been filled up with masonry, and the original north entrance has been opened and repaired. The proportions of this entrance are curious, the opening being 8 ft. high, but only 2 ft. 8 in. in width. As the upper portion of the chancel walls is lost, the room which rests on the lower parts of these walls will remain.

**T**HE Berlin Antiquarium has recently received an odd, and so far as we are aware, unique addition, in the shape of a bronze votive frog. There is no doubt about the creature's sacred purport, for on his back is inscribed in large and fairly well preserved letters, his dedication, "Ἀμὼν Σωνίου Βοδάωυ," "Amon, the Son of Sonios, to the Loud Cryer." This inscription has its special epigraphic value, because the letters are Corinthian of about the first half of the fifth century B.C. Corinthian inscriptions of this date are rare. The question naturally arises what god can be addressed as ὁ Βοδάωυ, the Loud Cryer, and why does he receive this tribute of a votive frog? Dr. Fränkel, of the Berlin Museum, thinks the Loud Cryer is undoubtedly Apollo, the clear utterer of omens. There was a famous frog in ancient times, own brother to the Berlin one, consecrated by Cypselos of Corinth to the Delphic Apollo: even in Plutarch's days its connexion with the god was matter of dispute. We need not revive the "Sun frog," who, Mr. Andrew Lang somewhat confidently hopes, has "sunk for ever beneath the western wave." Rather we should be inclined to think that the frog was associated with Apollo for the same cause as the raven, because he was the typical croaker. His tongue, we know, was possessed of magic power; if torn out and laid on the heart of a sleeping woman it compelled her to answer truly to every question. Or was the frog a Totem animal, as perhaps the sacred Smithian mouse? We leave these matters to those they concern,—the mythologists. Anyhow we are sure that the epithet Βοδάωυ



was meant as complimentary. To be *βοήθη* *ἀγαθός*, good at a shout, was for the oracle god a very desirable qualification.

WE are glad to find that the Trustees of the British Museum have provided a convenient lecture-room near the gallery now occupied by the remains of the Tomb of Mausolus at Halicarnassus, discovered by the late Keeper of the Greek and Roman Antiquities in the British Museum, Prof. C. T. Newton. This lecture-room, although not yet finished, was used for the first time on Tuesday last, when Mr. J. A. P. MacBride delivered the fifth of his present course of lectures on sculpture. The lecturer dealt with the works of the Greek sculptors subsequent to Pheidias, principally speaking of those of Polykleitos, Lysippos, and Praxiteles. He referred to the great industry of one or two of these sculptors,—an industry which he said he could not but regard as in some degree fabulous or legendary. It was recorded of Lysippos alone that he produced 1,500 works, many of them groups, and nearly all containing figures not less than life-size. If so great a number of works was justly attributable to him, he must, the lecturer thought, have had a large number of assistants. Referring to the Hermes of Praxiteles, he said that although it was a very fine work, marvellously executed, the surfaces were too lumpy or knotty,—there was too ostentatious a display of anatomical knowledge on the part of the sculptor, and too much adiposity in the figure, while the child held in its arms, the infant Dionysos, was a mere doll. It was a curious point, Mr. MacBride said, that in the whole range of Greek sculpture, as it was known to us, there was scarcely one satisfactory representation of babyhood. The Venus of Milo, he thought, could not, when compared with the Hermes just referred to, be regarded as the work of Praxiteles, as some believe; it was altogether different. As an old artist, he had little hesitation in saying that the Venus of Milo was better than the best work of the ablest disciple of Pheidias, viz., Praxiteles, and was not unworthy of Pheidias himself. The lecturer criticised the Venus de Medici as having too small a head, and he commended Mr. Murray for exhibiting it without the arms, which had been very badly restored. The first part of the lecture was given in the new lecture-room, and the lecturer afterwards conducted his audience to the galleries, and recapitulated, in front of the various statues or casts referred to, the points which he wished to emphasise. Mr. MacBride is clear and painstaking as a lecturer, and enlists the close attention of his hearers. His concluding lecture of the present series will take place on Tuesday next.

WE certainly live in an age of constant and rapid change in matters of taste; the change is, of course, not always in the right direction, but, on the whole, a very real and substantial improvement is evident. This reflection is perhaps not very fresh, but it occurs again after a visit to Messrs. Collinson & Lock's new show-rooms in Oxford-street. When we reflect upon the age of ornolu, or upon the heavy Gothic style which succeeded it, when a stop-chamber was the symbol of artistic salvation, or even when we remember the cut brackets and rows of plump little balusters, that but yesterday, as it might be, were hailed as high art, our hearts are filled with gratitude for the delicate cinque-cento ornament and the light and luxuriously-comfortable furniture which our decorators and upholsterers, following the lead of our architects, now give us. Messrs. Collinson & Lock, without pretending to make it a speciality, seem to be particularly successful with this cinque-cento ornament. We saw nothing of the kind in their rooms that was not both well drawn and in good taste, whether in carving or in marqueterie or in their fibrous plaster. They also show a good deal of "fitted furniture," good both in design and execution, and which we hope may help to persuade the public to adopt it more generally. There is nothing like fitted furniture for increasing accommodation in small rooms, and

for preventing those unhealthy and untidy accumulations of dust which cannot be prevented from occurring on the tops of, and below and behind, heavy pieces of movable furniture.

A VOLUME of "Picturesque Sketches in Italy," by Mr. Daniel Brade, F.R.I.B.A., is to be published shortly by Mr. Batsford. It will contain 28 drawings, about half of them in illustration of Rome, and most of the rest of Venice. The specimen plate forwarded to us,—a view of St. Peter's,—photo-lithographed from a pen drawing, would have been better if the author had been more reticent of lines and shading; the effect is rather scrambling and obscured. That St. Peter's does not show its scale is perhaps the fault of St. Peter's.

IN last week's number of the *Church Times* occurs a critique on the Liverpool Cathedral designs, amusingly indicative of the attitude of the clerical mind towards church architecture. The result of the critic's reasoning is, of course, a foregone conclusion. Messrs. Bodley & Garner's design is the best one, because theirs is the closest imitation of English Mediaeval architecture. That is the argument, divested of verbiage. Mr. Emerson (whose name the critic cannot spell rightly) is, of course, dismissed with scorn for having suggested new ideas in a cathedral. However, the design, we are told, "has found favour with the critics of the building trade," which is apparently the *Church Times* view of the architectural journals.

WE learn that President Cleveland has accepted the honorary presidency of the American Exhibition to be held in London in 1887. To this news is added the curious announcement that the President "will perform the opening ceremony by telegraph from the White House." This is certainly a novelty in the application of the telegraph, and perhaps a hint of what the perfecting of telegraph and telephone may bring the world to in time. There will be no occasion to change one's geographical situation to take part officially in any ceremony. But it will be rather dull. Men like to see each other's faces after all.

#### ARCHITECTURE AT THE ROYAL ACADEMY.

##### CONCLUDING NOTICE.

TURNING to the more decorative portion of the drawings in the Architectural Room, we may take first those which come under the head of wall decoration, leaving stained glass and purely decorative work to be considered afterwards.

1,556, "Additions to Milton Hall, Cumberland," Mr. C. F. Ferguson. A small elevation of what looks like a bit of old wainscoting, or else it is coloured so as to give that idea, with a red marble fireplace inserted in the centre portion, and a delicate gilt wall-paper above. There is what is apparently a modelled plaster panel above the fireplace portion of the wainscot; what are the precise "additions" there is nothing to show.

1,565, "Design for Morning-room," Mr. Christopher Gill. A Renaissance design, with dark wood pilasters and broken cornice enclosing the fireplace and mantel, similar wood dado, and cabinet and door, the dark ground lined with lighter material in inlay, wall in panels of flowered paper with a gold ground, enclosed by a darkwood architrave. The frieze is apparently plaster, modelled in relief, of a low drab tone, connecting the gold of the walls with the white plaster cornice above. Harmonious, but rather suggesting a dining-room than morning-room: somewhat too strong and decided in effect for a morning-room.

1,581, "Design for a Frieze in Glass Mosaic," Mr. Jas. Ward. Nondescript birds (we have no objection to their being nondescript,—rather like them the better for it) with dark blue necks and light blue bodies, perched on coils of artificial branches, and divided, each pair, by a six-pointed star panel with lighter ground, containing a conventional flower with three open blossoms. Elegant in

design and rich and well-balanced in colour; a very pretty piece of work.

1,590, "Proposed Decoration of Ball-room, 8, Chesterfield-gardens," Mr. Henry G. Liley. Very well executed drawing, but rather commonplace both in design and colour. Apparently a natural wood tint in the woodwork, which forms pilasters against the wall, the enriched caps of which are carried along as a string, leaving a kind of attic with consoles and panels over. The wall a light blue with a white foliage diaper. A cheerful-looking room it would make, which is one object in a ball-room, but it belongs only to the A B C order of design.

1,599, "Design for a Hall and Staircase," Mr. Lewis P. Grace. Perhaps this should hardly be classed with decorative design. It is really a coloured perspective of an interior, with nicely-designed and proportioned woodwork, and a large coved cornice divided by timber ribs into panels of dark blue, on which are devised gilded scrolls and tendrils and leaves, which are much too large, and reduce the scale of the whole. The treatment of this cove spoils the interior. The Turkey carpet on the floor is a silent rebuke to it.

1,666, "A Lady's Sanctum and Private Reception Room," Mr. W. F. Randall. Plan, elevations, and ceiling. A charmingly-planned little room with two recesses, screened off by columns, containing sofas and divans. The room is completely wainscoted, with heavy carved columns at intervals, rising from the subbase line; the wood rather dark in tone, with a painted frieze of figures in which gold and rich browns predominate. The effect is somewhat sombre, but rich and reposeful, and to be noted as a variation from the conventional idea of a lady's boudoir, which is currently imagined to be a place of mere prettinesses and light airy tints. The ceiling, panelled, with gold in the panels, is rather heavy, but not out of keeping with the room, perhaps. It would take a woman of a certain dignity of presence to properly occupy such a room, to be in harmony with the surroundings. If it is an executed work for a client, perhaps this has been considered.

1,721, "The Drawing-room at 29, Chesham-place," Mr. G. Aitchison, A.R.A. A symphony in blue-green and gold, with an architectural *cadre* of white touched with gold, round the alcove in the centre. The upper part of the alcove is gilt, plain gilt; below, a blue-green wall, with a white-flowered frieze, and a dado of a darker and more decidedly blue tone. The adjoining walls are a more delicate shade of the green, over which gilt sprigs wander. The darker colours of the dado are repeated in the cornice. So far, this is a delicate scheme, interesting because fugitive and somewhat evasive in regard to colour, tempting the eye to pause and consider; but why this violent intrusion of mahogany polished doors (are they not?) with plate-glass panels in them? They do not seem to belong to it; they have no right there; or were they perhaps rather there already in possession, and had to be made ashamed by the delicacy of their surroundings? Anyway, it is an odd combination. The ceiling above (1,722) is pretty, divided into three panels by white soffits, illustrated with flower-sprigs and gilt lines, the panels having foliage and small figures on a gold ground, with a darker strip to separate the gold and white. It goes well with the wall-design; but then—good heavens! those doors again.

1,725 and 1,732, "Decoration of Ceiling and Auditorium, Theatre Royal, Lyceum," Messrs. Campbell & Smith. Theatre decoration seems always to upset the *morale* of the decorator. Something licentious seems to be expected in such a case. The design in this case is a good reproduction of a certain type of Italian Renaissance ornament; panels with pictures spotted about, and the interspaces filled in with Cupids and ribbons and thin festoons wound about. We do not call this really design. The general effect is "festive," which is probably what was wanted.

1,740, "Decoration of a Room," Mr. Henry G. Liley. A symphony in browns, drabs, and blue. Very neat drawing; no thought or fancy either in colour or design.

Among stained glass and other decorative design we find,—

No. 1,554, "Design for Memorial Window, Hythe Church, Kent," Messrs. Heaton, Butler, & Bayne. A small drawing showing good figure-drawing and colour, but not giving the character of stained glass; the left-hand com-



partment in particular is a regular picture, with a long vista of perspective, and distant figures.

1,563 and 1,573, "Windows on North and South Sides of St. Botolph's Church, Aldersgate"; Messrs. Ward & Hughes. Low segmental arched windows, representing scenes from New Testament history and parable, in what may be called decorative paintings, sufficiently on one plane, with decorative borders enclosing them. No lead lines are shown, except in the borders; so that we are left to suppose that they may be enamel painting on glass, and not stained glass proper. The style of design better suits this idea. The groups have a good deal of spirit and expression, and are perhaps the right sort of thing for a church where they may appeal to the uneducated eye; from our point of view, they are rather too pictorial for windows; they would do better as wall-paintings.

1,584, "Design for Window over Font, St. Vedast, Foster-lane," Messrs. Heaton, Butler, & Bayne. A design, with a frame of Renaissance architecture to suit the style of the church, and a group within it of Christ inviting little children, in the well-known sentence. The general effect of the design is decorative, as that of a stained-glass window should be; but there seems an odd sort of effort to steer halfway between realism and conventionalism, in the half naturalistic treatment of the tree and the grass and flowers; and then there is the distant background and coast-line. This is only doing badly what a painting could do much better. If people would only find out what stained glass is really fitted to do best, and stick to it, they would be more likely to produce work worth general admiration; but too many stained-glass designers seem to have an immoral wish to make the best of both worlds; they know they must conventionalise to some extent in such a material, and then they compound with the popular mind by getting in as much realism as they can manage.

1,614, "St. Nicholas, Cole Abbey," Mr. G. H. Birch. A decorative scheme for part of the church, with dark red columns and apparently stained windows between, with a generally rich effect, but hung too high to make out anything of the details.

1,633, "Design for an Eight-light Stained Window, Illustrating the Creation and the Deluge," Mr. W. F. Dixon. One could have formed a better idea of the decorative effect if the tracery had been drawn out and coloured, instead of being left blank spaces. The drawing is, in the lower part, a series of small figure pictures in water-colour, of considerable merit, and promising a good general colour effect. In the upper or tracery portion of the window the small lights are occupied with emblematic figures, rays of light, &c. The author seems to have borrowed from Mr. Burne Jones the notion of angel figures holding circles with emblems of the days of Creation.

1,681, "Design for an Advertisement Placard of the Guardian Fire and Life Assurance Company," Mr. E. J. Poynter. A richly-coloured Ionic Greek shrine, with a blue-robed figure of Minerva standing in the centre, is surrounded by imitation columns (gilded) and a wood architecture, of the type and proportions derived from ancient vase painting. The lettering is given in irregular writing, according to antique custom, part of it appearing as cut on the marble pedestal of the Minerva, and part as executed in mosaic on the side pedestals. This kind of imitation of materials and processes does not seem to us a correct principle in decorative design. The effect of the whole is gay and brilliant, but not very harmonious.

1,717, "Sketch Design for Domestic Window in Grisaille and Colour," Mr. Lewis F. Day. Now this is a real stained-glass design. Side panels filled with conventional figures running into foliage, all treated in the broad manner suitable to the material; low tones are used here; the centre panel is "a note in red," apparently representing demons dancing. Without caring particularly for demons, we commend the design to notice as a piece of pure stained-glass effect. We may say the same of No. 1,718, by the same hand, a sketch design for a clearstory window in mosaic. This is a capital bit of purely decorative design—a centre with scroll foliage in two tones of blue, with greens intermixed; a lighter-toned border of more severely conventional type enclosing it. These are real windows, not paintings applied to window decoration.

1,719, "Design for Stained Glass Window,"

Mr. J. G. Bromilow. A small one-light window of the Flight into Egypt, very good in tone, and more decidedly stained glass in style than a good many others. It is hardly necessary, however, to emphasise the fact that glass is led in by carrying the lead lines so defiantly across and in opposition to the architectural lines of the canopy.

1,723, "Design for a Window," Mr. H. W. Lonsdale. This, again, is a piece of real stained-glass design; no realism of any kind. White-robed figures are intertwined among scrolls, apparently in the "Adoration of the Lamb." The central shrine with the Lamb is much too naïve for our taste; but the general effect is unquestionably good.

1,724, "Pomona: Design for Stained Glass," Mr. G. Parby. A Classical stained-glass window is not very common, and in this the figure is a pretty one, and some of the border-work very pretty and gem-like, but the perspective of the architectural entablature mars the effect. Stained glass should look flat; it is ridiculous to put in a perspective entablature which must obviously be out of the window at one side or the other.

1,725, "Design for Memorial Window to Lady F. Chaplin," Mr. Ion Pace. A little one-light drawing, with a portrait figure, and a small scene underneath, which looks like the stoning of Stephen, though it is difficult to see the connexion of that with the object of the window. A good stained-glass style, perhaps rather over-emphatic in colour.

1,727, "Design for Aisle Window in St. James's Church, Yarmouth (Isle of Wight)," Mr. Charles Hardgrave. Excellent as a piece of stained-glass effect. A two-light (false) window, with central figures of David in one light and Isaiah in the other, with jewelled backgrounds; the rest of the window filled in with architectural canopy-work and angels, with small pictorial subjects underneath. The mild old man who does duty for the fiery Isaiah is intellectually ridiculous, but then one does not expect stained-glass artists to rise to the intellectual conception of a character; if they rise to the proper style of putting a figure on stained-glass at all, that is wherefore to be thankful. Stained-glass figures are usually dummies, and these are no exceptions, but the decorative effect of the whole is very good.

1,733, "Design for Large Screen in Wrought and Chiselled Iron: subject, 'Peace,'" Mr. John J. Shaw. A fine bold piece of Renaissance design, apparently partly inspired by the work of the author's namesake, the Shaw of the Hampton Court ironwork: figures, interspersed with bold acanthus foliage. We wish the designer, however, had kept purely to this conventional type of foliage, instead of mixing apples and festoons and other baubles with it.

1,734, "Design for Stained Glass, Upper Stondon Church, Beds," Messrs. Shrigley & Hunt: very pretty, and true stained-glass work. Faith, Hope, and Charity, in a three-light window; no absurdities of background or landscape, the figures in fine, freely-treated draperies, with darker drapery backgrounds, over which angels with wings crossing fill up the space. We do not quite like the marked horizontal line formed by the top of the draperies behind the figures; but in general it is a good and artistic window.

1,737, "A Toilet Set; Hand Mirror, Trinket Tray, and Casket," Mr. W. G. B. Lewis. The casket is the best part of the work, the open tracery panels very well designed; the griffins or lions which form the feet are too light and flimsy in character for the style of the rest. The trinket-basket stands on a block of realistic rockwork, which we dislike exceedingly.

1,741, "Design for East Window of St. Edmund's Church, Lombard-street," Mr. C. Hardgrave. Rather strong in colour, but showing a true perception of what stained-glass is for; the design being a crowd of angelic figures and rays of light, &c., entirely ideal and conventional. The subject appears to be the adoration of the saints and elders, from the book of Revelations. We do not like the smoke from the censers; it looks like so many balloons in process of inflation. But in the main the window is a fine bold idea, in the right direction.

1,741, "Design for a Reredos," Mr. P. H. Newman. In the centre, St. Michael as a celestial housemaid, sweeping up Satan; on each side angels kneeling to see that she does her work properly; and behind, cherubs' heads on a counterpane. A remarkable little work.

1,747, "Design for Five-Light Window," Mr.

E. T. Taylor. Illustrating the passage, "Verily I say unto you, inasmuch as ye did it unto one of the least of these," &c. A very good subject for a window, recalling Flaxman's series entitled "Acts of Mercy." The groups of figures are well designed, and the whole character of the window decorative and suited to stained glass, as far as design is concerned; but the colouring seems rather dull and muddy, and this effect is, perhaps, increased by the employment of gold for the dividing mullions. In execution the window might look clear enough in colour, but the drawing does not convey the idea of stained glass.

Among drawings which are illustrative only, and which we have omitted to notice, may be named, "Old Church of St. Nicholas, Boulogne-sur-Mer" (1,589), a good, clear water-colour drawing, a little dull in tone, by Mr. R. J. Cornwell Jones; "Farnese Palace" (1,618), by Mr. E. l'Anson, a drawing of one of the interior courtyards; "San Michele, Pavia" (1,678), a view of the east end, by Mr. E. G. Hardy, and (1,715), the north and south transepts, by the same hand. The collection also includes Mr. G. H. Birch's original water-colour elevation for "Old London," an interesting record of a work which has excited much public admiration, and which was, we believe, prepared on very short notice by a *tour de force* in the burning of midnight oil.

#### ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE concluding ordinary meeting of this Institute for the present session was held on Monday evening, Mr. Edward l'Anson, F.R.S., President, in the chair. There was a very large attendance including Sir Frederick Leighton, P.R.A., Mr. Charles Garnier (Recipient of the Royal Gold Medal), M. Paul Sédille (Vice-President of the Société Centrale des Architectes, Paris), and Mr. Richard M. Hunt, of the United States (Hon. and Corresponding Member).

#### Obituary.

Mr. William H. White (Secretary) announced the decease of Mr. Edward Hughes, of Huddersfield, Fellow.

#### Books: The Late Mr. Fergusson.

Mr. White.—I have also to announce a long list of donations from members of various societies, and from others, and I have to formally inform the Institute of the bequest made by the late Mr. James Fergusson. The terms of the will are as follow:—"I bequeath to the Royal Institute of British Architects such works as they may select from among the architectural books in my library, not being duplicates of those already possessed by them." (The books, 140 in number, were exhibited on a table.)

Mr. Hansard (chairman of the Library Committee) drew attention to the fact that this bequest had been made under somewhat peculiar circumstances. Mr. Papworth and he, with the assistance of the Librarian, had gone through every book in Mr. Fergusson's library, choosing those which the Institute did not possess.

Mr. Charles Barry, F.S.A., wished to know whether it was the intention of the Council, and specially of the Library Committee, to record the name of the donor upon these valuable gifts? It was most desirable that this should be done, not only as a recognition of the value of the gift itself, but as an encouragement to those who were able, like Mr. Fergusson, to be more or less generous to the Library.

Mr. Hansard replied that a special book-plate would be designed and planted in each book. The Council had also decided to have a new book-case to contain these and other works which the Library might receive.

The President.—We can hardly exist as a useful institution without occasional donations of this sort. We have recorded this evening the gift of a singularly valuable addition, and I presume it will be your pleasure that we pass a vote of thanks to the executors of the late Mr. Fergusson, and the other donors of the works which the Secretary has announced.

The vote was passed by acclamation. Mr. J. Macvicar Anderson.—Sir, it will be gratifying to the meeting, I am sure, to be informed of the appreciation with which the late Mr. Fergusson's memory is held in other



lands besides our own. I therefore crave your permission to read a letter we have received from the American Institute of Architects:—

"At an adjourned meeting of the Board of Trustees of the American Institute of Architects, held at its office in the Welles Building, 18, Broadway, New York, on the 21st of May, 1886, the following report was received and unanimously adopted.

(Signed) A. J. BLOOR,  
Trustee and Secretary, *pro tem.*

"To the Board of Trustees of the American Institute of Architects.

Gentlemen,—Your committee nominated to prepare resolutions expressive of the loss sustained by the profession and the Institute in the death of their late Honorary Member, James Fergusson, the eminent and learned historian of architecture, would respectfully submit the following:—

The Board of Trustees of the American Institute of Architects in recording the decease of a late Honorary Member of the Institute, Mr. James Fergusson, F.R.S., M.R.A.S., F.R.I.B.A., &c., &c., desire to express their high estimate of his eminently valuable and productive labours in the field of historical architectural criticism, and of his profound and extended researches into the origin and development of architectural styles. His grand work on East Indian architecture stands unique, and will always be a mine of wealth for future investigators. His

"History of Architecture," developed from his previously issued Handbook, forms the highest authority on the subject for English-speaking architectural students and connoisseurs, while these and his many other architectural writings, published during an active career of authorship of forty years, all attest the depth of his scholarship and his earnest devotion to the cause of good architecture—a devotion which those who were fortunately brought into contact with the man found to be as sincere as it was enthusiastic. Much of the modern catholic and sympathetic appreciation of the beautiful peculiarities of each style is owing to his teaching, and the influence of his work is felt in all directions by the present generation of architects.

A most notable fact in connection with Mr. Fergusson's long and highly honourable career is that he was not educated to architecture, either as a practitioner or an amateur, but to mercantile pursuits, and that he voluntarily gave up fine prospects in this direction for the sake of devoting himself to the disinterested study of architecture, and to the literary elaboration of the history of its form. The profession, while deeply mourning his loss, should feel grateful that he was yet spared to an advanced age, while retaining in its behalf, and in that of the cultured public, the full vigour and active use of his faculties to the end.

Resolved that the above be forwarded to the *American Architect*, and also to the Royal Institute of British Architects in London, for such publication as the latter may think proper.

(Signed)  
A. J. BLOOR,  
F. L. Le Brun, } Committee.  
Welles Building, 18, Broadway, New York,  
May 21st, 1886."

#### Distinguished Visitors.

Mr. Anderson continued,—Sir, it is our custom at these meetings to introduce formally to you, as President of the Institute, any members who attend for the first time since their election. We are honoured to-night by the presence of a distinguished *compère* from France, who, in the course of this evening's proceedings, will receive at our hands such honours as it is our happiness to ask him to accept. And we have amongst us a gentleman who happily unites in his own person the land of his education, *La belle France*, with the land of his achievements, America: I refer to Mr. Richard M. Hunt. Mr. Hunt's works are well known to most of you. He entered the Ecole des Beaux-Arts in Paris as a student, and on his return he was offered the position of one of the Government Architects. This he declined, and he has since prosecuted a very extensive practice in the United States. It would ill become me to refer in his presence to his many large and notable works; I will only express the gratification it is to us, and I think it must be to himself, to have bestowed upon him the rank of an Hon. Corresponding member of the Royal Institute of British Architects.

Mr. Hunt (who met with a very cordial reception on his admission by the President) said:—Mr. Chairman and gentlemen, I have to thank you for the honour you have done me. All such honours, I know, are accompanied with corresponding obligations, and it will be my sincere endeavour and duty to perform them so that I may carry out the trust to your satisfaction. I did not expect to be called upon this evening, and was rather taken aback as I came into the room; but, at the same time, if you will allow me, I would express my sincere thanks for the universal kindness that has been shown by all my fellow colleagues and brother architects both in England and on the Continent. I must also express the sincere thanks of the whole confraternity in the United States for the expressions of regret and sympathy that have been made by this Institute on learning of the death of Mr. Richardson, which has been an immense loss to our country.

Mr. G. J. Martin (Government Architect of Bengal) was also admitted by the President.

Mr. R. Phené Spiers then read the following letter he had received from Mr. Henry Irving with regard to the late Mr. Richardson:—

"Lycium Theatre.  
Dear Sir,—It was with very deep regret that I heard of the death of poor Richardson. My acquaintance with him was necessarily limited, as our only opportunities of meeting were during my brief stay in Boston, but from the moment we met I am glad to say that we felt as friends. I bear in most pleasant remembrance an afternoon which I spent with him in his delightful house at Brookline. I was much struck with his great energy and grandness of purpose. A few such men in a generation mould the artistic destinies of a country, and it seemed to me that he grasped in the hollow of his strong hand two series of facts widely distant,—those concerning the needs, and those concerning the possibilities, of a marvellously growing land. He has built monuments of his power in his church at Boston, in Back Bay, which struck me with renewed admiration every time I saw it; in those beautiful arches of the State House at Albany; in his building at Cambridge; and in those colossal works for Pittsburg, on the drawings for which he was engaged when I visited him. But more even than these things was his work for the nation in the school which he was founding, by gathering round his own studio the young men of bright promise, whom I saw and whom I say that my deepest sympathy is with Mrs. Richardson and their family in their affliction, as is that of each and all of their friends?—Believe me, dear Sir, yours very faithfully,  
HENRY IRVING.  
R. Phené Spiers, Esq."

Presentation of the Royal Gold Medal to  
M. Chas. Garnier, of Paris.

The President then said:—

Gentlemen,—We are met together this evening to perform an agreeable duty, the most important part of which is to present the Royal Gold Medal for Architecture, the gift of Her Most Gracious Majesty the Queen, to the chosen recipient for the year, M. Charles Garnier, whom we have the great satisfaction of seeing amongst us (applause).

Most, if not all, of the gentlemen I have now the honour to address are acquainted with the Opera House of Paris. Still it may not, on this occasion, be uninteresting to recall that grand work to our minds. None of our theatres at all approach it in magnitude or magnificence, for it has a

Superficial area of (37,317	Mètres.	Cube
English feet) .....	11,337	—
And cubical contents of ...	—	428,660

Whilst the comparative area and cubical contents of the Opera Houses of Vienna, St. Petersburg, and Berlin are as follow:—

	Mètres.	Cube
	Mètres.	Mètres.
Opera House of Vienna ...	8,567	222,777
" St. Petersburg ...	4,500	114,288
" Berlin .....	1,891	35,000

The number of seats the French Opera House contains is 2,156; the width of the façade is 70 metres (230 English feet); the greatest width of building, 124 metres (408 ft.); its height above the ground level equals 56 metres (184 ft.); and from the foundation to the summit it attains the great height of 81 metres 60 centimetres (266 ft.). I might give further particulars, such as the size of the magnificent staircase, of the *ante-foyer* and the *foyer*; of the splendour of decoration in marble and mosaics, in painting, in sculpture, in bronze; but my object is simply to call your attention to the real importance of this truly magnificent work, which, since its completion, has been accepted as the model for all similar monuments erected in Europe. There are others which, no doubt, vie with and even surpass it in costliness of material, such as the St. Isaac's Church at St. Petersburg, the Medici Chapel at Florence, but there are none which in my recollection combine so much artistic work with such costliness of material.

No less than fifteen eminent painters, fifty-six eminent sculptors, besides nineteen sculptors of ornament, were engaged on the external and internal decorations.

The construction of this great work occupied thirteen years, which, considering that the Bourse of Paris, a very much smaller building, occupied nineteen years, is but a short period for such a work. M. Garnier gave his entire and unremitting attention to it, and, aided by several zealous assistants, produced the prodigious number of more than 30,000 drawings (applause).

Gentlemen, it is M. Garnier's rare fortune to have been the architect of one of the grandest and most original buildings of our time, under circumstances which (having reference to the

very rare occasions when our Government subsidises or undertakes works of public utility, but when all that with us emanates from private enterprise) do not occur in England. It has also been his good fortune to live and practise in a country,—in that great city which is aptly called the modern Athens, where art in all its branches is keenly appreciated by the public, and, moreover, is substantially acknowledged by the State,—where the national appreciation of operatic performances is evinced by the noble theatre which the liberality of his fellow countrymen has enabled him to erect.

There is also a reason for emphasising our welcome of M. Garnier. He comes to us in a high representative character, and perhaps on this account, gentlemen, I may be permitted to express your pleasure as well as my own at seeing here this evening Sir Frederick Leighton, P.R.A., our illustrious chief of the arts in this country. M. Garnier is not only a great architect, but this year, in France, he is the chief of the arts of painting, sculpture, architecture, engraving, and musical composition,—the President of one of the five academies which compose the Institut National de France. He represents and illustrates, in a practical as well as a moral capacity, an academic system older and more extended than our own, and he has profited by a method of education peculiar to the French people and eminently national,—a method, to say the least, which is more careful in its character and aims than is our own. A pupil in the atelier of Hippolyte Lebas, who was an Hon. Corr. Member of our body in 1835, M. Garnier was received as a student of the Ecole des Beaux-Arts in 1842, and he obtained, at the early age of twenty-three, the *Grand Prix de Rome* for Architecture. Thereby he earned the right to be received for four or even five years at the Académie de France at Rome, as the Government student. During that period he was enabled to visit the principal cities of Italy, and to make a prolonged stay in Greece. His studies of ancient buildings and of their remains were duly sent to Paris and approved. In 1852 his admirable restoration, consisting of fourteen drawings, of the Temple of Jupiter Panhellenus at Egina, was finished, and it has since been published, at the cost of the French Government, in the great work entitled "Restaurations des Monuments Antiques par les Architectes Pensionnaires de l'Académie de France à Rome depuis 1788 jusqu'à nos Jours," and still in progress. Though he returned a short time afterwards to France, it was not until 1861, at the age of thirty-six, that he commenced the labours of his more mature professional life. Elected in 1874 one of the eight architect-academicians pertaining to the Académie des Beaux-Arts, he has been just called to the presidency, it being this year the turn of the Section d'Architecture to preside over those of Painting, Sculpture, Engraving, and Musical Composition.

M. Garnier, Sir, having reference to your past career, to the fact that you obtained in your early years the "Grand Prix" for Architecture, that you have since distinguished yourself in Greece, Rome, and other parts of Italy, and that the great work of the Opera House at Paris was the honourable result of a double competition with other distinguished architects practising in your artistic city, and that you moreover fill the position of President of the Académie des Beaux-Arts: this Institute, having these facts before it, came to the conclusion that we could not more appropriately show our appreciation of your distinguished career, and of the great work you have carried out, than by recommending our Sovereign to confer this Medal upon you; and I am sure it must be gratifying to you to know that, in this honour, your name will be henceforth associated with the names of those of your countrymen who have been recipients of the Medal: with Jacques Ignace Hittorff, in 1855; Jean Baptiste Lesneur, in 1861; Eugène Emmanuel Viollet-le-Duc, in 1864; Charles Texier, in 1867; Joseph Louis Duc, in 1876; and the Marquis de Vogüé, in 1879,—all but the last-named being now deceased.

Sir, it remains for me to say, in placing this medal in your hand, that it affords us the greatest pleasure to welcome you here on so interesting an occasion as the present, and I esteem it a great privilege that, in virtue of my official position as President, I am permitted to present to you this medal, which, on the recommendation of this Institute, our most gracious



Sovereign, of her royal bounty, allows us annually to offer to some distinguished architect or man of science, of any country, who by his labours has tended to promote or facilitate the knowledge of architecture or the various branches of science connected therewith (applause).

And now, gentlemen, for myself, if I may still trespass a little longer on your attention, I will add that I have, from my youthful days, been a warm admirer of modern French architecture, particularly that of Paris, of which I have naturally seen most, and my study and appreciation of which has, I think, sensibly and beneficially influenced many of my own works. I have, moreover, very personal reasons which invest France with a sentimental interest for me; the best part of my early education was received at the Collège Henri IV. at Paris, and I have enjoyed, in that interesting land, the recreation of my middle life, visiting its provincial cities, studying its grand cathedrals and municipal buildings of the Middle Ages. It affords me, therefore, exceptional pleasure to welcome our *confrères* here this evening, not only on account of his honourable and dignified position as a distinguished artist, but also as a citizen of a country the genius of whose architects we admire, and with whom we sincerely wish to live on terms of brotherly friendship and mutual esteem, reciprocally communicating the particulars of our labours, and the results of our studies.

Before I sit down I ought to tell you that in the course of the day I have received a telegram from M. Bailly, President of the Société Centrale des Architectes, in Paris. Unfortunately, I have not brought it with me, but it was to this effect,—that M. Bailly regretted extremely that he was himself unable to be present on this very interesting occasion, but that representing him, M. Paul Sédille, whom we have the pleasure of seeing, and who is Vice-President of the Société Centrale, would be here this evening amongst us. M. Bailly also said that all the members of the Société Centrale most heartily congratulated their *confrères*, M. Garnier, on having been made the recipient of so honourable a distinction as that of the Gold Medal for architecture conferred by the Queen of England; and they wished him all joy and happiness in receiving that medal.

The President, having invested M. Garnier with the Gold Medal, amidst loud cheers,

Monsieur Charles Garnier, who, on rising to thank the Institute for its award, was greeted with renewed applause, said:—Monsieur le Président, Messieurs, et chers Collègues,—Mes émotions sont bien trop grandes pour me permettre de répondre dignement au discours si élogieux de notre honorable Président. Les paroles sympathiques que le Président a prononcées et la bienveillance qui m'a été témoignée par tous mes *confrères* me mettent presque dans l'impossibilité d'exprimer dans des termes assez dignes tout le sympathie qui a été éveillée dans mon esprit et toute la valeur que j'attache à la médaille d'or de sa Majesté la Reine dont ils m'ont honoré. Ainsi, si je ne dis pas toute la gratitude que je sens, c'est seulement parce qu'il y a des choses qui sont bien plus faciles à sentir au fond du cœur que d'exprimer par des paroles. Cependant, chers collègues, je vous prie de croire que ma gratitude est, comme j'espère, à la hauteur et de votre bienveillance et de la valeur de la grande médaille d'or que le Président vient de me décerner. Cette médaille se rattache au nom de la Reine Victoria ainsi qu'à l'Institut Royal des Architectes Britanniques, est un honneur, au dessus de tout autre, le plus admirable et le plus enviable des distinctions. Personne ne conteste sa valeur, personne ne peut se méprendre sur sa signification. Pour ma part, je l'estime et je dois l'estimer, au dessus de tous les compliments qui m'ont été accordés. Elle n'est pas seulement un simple expression de bienveillance, mais elle vient d'un corps indépendant, qui n'a pas de parti pris et qui cherche celui qui a le plus de mérite, et qui parle le plus digne. Les architectes ne sont pas comme les hommes politiques. Ils n'ont ni des portefeuilles à conserver ni des électeurs à considérer,—ils n'ont à écouter que leur conscience, et lorsqu'ils ont fait choix d'un de leur collègues pour un honneur, celui-ci a le droit d'être fier du choix. Laissez-moi, donc, mes chers collègues, être fier d'avoir été désigné par vous,—laissez-moi croire que votre décision a atteint le but que vous vous proposiez. Mais on n'est pas moi seulement que votre résolution atteigne, elle s'étend plus haut et plus loin. Vous avez voulu choisir encore un architecte Français,—

sans doute pour honorer la France aussi bien que son architecture,—mais sans considérer les exigences politiques et sans agir autrement que dans les intérêts de l'art, que vous avez voulu soutenir de votre grande autorité. C'est ainsi que votre résolution a été comprise par l'Institut de France et par la Société Centrale des Architectes et qu'il est considéré dans mon pays extrêmement important de gagner ce prix. Voici pourquoi votre médaille d'or est tant respectée, tant désirée. Il me semble que l'appréciation que votre médaille commande à l'étranger doit vous être agréable, et doit donner à elle une valeur toute particulière. N'est-ce pas la grandeur de l'âme du donateur qui donne une valeur supérieure à ce qui lui offre? Je ne saurais donner jamais une trop grande place dans mon estime à la distinction que vous m'avez conférée, car le plus il me paraît précieux le plus il me marque mon respect pour le corps qui me l'a décerné. Cependant ce sont les faits même qui parlent. Les applaudissements qui ont été accordés en France à votre décision sont bien certainement l'expression de la gratitude des architectes de la France faite aux architectes Anglais. C'est que les artistes des deux pays se sont réunis dans une fraternité cordiale (applause) et lorsque je vous offre l'expression de ma gratitude je remplis également une mission de la part de mes compatriotes.

Mais il y a deux autres raisons, celles-ci spéciales, qui me font apprécier d'une manière particulière l'honneur que vous m'avez accordé. Il y a bien long-temps lorsque je fus de retour de Rome, après mon séjour comme étudiant du Villa Medici, et, comme il arrivait souvent à ce temps-là, je revint pauvre, sans ouvrage et presque sans espoir d'en avoir bientôt. J'étais par conséquent dans l'embarras. En attendant, sa Majesté la Reine Victoria est venue rendre visite à Paris. Un grand bal fut donné en son honneur à l'Hôtel de Ville, et le Préfet visitait tous les salons. Volant offrir à sa Majesté un souvenir de cette soirée, M. le Préfet désirait faire faire un grand album contenant des vues de tous les salons, les galeries, et les salles du bâtiment. Je fus recommandé, et puisque alors je n'avais pas trop mal les aquarelles j'ai reçu la commission de faire deux de ces vues. Vous pouvez vous figurer combien j'étais enchanté de cette bonne chance qui me rapportait le premier argent que j'avais gagné depuis mon retour. Je n'ai jamais oublié cette circonstance. Je considérais (sans l'autorité de sa Majesté, bien entendu) la Reine de votre pays comme mon premier client, ou du moins la cause de ma première clientèle. Il me paraît alors que c'est, en quelque sorte, à sa Majesté que je dois le succès que j'ai pu obtenir depuis dans notre profession.

Plus tard, en 1867 j'ai reçu inopinément une lettre, signée par feu M. le Professeur Donaldson, conçue en ces termes:—« Les membres de l'Institut Royal des Architectes Britanniques se sont honorés en vous nommant membre correspondant, » &c. Cette manière de conférer une faveur me paraissait bien courtoise, et la formule me semblait bien digne d'être retenue en mémoire. Je fus tout moins charmé que surpris que l'on ait pu penser à moi dans un pays étranger. Depuis ce temps-là j'ai été nommé membre de beaucoup d'autres académies, mais, sans vouloir mépriser la valeur de ces nouveaux titres, c'est toujours le premier honneur,—celui que votre Institut m'a conféré, qui m'est resté le plus cher et le plus précieux. Ainsi, le premier argent que je gagnais et mes premiers honneurs viennent de vous. On dirait presque que vous vous êtes chargés de moi, et que, une fois la voie ouverte, vous vouliez me conduire jusqu'au bout. À tout ceci je dois ajouter la réception cordiale d'aujourd'hui, où vous m'avez traité pas seulement comme un confrère, mais comme un ami. Ceci me va droit au cœur (applause).

Je ne sais pas si ma carrière d'architecte devait terminer ou si elle serait donnée de moi d'encore une fois à mon art, mais si, après les bâtiments que j'ai construits, j'avais à construire un autre, il me semble que je serais d'autant plus encouragé de faire de mon mieux, que j'aurais à me montrer encore plus digne de l'honneur que vous m'avez accordé, et à grandir mes idées, afin que la médaille d'or de sa Majesté la Reine Victoria ne perde rien de l'estimation y rattachante, en tombant dans des mains défallantes.

Mes chers confrères, je vous prie de pardonner ce discours, un peu long peut-être, pour vous qui l'ont entendu, mais trop court pour me laisser exprimer toutes mes reconnaissances.

Monsieur Garnier resumed his seat amidst loud and continued applause.

Sir Frederick Leighton, F.R.A., then rose, and said,—I fear, Mr. Chairman, it may seem presumptuous, or even almost impertinent, in an individual to whom, in your excellent address, you alluded incidentally, but in too indulgent terms, to rise to speak, however briefly, on the occasion of a ceremony, of which I am only one of very many spectators, and on the subject of the award of a medal, in determining which I had neither part nor share. But I have been given to understand, sir, that it was your wish, and your wish here is my command, and I do it. Well, sir, I stand here in the position of one who owes a double allegiance; I owe allegiance, first, to you as the respected President of a society of which I am a member; I owe allegiance also to the famous architect, on whom all eyes are turned this evening, and who, as you have been reminded, is at this time President of that section of the Institute of France of which it is my great pride to be an Associate. And, indeed, I rejoice to have this opportunity of proffering my loyal respect to one who well fills a position so conspicuous. Well, then, sir, since you have permitted me to express an opinion on the subject before you to-night, I will venture to say that this Institute has done well in recommending her Majesty the Queen to confer this special distinction upon the highly-gifted architect of the Grand Opera House of Paris. It is not for me here to rehearse his many claims to this distinction, in respect of his works, for this has been done, and exhaustively done, by your President. He has himself, with native grace and eloquence, expressed his sense of the honour which has been conferred on him by his comrades beyond the sea, and you, I venture to say, have added a worthy name to the long and distinguished muster-roll of this Institute (applause). But there is in this award more, I think, than a tribute of respect to a considerable personality, and this, sir, you foreshadowed in the closing passages of your address; and it was also referred to in the eloquent words of M. Garnier himself. For, it seems to me, you have wished to express that deep debt under which all the world of art is laid by the genius of the great people to which M. Garnier belongs (applause). That debt is, I think, patent over the whole field of art, but nowhere, perhaps, more specially manifest than in the field of architecture. If you consider the inexhaustible profusion, the endless variety, with which the builder's art has adorned the sunny breadths of that favoured land, whether you turn to their civil architecture or to their ecclesiastical architecture; whether you consider that phase of art which, in the South and in the West of France reveals to us a Latin severity and sobriety linked with a Celtic fire; or whether, further in the North, you observe that asper evolution of the French spirit which during three centuries lighted up Medieval Europe; whether you consider the ornate stateliness and elegance of the *châteaux* of the Loire, or the regal splendour of the buildings of the *Grande Siècle*, you will feel how vast is the fund of wealth which has been poured into the common treasury of this singularly brilliant people (applause). Gentlemen, I am able to say that no one in this room can join with a deeper conviction of this, and with more grateful impulse, in the honour which you have paid to French art, in the person of one of its foremost representatives. In conclusion, Sir F. Leighton turned to M. Garnier, and addressed him as follows:—Et vous, cher collègue, et très honoré Président, souffrez que je joigne mes félicitations personnelles et bien chaleureuses aux paroles officielles que vient de prononcer le Président, au sujet d'un honneur qui réajillit sur ceux qui le décernent aussi bien que sur vous qui le recevez (loud applause).

#### Provincial Visitors.

Mr. Macvicar Anderson.—It is somewhat galling to have to come down from these agreeable proceedings to the everyday humdrum of ordinary business, but we have a certain amount of work to get through to-night, and I must ask your attention to it. Before proceeding to the ballot, I should like the meeting to know that the individual members present at this meeting are of a highly representative character. It is our wish, and we are endeavour-



ing now, so far as we possibly can, to unite the members of our profession throughout the country by a system of federation. We have a scheme in contemplation, which will be duly submitted to you; but my object now is simply to intimate that we have the honour and pleasure of receiving here to-night the following gentlemen, as representatives of several professional societies:—Mr. Thomas Worthington, as representing the Manchester Society of Architects; Mr. G. Washington Browne, as representing the Edinburgh Architectural Association; Mr. James Sellars, as representing the Glasgow Institute of Architects; Mr. G. G. Hoskins, as representing the Northern Architectural Association; Mr. G. E. Grayson, as representing the Liverpool Architectural Society; Mr. J. Wreghitt Connon, as representing the Leeds and Yorkshire Architectural Society; Mr. J. B. Eyraud, as representing the Leicester and Leicestershire Society of Architects; Mr. A. Nelson Bromley, representing the Nottingham Architectural Association; Mr. F. B. Osborn, representing the Birmingham Architectural Association; and Mr. J. A. Gutch, President of the Architectural Association of London. These gentlemen have not yet attained to the distinguished eminence of M. Garnier, but they are all men who are distinguished in their own neighbourhoods and spheres, and it is with very great pleasure we welcome them here to-night.

#### Election of New Members.

On the motion of Mr. Charles Barry, seconded by Mr. Penrose, M.A., the following gentlemen were elected Hon. and Corresponding Members of the Institute, viz., Herr Julius Carl Raschdorff, architect, Professor of Architecture at the Royal Technical High School of Berlin; and M. Paul Sédille, Architect, Vice-President of the Société Centrale des Architectes, Paris.

M. Paul Sédille, who was applauded on rising, then addressed the meeting in French. He said:—

Je regrette vivement, Messieurs, de ne pas pouvoir exprimer en Anglais ce que je sens en ce moment-ci. Heureusement, beaucoup d'entre vos membres comprennent le Français et ainsi je puis peut-être me permettre de vous parler Français comme aux Français. Je ne sais pas, Messieurs, si, appelé comme de suite, à représenter la Société Centrale des Architectes, cette société n'aura pas pu être représentée auprès de l'Institut Royal par un membre plus digne que moi, mais je suis certain qu'elle n'aura jamais de représentant animé d'un plus grand désir de voir avancer mon art dans l'Angleterre. (Applause.)

Six Fellows, twenty-two Associates, and three Honorary Associates were also declared to be duly elected.

#### Other Medals and Prizes.

The President then presented the various prizes to the students and others who had won them.

*The Tite Prize* of 30*l.* and a certificate was awarded to Mr. Benjamin Priestley Shires. The subject was a School of Medicine and Surgery, and there were six competitors. In the same competition Mr. Alexander Nisbet Paterson, M.A., of Glasgow, was awarded a Medal of Merit; and Mr. Everard William Leeson, of Oldham, a Certificate of Honour.

*The Grissell Gold Medal* and Ten Guineas, a prize which has not been awarded for three years, was gained by Mr. Alfred Arthur Cox, Associate, the subject being the central hall of a market of iron construction.

For *The Soane Medallion* (with 50*l.* to be afterwards paid under the usual conditions) there were sixteen competitors. The medallion was won by Mr. Arthur Needham Wilson, of Snarbrook, Essex. The President, in presenting this prize, said that the drawings were very meritorious and picturesque, but Sir John Soane could never have dreamed that his Medallion would have produced a style so decidedly different from what he himself practised. Still, had he been alive he would doubtless have greatly rejoiced to see what strides had taken place in the knowledge of Mediaeval architecture since his time. [In the same competition a Medal of Merit and ten guineas were awarded to Mr. John Henry Curry, Associate, of Sutton, Surrey; a Medal of Merit to Mr. William Henry Bidlake, M.A. (Pugin Student, 1885); and a Certificate of Honour to Mr. Robert Weir Schultz.]

The *Institute Medal* and Ten Guineas, for measured drawings, elicited seven sets of drawings from the same number of competitors. Awarded to Mr. Edmund Harold Sedding.


*The Institute Medal* and Five Guineas were won by Mr. Arnold Bidlake Mitchell (Soane Medallist, 1885); a Medal of Merit being awarded to Mr. Eustace Lauriston Conder, of Parliament-street; and a Certificate of Honour to Mr. Sidney Howard Barnsley, of Bromley, Kent.

*The Institute Medal* and Twenty-five Guineas for the best Essay on "Pediments and Gables," were awarded to Mr. Paul Waterhouse, a Medal of Merit being given to Mr. William Thomas Oldrieve, of Edinburgh (Holder of the Godwin Bursary, 1886). Ten essays altogether were sent in, three of them being specially good.

The President then declared the session adjourned until the first Monday of November, and the proceedings terminated.

### Illustrations.

#### "THE PEOPLE'S PALACE" FOR EAST LONDON.

 We give a view and plan of this important building, the foundation-stone of which is to be laid by the Prince of Wales on Monday next. The site consists of about five acres, and has been bought for 22,000*l.* from the Drapers' Company. The design for the building has been prepared by Mr. E. R. Robson, F.S.A., F.R.I.B.A., and when erected, the "Palace" will form a notable addition to the buildings of the East End and, indeed, of London at large. It may be mentioned, *en passant*, that the design exhibited by Mr. Robson amongst the architectural drawings in the present Academy exhibition, and of which we spoke a few weeks ago (see p. 772, ante), is not the one that is intended to be carried out; it was given up as too costly. The main outline of the building about to be commenced, and which will stand some 50 ft. back from the Mile End-road, partakes, as will be seen by our illustration, somewhat of an Oriental character, though the details are Renaissance in feeling. The building externally will be of stock brick with red edgings, Portland stone of the best description being used for columns, arches, pediments, &c. The chief features towards the main thoroughfare will be the semicircular portico; the two minarets, capped with gilded cupolas; and the dome. The latter will cover a large rotunda, which will constitute the entrance-hall of the Palace. Arrangements will be made for heating this covered space in the winter, and it is intended to serve as a playground for children in the day time throughout the year, while in the evening it is to serve as a sort of common-room in which those who choose may sit and chat and smoke their pipes. Opening from the rear of this large circular vestibule will be "The Queen's Hall," which will be about the size of St. James's Hall, Piccadilly. This will be the central feature of the scheme, and the "foundation-stone" about to be laid will form part of one of its walls. This hall will be used for several purposes, such as concerts, band performances, and assemblies; it will also be used as a large club-room, in which people may meet for talk and refreshment. Beyond "The Queen's Hall" will be a library and reading-room, while to the right of it will be a series of workshops and lecture-rooms, constituting a technical school for instruction in various handicrafts, somewhat on the principle of those established by Mr. Quintin Hogg at the old Polytechnic Institution, but with the additional advantages afforded by the fact that at "The People's Palace" the lecture-rooms and workshops will be specially planned and constructed to serve their purpose, and will be provided with the most suitable fittings, appliances, and plant. To the left of "The Queen's Hall" will be the cookery schools, a restaurant, and a hall somewhat smaller than Prince's Hall, Piccadilly; this smaller hall, it is suggested, may serve, among other purposes, for an art school. The inner end of the great hall ("The Queen's Hall") is to open into a large winter garden, — a great space which is to be covered in with glass, and adorned with flower-beds and sub-tropical trees and plants, arrangements being made for keeping it at the necessary temperature. On the left of the main building, and detached

from it, will be warm and cold swimming-baths, and well-appointed gymnasia for men and women. The plan also provides commodious rooms for cycling and cricket clubs, &c., trade associations, and small social gatherings of various kinds. Meanwhile, of the five acres of ground purchased by the Beaumont Trustees, enough (3½ acres) will remain uncovered to permit of some 5,000 persons disporting themselves at the same time. The amount required to carry out the scheme (including the cost of site) is 100,000*l.*, of which 275,000 has now been subscribed or promised. The Drapers' Company has given 20,000*l.* We shall watch with much interest the development of the scheme, in furtherance of which Sir Edmund Currie, Lord Rosebery, Mr. Brownlow, and the East and West India Dock Company have rendered valuable aid.

It should be observed that the plan here given, though representing in the main what will be carried out, is still to be regarded as "under revision," and is not the final and completed form.

#### THE NEW SORBONNE, PARIS.

We give an elevation of the principal façade, forming one end of this great block of building, concerning which further particulars will be found in a separate article.

We regret that the elevation has been sent to us from Paris without any scale, a deficiency which, of course, we are unable to supply.

#### THE RATH-HAUS, LIMBURG-ON-THE-LAHN, AND THE THREE CROWNS INN, WÜRZBURG.

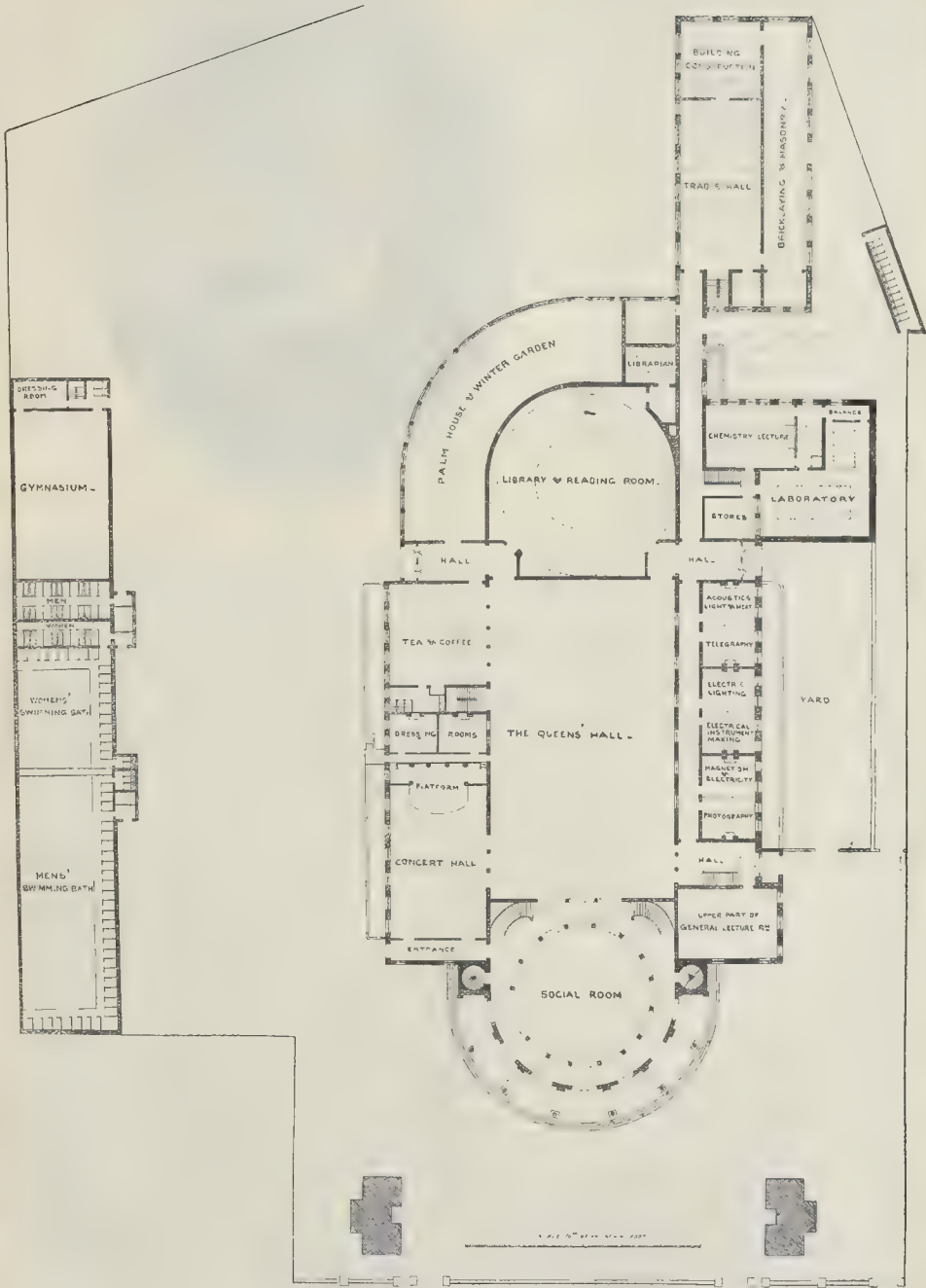
THE two sketches which we publish are examples of the picturesque style of German domestic architecture which came into use at the close of the sixteenth century, and which forms the link between the old Gothic style and the more "correct" revised Classical. This kind of architecture has suffered more than any other by modern "improvements," and in a few years scarcely an example of it will have escaped: this is to be greatly regretted, because it not only delights the artist with its quaintness and picturesqueness, but really offers valuable hints to the architect; the little bow-window, for instance, of the Three Crowns Inn, though exceedingly plain, has a remarkably original appearance; the treatment of the corbel which supports it is very uncommon; it is as plain as it could possibly be, and yet has a remarkably good effect, and would be a very pleasing feature to introduce in a country house. The house next to the Three Crowns is a baker's shop, and shows an arrangement which, we think, is peculiar to this part of Germany. The stall is an erection which very much resembles a stone altar, over which projects a kind of wooden canopy, or hood, covered with slate; the resemblance to an altar is all the more remarkable on grand festival days, when these stone stalls are covered with a white cloth, and adorned with a pair of candles and a crucifix. One never enters the shop to purchase the bread, but it is exposed for sale upon the slab; we have no doubt that this custom is one of very considerable antiquity, but is now being given up, as are all the links which bind the Germany of the present to that of the "Middle Ages." The little church shown in the same view is called the Hofspital Kirche. It is a poor example of the very latest Gothic, with a Corinthian portico added in later times; it contains nothing remarkable except a curious piece of sculpture in wood, representing the patron saints of Franconia, executed by Tilman Riemenschneider about the year 1500.

The Rath-haus at Limburg is a very quaint and irregular structure, the earliest portion of which dates from about the middle of the sixteenth century, and it is not the least picturesque of the old buildings in that curious town.

H. W. B.

#### SYNAGOGUE, RUE DE LA VICTOIRE, PARIS.

This is an interior view of the large Synagogue, designed by M. Aldrophe, which was visited the week before last by the Congress of French Architects, and which was described at some length in our article on the Congress last week (See p. 877, ante).



"THE PEOPLE'S PALACE" FOR EAST LONDON.—PLAN.



## SUNDERLAND MUNICIPAL BUILDINGS.

We give this week an elevation and section of the design by Mr. Brightwen Binyon, which received the first premium in the recent competition, together with plans of two of the floors to a small scale.

The Town Council have appointed Mr. Binyon architect for the building, and commissioned him to proceed with it. The variations from the design as first drawn will be very slight, which is not always the case in competitions.

Some remarks on this and others of the competing designs appeared in an article in the *Builder* of May 29th.

We may observe that the return elevation of the shorter side of the building (which is at the angle of two streets) is so nearly the same design returned, only somewhat shortened, that we have thought it better to give the one elevation on a pretty large scale than to give the front and side on a smaller scale.

## THE ANTIQUITIES OF PARIS.

THE second annual report of the Society of Friends of Parisian Monuments,\* in addition to a summary of the work of the Society during the past year, contains several interesting notes contributed by various members on Parisian antiquities, and is further enriched by some remarkably good engravings. M. Charles Sellier contributes an essay on the Hôtel Salé, otherwise called the Hôtel de Juigné, recently used as the Central School of Arts and Manufactures, of which we gave a short account last year (vol. xlviii., p. 161). This fine old mansion, which is situate in Rue Thorigny, is offered to be let or sold, and it is impossible to predict what may be its ultimate fate. It contains a very handsome staircase, which is illustrated in the report by a plan and elevation. The house occupies a portion of the farm of the Hospital St. Gervais, which belonged to the Convent of St. Anastasia, who sold it in 1656 to Aubert de Fontenay, a rich farmer of Customs, who built the present mansion. As Fontenay's large fortune was chiefly derived from a duty on salt, the populace nicknamed his mansion the Hôtel Salé, a name which it retains to this day. Fontenay sold the mansion to Jean le Camus, secretary to the king, who was Governor of Auvergne, and occupied the post of civil lieutenant of the Châtelet from 1670 till his death in 1710. After his death the mansion in the Rue Thorigny remained in his family, it being marked in Turgot's plan of 1739 under the name of the family, and the Royal Almanack for 1746 mentions it as the residence of M. Nicolas le Camus, first president of the Court of Assistants.

The hôtel was for some years the residence of the Venetian ambassador, and afterwards of Marshal de Villeroi, the tutor of Louis XV.; in 1763 it is called, on Deharme's plan, Hôtel Chameville, and eventually, having passed into the hands of the Juigné family, it became the residence of one of the members of this family, who became Archbishop of Paris in 1781, about the same time that another member acquired the mansion formerly belonging to the Duc de Mazarin on the Quai Malaquais.

Monsieur Leclerc de Juigné, who was a member of the States General, had his carriage riddled with stones by the populace, because he had advised the king to resist the Revolution by force. He was compelled to emigrate, and the Hôtel Salé became the property of the nation. During the Convention the house was used as a temporary store for books which had been saved from the libraries in the neighbourhood, and was finally sold to a private person for four million francs (160,000*l.*), paid chiefly in assignats. It is now the property of M. Roussille, the nephew of the last purchaser, who let it during the Restoration for university purposes. In 1829 the Central School of Arts, &c., was established and remained here until its removal to the new buildings in the Quartier des Arts et Métiers. The Hôtel would be admirably suited for a museum, a school, or a library, and it is to be hoped that some means may be found for adapting it to one of these purposes.

Attention is drawn to another interesting mansion, the Hôtel de Rassis, Rue Visconti, which is threatened by the proposed continua-

\* Bulletin de la Société des Amis des Monuments Parisiens, Année 1885, Numéro 2.



M. Charles Garnier.

tion of Rue de Rennes. It was here that Racine and Adrienne Lecouvreur died, and Mdlles. Clairon and Champmeslé lived. It is believed that Racine wrote his tragedy of "Athalie" in a part of the building now occupied by M. Mario Proth, and Voltaire carried to the portico the dead body of Adrienne Lecouvreur.

The Report gives a list of mansions worthy of note with a view to their classification and preservation. Among them may be named the Hôtel la Vieuville, Rue Saint Paul No. 2, brick and stone front, painted beams,—rooms next the Quai des Célestins, have ornamented ceilings; Rue des Lions-Saint-Paul, No. 13, bas-relief on staircase, painted ceiling in boudoir; Hôtel Lambert, île Saint Louis, paintings by Lebrun, Lesueur, &c.; Hôtel de Pimodan or de Lauzun, île Saint-Louis, handsome rooms; Hôtel Scipion-Sardini, Rue du Fer-à-Moulin, internal court, terra-cotta bas-relief; Hôtel Colbert, late Rue des Rats, remarkable seventeenth-century work; Rue Saint-André des Arts, Renaissance fronts; Hôtel Fieubet (École Massillon), Quai des Célestins.

## M. CHARLES GARNIER, THE INSTITUTE ROYAL GOLD MEDALLIST, 1886.

JEAN LOUIS CHARLES GARNIER, of whom we give a portrait,\* and on whom the Royal Gold Medal of the Institute of British Architects was conferred on Monday last amid much enthusiasm, was born on the 6th of November, 1825, and is, therefore, 60 years old, though his appearance conveys the idea of his being a much younger man.

In spite of his decidedly southern-looking physique, the eminent architect is a Parisian *pur sang*. He showed, when very young, remarkable artistic talent, and entered, in 1842, the École des Beaux-Arts, where he studied successively in the ateliers of Lévêil and Hippolyte Lébas. In 1848 his design for a "Conservatoire des Arts et Métiers" gained him the Prix de Rome, and the young architect turned to account his sojourn of some years at Rome to send successively his very remarkable studies on the Forum of Trajan, the Temple of Vesta, the Temple of Jupiter Serapis at Pozzuoli, and the polychromatic restoration of the Temple of Jupiter Panhellenius.

M. Garnier passed almost the whole of the year 1853 in the kingdom of Naples and Sicily, in the preparation of a work on the restoration of

the Angevine tombs and monuments there. This work, commissioned by the Duc de Luynes, has, unfortunately, never been published. In 1857 he obtained a "Médaille de Troisième Classe" at the Salon, and, after some years passed in unostentatious work in the service of the Municipal Administration, during which he took part in the restoration of the Tour St. Jacques la Boucherie, he appeared as a competitor, in 1861, in the competition for the rebuilding of the Opera House.

The design of M. Garnier was unanimously adopted by the jury, and its author became at once a celebrity. Thanks to the encouragement given by the Imperial Government, and the liberal sums placed at his disposal, he was able to secure the assistance of the most illustrious artists, and to employ the richest materials in which to realise his creation.

After having, at the Salon of 1863, obtained a "Médaille de Première Classe," he received the following year the Cross of the Legion of Honour. In 1861 he had already been named Honorary and Corresponding Member of the Royal Institute of British Architects, and sixteen other foreign academies count him among their members. In 1874 he was elected Member of the Académie des Beaux-Arts, as successor to M. Victor Baltard.

In 1875 took place the inauguration of the new Opera House, on January 5th, on which occasion its architect was promoted to be an officer of the Legion of Honour.

Since that day, which was the crowning of the work to which he had devoted his whole care and thoughts for fourteen years, the eminent architect has directed the construction of the Nice Theatre and edited the monograph of the Opera House. He is now occupying much of his leisure time in defending, at the head of the "Société des Amis des Monuments Parisiens," the remains of old Paris against the attacks of official demolishers, and in giving his active assistance to the different artistic undertakings of the State and the Municipality of Paris. Since the funeral of Victor Hugo, he has been commissioned by the Government to oult the catafalque of the great poet, under the Arc de l'Étoile.

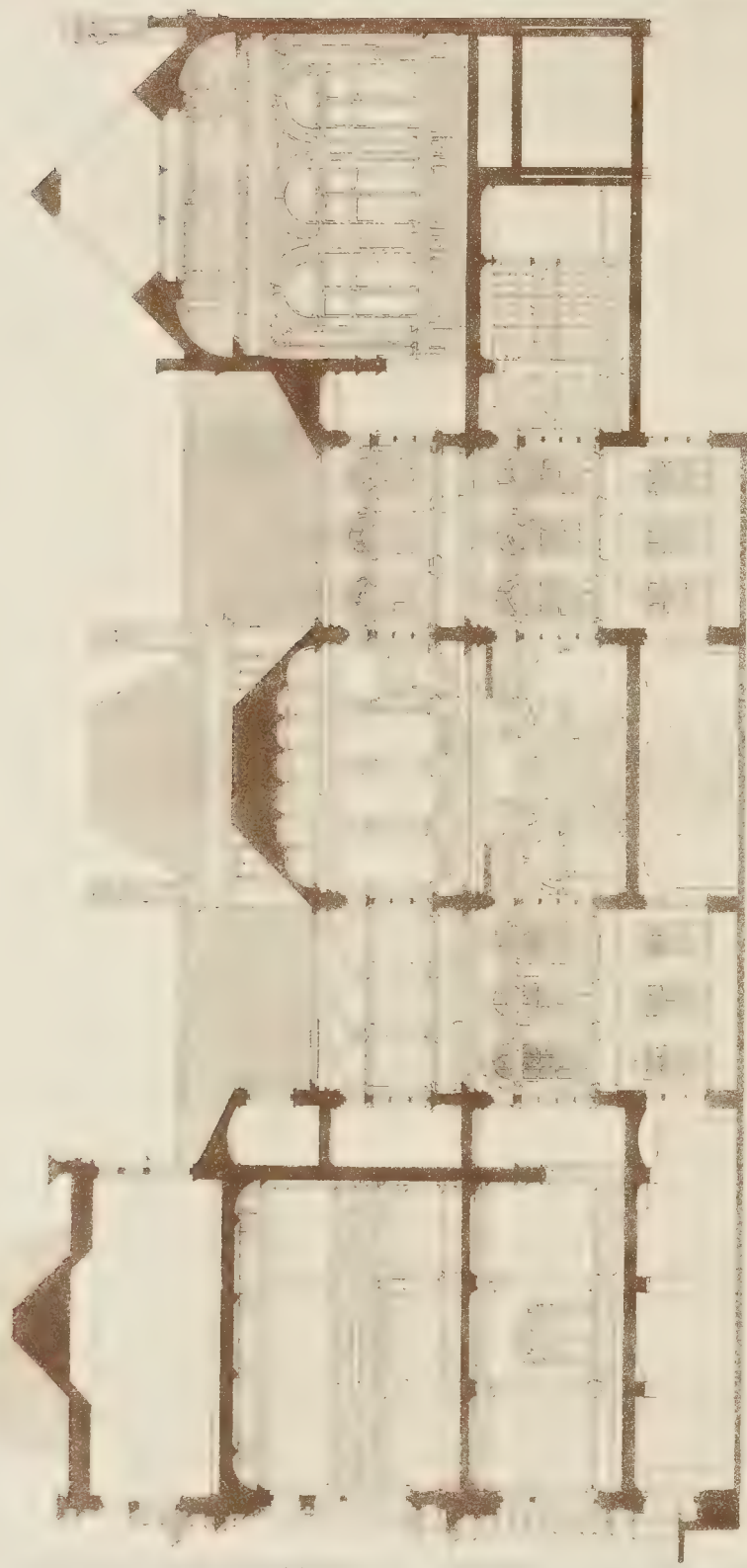
It may be added that M. Garnier is not only an artist of great ability, but a learned and clever writer, with a style full of humour, and his facile and original pen has been often engaged in critical reviews. His "Étude sur la Construction théâtrale," published in 1871, is a didactic work of the first order, and as such has obtained a legitimate success in the world of art, both in his own and in other countries.

\* Reproduced, by permission, from a photograph by M. Eugène Piron, photographer to the Institut, Boulevard Saint Germain, Paris.



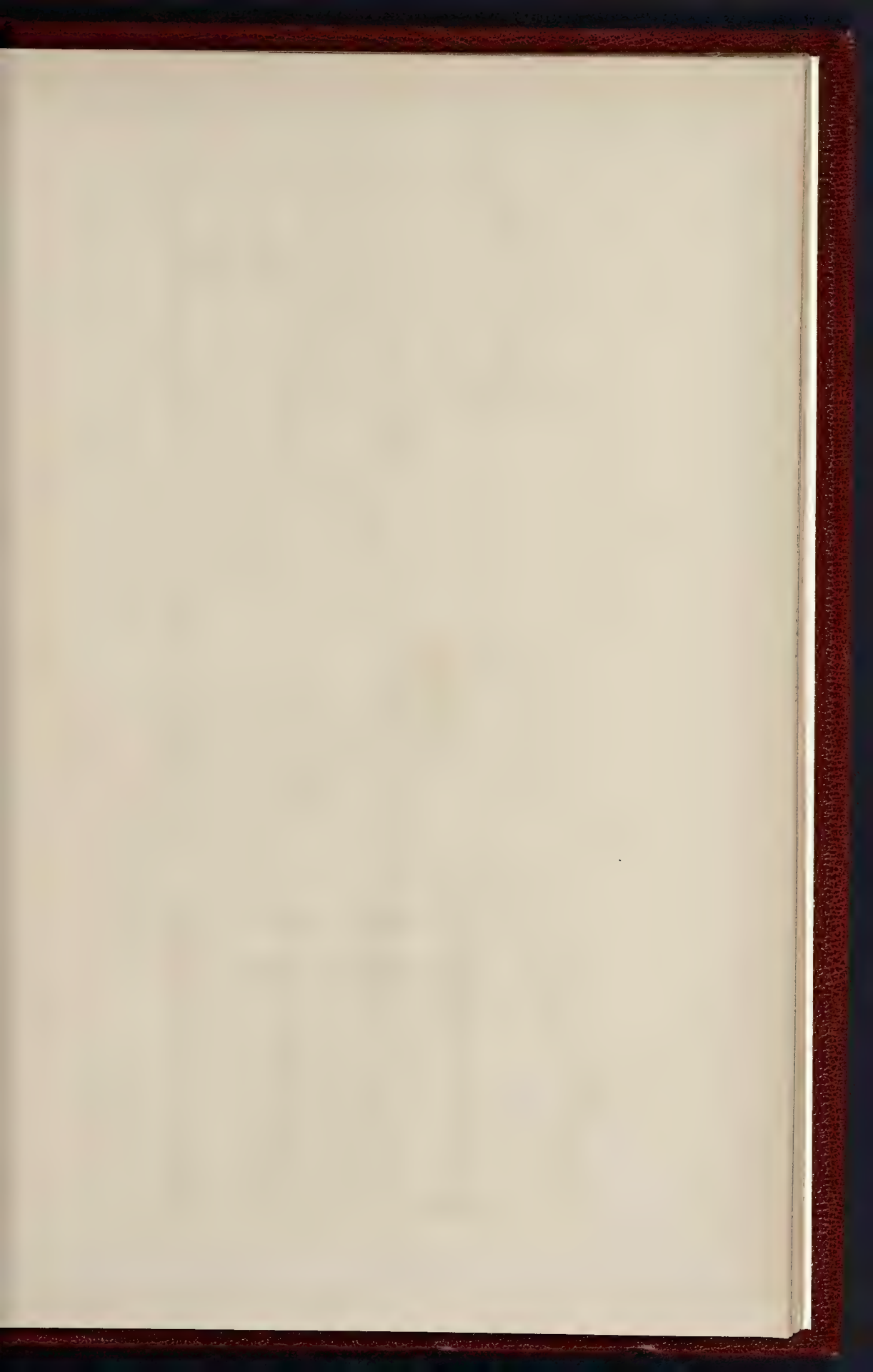


THE BUILDER, JUNE 26, 1886.



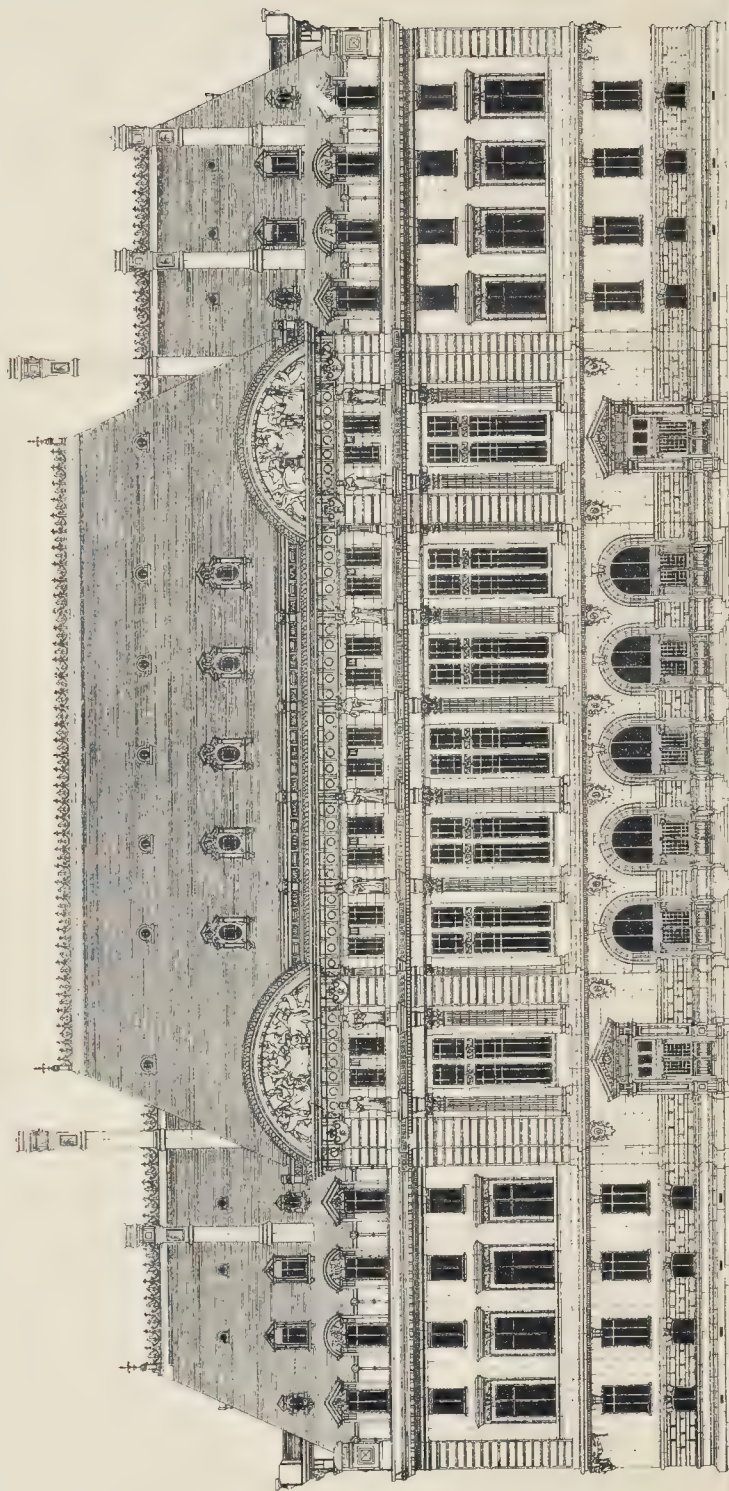
SELECTED DESIGN FOR SUNDERLAND MUNICIPAL BUILDINGS.—MR. BRIGHTWEN BRYON, A.R.I.B.A., ARCHITECT.

LONGITUDINAL SECTION.

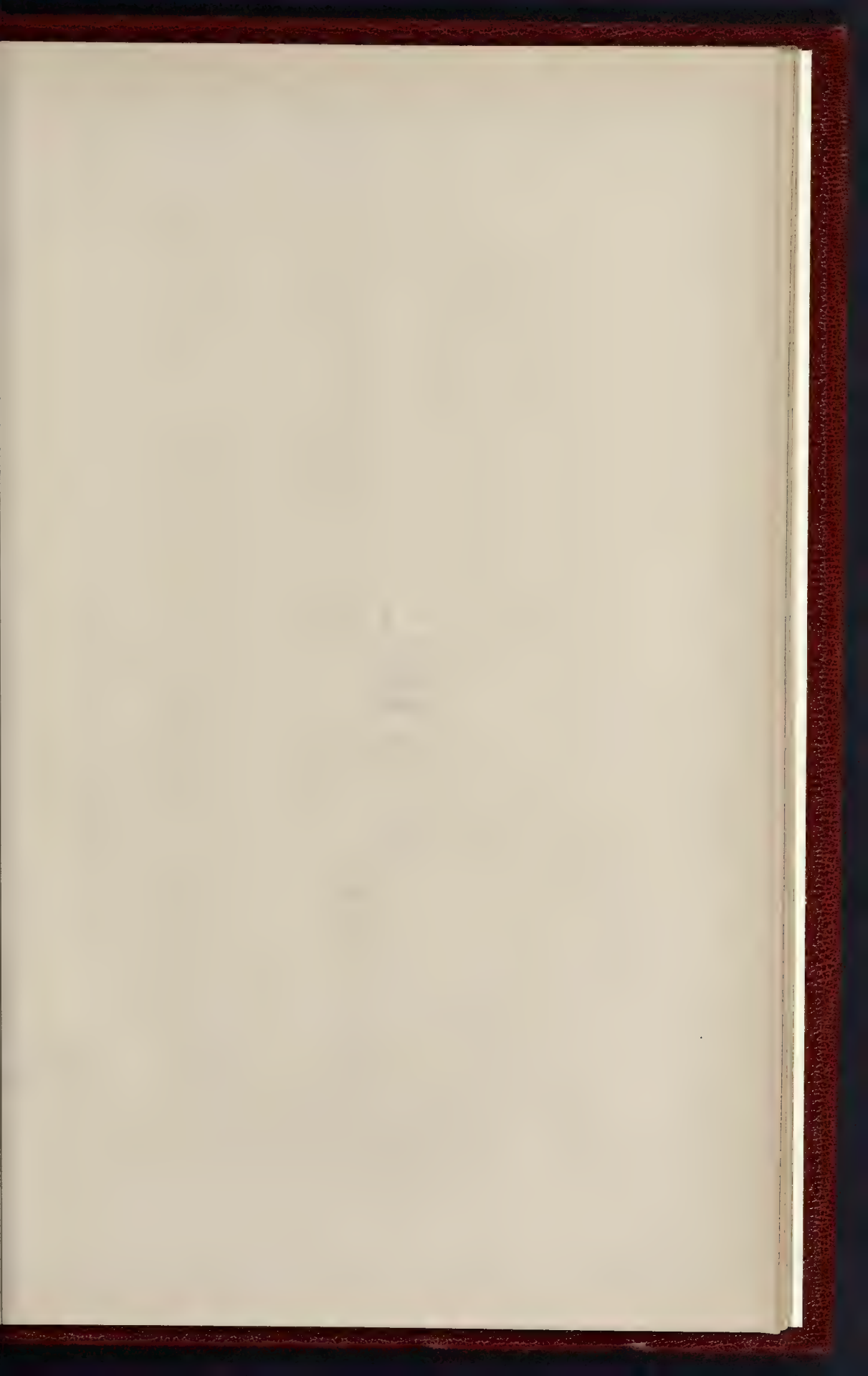




THE BUILDER, JUNE 26 1886



THE NEW SORBONNE, PARIS. M. PAUL NENOT, ARCHITECT.





# The People

## East

MR. E. R. ROBSON



Palace

ndon .

A.A. ARCHITECT



30 40 50 60 FEET

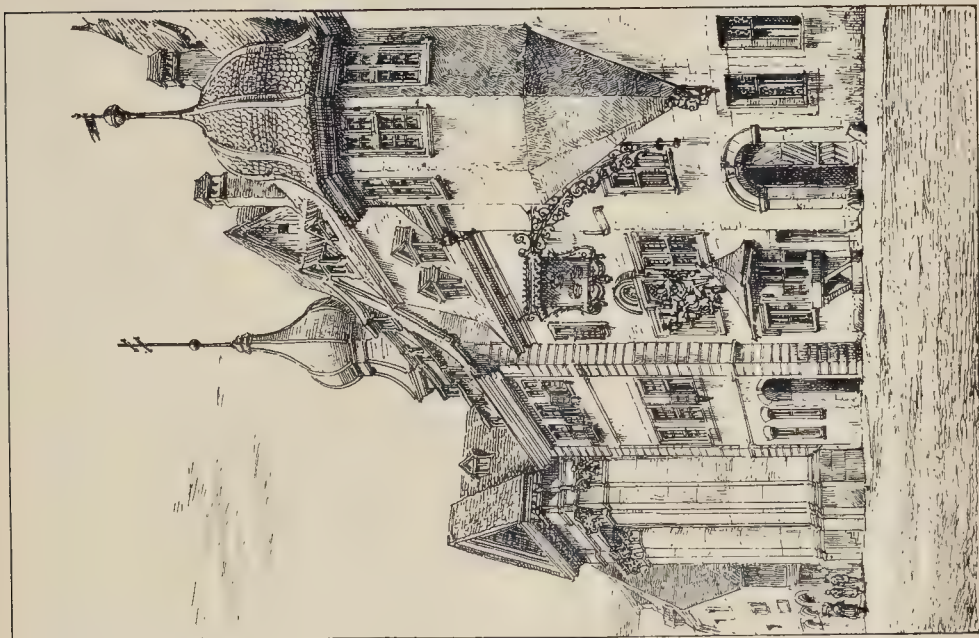
— ELEVATION OF THE PALACE —







THE RATHHAUS, LIMBURG.

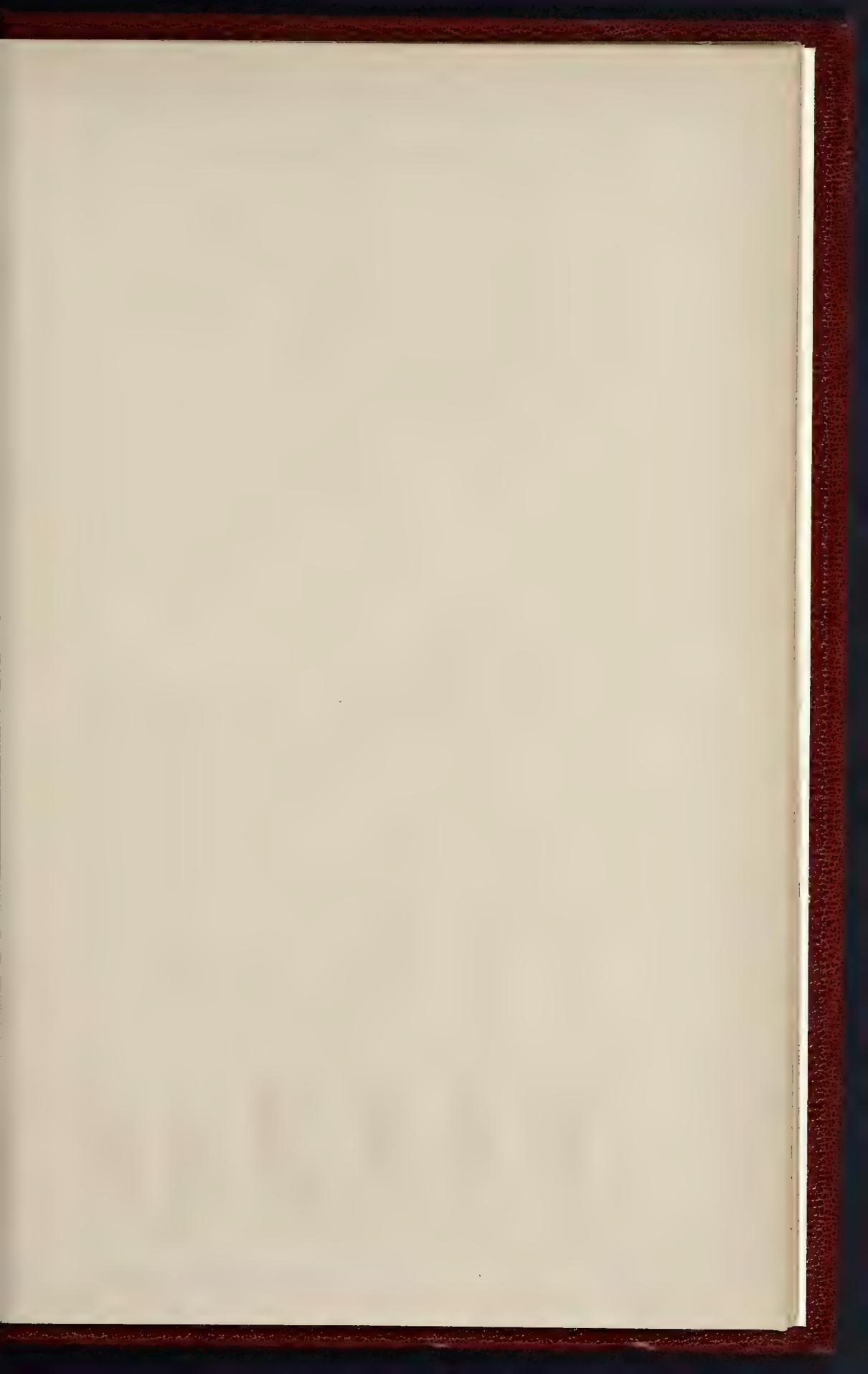


F. Bell, Photo. Lith. & Calc. Ch. Bonn, Leipzig &c.

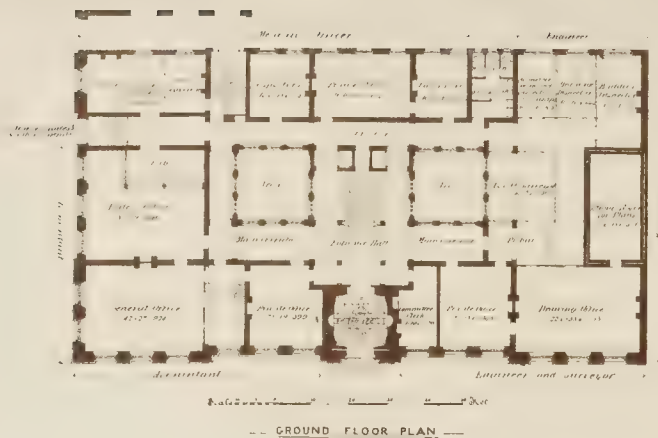
“THE THREE CROWNS,” WÜRZBURG.

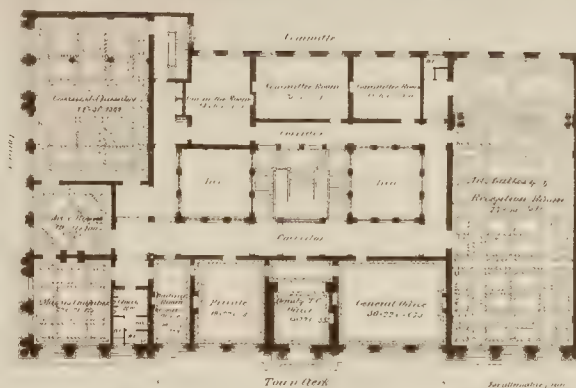






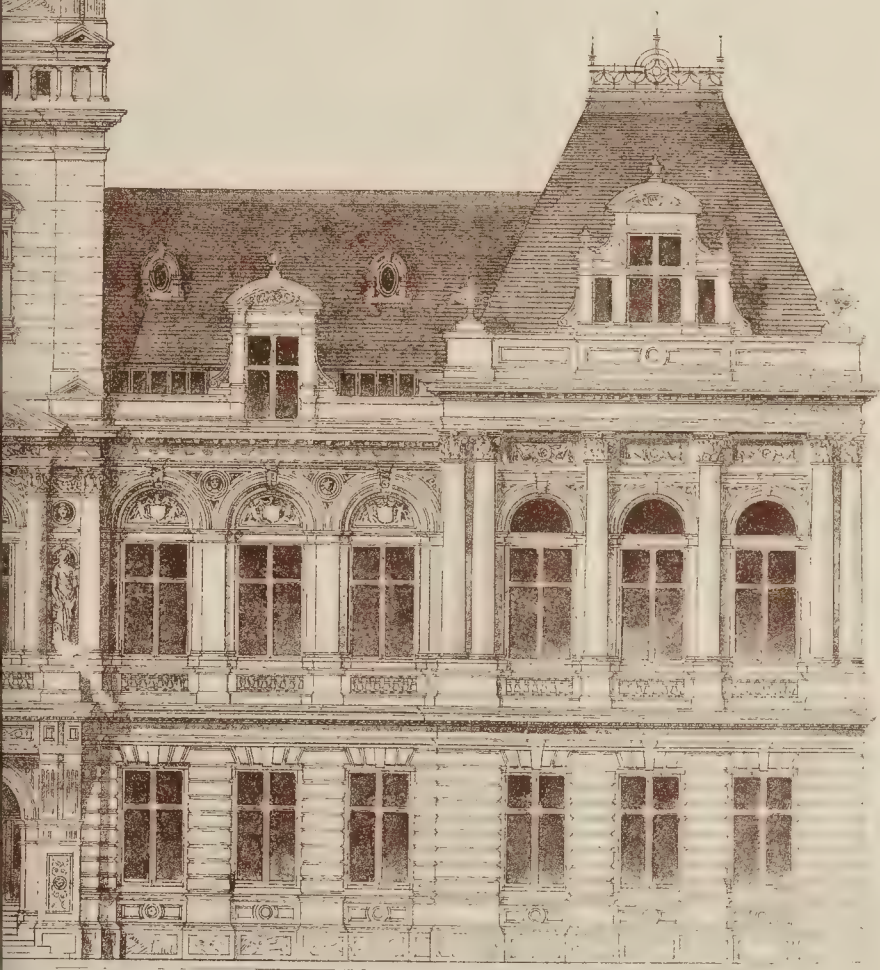






FIRST FLOOR PLAN

See plan of 1st floor  
NOTE: The Reception Room  
and Reading Room  
are shown in plan





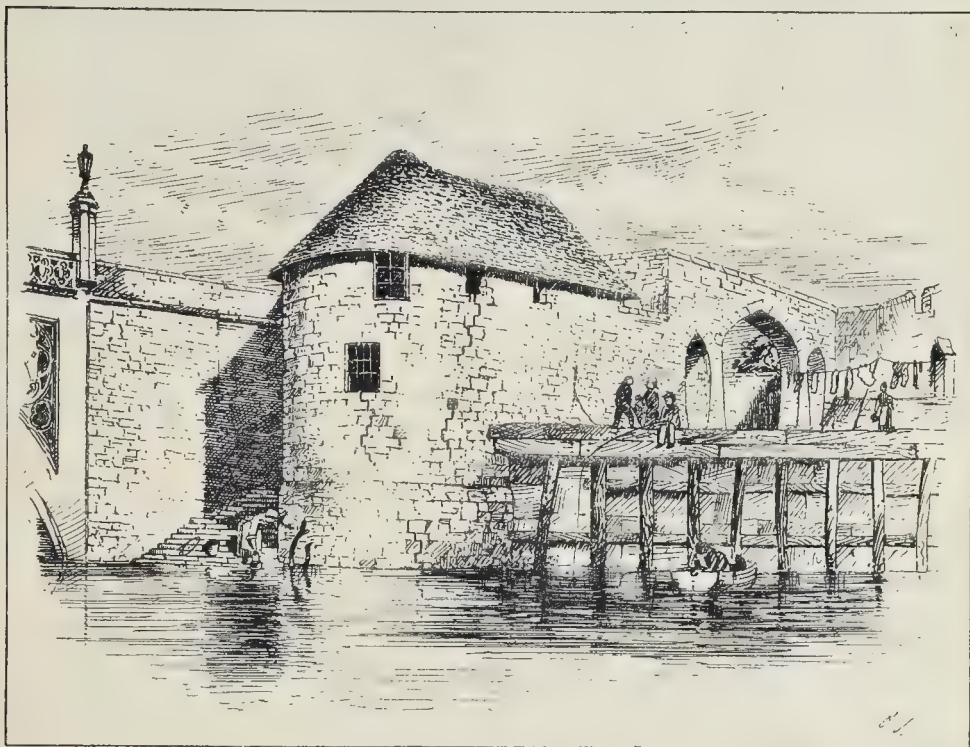




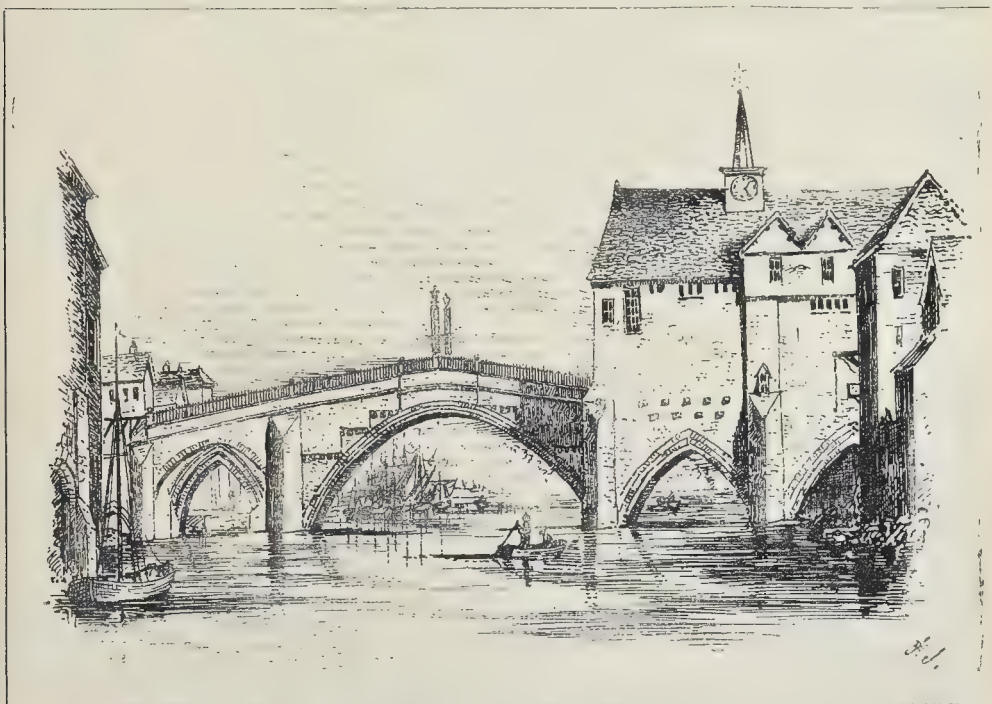
INTERIOR OF SYNAGOGUE, RUE DE LA VICTOIRE, PARIS.—M. ALDROPHE, ARCHITECT.







*North Street Postern, York.*



*Old Ouse Bridge, York. Taken down in 1809.*



Hayman, Hogarth's friend, and Van Nost, the sculptor, Reynolds merely added a fresh artistic tradition to the house in St. Martin's-lane, where he first made his London reputation, and the studio at the back of which had been tenanted by Roubiliac, the sculptor, J. T. Smith, the antiquary,—"Rainy Day" Smith,—who remembered all the artistic life of the last century has, in his amusing "Life of Nollekens," related many of the facts associated with this classic little corner, where, he tells us, Roubiliac executed his statue of Handel. Upon Roubiliac leaving this studio "it was fitted up as a drawing academy, supported by a subscription raised by numerous artists, Mr. Michael Moser being unanimously chosen as their keeper." This is Moser the sculptor, and it will be remembered, in after years one of the foundation members of the Royal Academy. From an article written by Hogarth about 1760, and published in Ireland's "Hogarth," we learn the share he took in the formation of this drawing-school:—

"Sir James [Thornhill] dying, I became possessed, in 1734, of his neglected apparatus, and, thinking that an academy, if conducted on moderate principles, would be useful, I proposed that a number of artists should enter into a subscription for the hire of a place large enough to admit of thirty or forty persons (drawing after the naked figure). This proposition having been agreed to, a room was taken in St. Martin's-lane (Peter's-court). I sent to the Society the furniture that had belonged to Sir James's academy; and attributing the failure of the previous academies to the leading members having assumed a superiority which their fellow-students could not brook, I proposed that every member should contribute an equal sum towards the support of the establishment, and have an equal right to vote on every question relative to its affairs. By these regulations the Academy has now existed nearly thirty years, and is, for every useful purpose, equal to that in France or any other country."

Till the foundation by the regularly constituted Royal Academy of its free schools, the little "Academy" in St. Martin's-lane prospered amidst all the bickerings in which the artists indulged in the middle of the last century respecting the formation of an adequate "Academy of the Fine Arts." How the Dilettanti Society generously offered to take upon themselves the organisation of such a body, even purchasing a site in Cavendish-square and supplying the Portland stone; how they were thrown over; how Newton, in later years the first Secretary of the Royal Academy, but in 1753 Keeper of the "Academy of Painting, Sculpture, &c., St. Martin's-lane," endeavoured to evolve his conception of an academy; how the Duke of Richmond's private gallery of casts was generously thrown open; how the then newly-formed Society of Arts came to the rescue and opened in 1760 at their new home the first genuine exhibition of English pictures; how further squabbles led to the split which produced the Spring-gardens exhibition,—its catalogue illustrated by Hogarth's caustic pencil; how the Society of Artists enlisted the services of Dr. Johnson; how the St. Martin's-lane Academy after thirty years of active services in Peter's-court at length moved to Pall Mall (where over the door, at least, the school was dubbed the "Royal Academy"); how the Incorporated Society of Artists continued their painful quarrels; how eventually, thanks to Sir William Chambers, who had been tutor of architecture to Prince George, the interest of royalty was extended to the young body of artists who were soon to form the legitimate Royal Academy; how Reynolds was elected their first President, and George III. in 1768 signed the famous "Instrument" which defines the constitution and government of the authorities now at Burlington House; how the newly-formed Academy founded its schools at their first home in Pall Mall, where Sir Joshua delivered the earliest of his famous discourses; how the Academicians were eventually moved into Somerset House, where the head of Michelangelo over the old entrance still keeps alive the memory of the artists' sojourn in the land of red tape and circumlocution; how the Academy moved to Trafalgar-square, and eventually to their familiar home in Piccadilly; all this, which would demand much space to relate, can be found, by those interested in a little pleasant research, in the pages of Sandby's "History of the Royal Academy," where a small woodcut of "the Old Academy in Peter's-court, St. Martin's-lane," will soon remain all that will serve to recall a spot intimately connected with the story of the arts in England.\*

\* Though in the present changes Peter's-court (which opens out of St. Martin's-lane) will not itself disappear, the Mission House at its further end has already been demolished, all that remains being the doorway, which is now boarded up.

In that story St. Martin's-lane has played no small share. From the outset of its existence in the seventeenth century as an acknowledged thoroughfare, it would seem to have been the residence of more than one personage eminent in art. Kneelm Digby, the intimate friend of J. Vanduyck; Daniel Mytens, the brilliant court painter; and that charmingly English and genuinely artistic poet, Sir John Sackling, are all known to have resided in St. Martin's-lane. To the names of Roubiliac, Sir James Thornhill, Van Nost, Hayman, and Reynolds, artistic residents in the lane, must be added that of Fuseli, while Slaughter's Coffee House, till it disappeared within the memory of many still among us, may be said to have been the Caffè Greco of London, the general meeting-ground of the London artists of the last and the beginning of the present century. Well, indeed, might "Rainy Day" Smith,—who in his "Life of Nollekens" has left a short sketch of St. Martin's-lane,—remark, "St. Martin's-lane affords so rich a mine for anecdote, that I never pass through it without receiving a ray of recollection from almost every window." As next-door neighbour to "Slaughter," lived John Beard the singer, one of the privileged and historic few belonging to the "boards," who may be said, if not to have entered, at least to have skirted the charmed circle of "society" by his marriage with Lady Harriet Powis, daughter of the Earl of Waldegrave. In Beard's parlour (when it passed to his son-in-law, Rich, of Covent Garden Theatre fame) would gather in the congenial atmosphere of tobacco and its "allied comforts," Roubiliac, J. T. Smith's father, Rich and Quin and Woodward the comedians, and George Lambert the scene-painter, and founder of that Sublime Society of Beef Steaks, which has since his day earned for itself a world-wide reputation.

Architecturally, too, St. Martin's-lane commands itself, for here lived Payne, who, among other works, designed Salisbury-street, in the Strand, and the original Lyceum Theatre; the intimate of Gwynn, the architect, one of the foundation-members of the Royal Academy, in which their friend in common, Sam. Wale, was the first lecturer on perspective. Friendships between artists a century ago were, we see, as abiding as in the days which have seen the rise of Melbury-road, for Payne, so Smith tells us, "built two small houses at the end of his garden, purposely to accommodate Gwynn and Wale; the entrances were in Little-court, Castle-street, and are still standing." The recent demolition will, however, at length remove all traces of Little-court, which, with the whole eastern side of Castle-street, will soon have been carted away, with many an unsavoury memory which in modern days has been associated with a thoroughfare little over a century ago the residence of that most sedate and respectable of artists, Benjamin West, P.R.A., and the scarcely less courtly engraver Sir Robert Strange, who here, according to Cunningham, engraved the portrait of Charles I. after Vanduyck, so familiar to all print collectors. With the disappearance of the eastern side of Castle-street will pass away, too, all trace of those gardens where, a century back, vines were able to grow which could produce from one tree a pipe of wine, as Smith tells us was the boast of Powel in St. Martin's-lane, the then keeper of "one of the oldest, colour-shops in London," still, doubtless, remembered by not a few readers; a house immortalised by Hogarth, who has introduced one of its well-planned rooms into the scene of the interior of the quack doctor's, in the series of "The Rake's Progress."

If it be difficult for the Londoner to realise the existence of Powel's vine, few would believe that on the space opposite St. Martin's Church,—where the demolisher's pick is now hard at work,—could, within comparatively recent times, have stood a pair of elaborately carved stocks, which Smith assures us were, within his memory, "standing opposite to the centre of the portico of the church." \* Looking over old maps, it is indeed easy to realise that not so very long since, Gibbs's fine Church of St. Martin truly stood "in the fields," when existed in full bloom the Hop Gardens on the eastern side of the lane, the site of which is still marked by a court bearing their name,

\* The existence of this old-world relic can be believed when it is remembered that within the sound of "Big Ben" there can still be seen, almost at the gate of Waltham Abbey—that far too little-visited memento of our Norman history—a pair of stocks, belonging, if we mistake not, to the seventeenth century.

within but a few steps of May's Buildings, and the quaintly designed red brick façade of the house which Mr. May built about the year 1733, before the reputation was established of his neighbour Chippendale, the upholsterer, who published at his house, No. 60, in St. Martin's-lane, that interesting book of models of furniture, of which a grateful generation made ample use, till fashion flung it aside, to be once more,—within but a few years,—taken up again, and yet another time set aside for the monstrosities of a so-called "art decoration," more calculated than all the picks and shovels of the contractors to rouse from their quiet slumbers the shades of the many artists who have made their home in St. Martin's-lane.

#### THE ROYAL HOLLOWAY COLLEGE FOR WOMEN, MOUNT LEE, EGHAM.

On Saturday last a large number of gentlemen, with a few ladies, were invited by Mr. Geo. Martin-Holloway to a private view of this large and costly building, which is to be opened by Her Majesty the Queen on Wednesday next. The building, as our readers know, was founded by the late Mr. Thomas Holloway, and it is intended to meet the demands for that higher education which modern requirements claim for women, and at the same time to conform to the usages of home life. It is stated in the foundation deed that "The college is founded by the advice and counsel of the founder's dear wife."

The first step taken in furtherance of the project was a conference in 1875, at which were present, among others, the late Professor Fawcett, M.P., Sir James Kay-Shuttleworth, bart., Mr. Samuel Morley, M.P., Mr. David Chadwick, M.P., Dr. Hague, of New York, and Mr. F. Pennington, M.P. Being thoroughly convinced of the importance of the educational question, and foreseeing a great need which must arise with the advance of public opinion, Mr. Holloway at once resolved to take upon himself the whole burden of building and endowing a college on such an unprecedentedly large scale that it would practically form the nucleus of a university for women.

In order to acquire full information, extensive foreign inquiries were personally made by Mr. Holloway and his brother-in-law, Mr. Martin-Holloway, who was associated with him in the scheme from the first.

A suitable site of 95 acres was selected at Mount Lee, Egham, and was conveyed by Mr. Holloway on the 8th May, 1876, in trust to Mr. Henry Driver-Holloway, Mr. George Martin-Holloway, and Mr. David Chadwick. Plans were settled (Mr. W. H. Crossland, F.R.I.B.A., being architect) and a first contract for the original building was entered into with Mr. John Thompson for 257,000*l.*

The first brick was laid by Mr. Martin-Holloway on the 12th September, 1879. The building under the original contract was finished well within the stipulated time of four years, and as a proof of the business capacity exhibited throughout may be mentioned the fact, almost without parallel in a building of such magnitude, that not a shilling was claimed or paid for extras. Other extensive works were subsequently undertaken, which, with the requisite fittings, furniture, pictures, &c., have brought the total outlay up to about 600,000*l.*, exclusive of endowment.

The style of the college is the French Renaissance, in red brick with Portland stone dressings. The whole building forms an immense double quadrangle, and probably covers more ground than any other college in the world.

As to the arrangement of the buildings, the two long blocks are devoted to accommodation for students and professors and class-rooms, the corner pavilions containing class and teachers' rooms. Each student will have a study and a bedroom.

In the three connecting blocks are arranged the chapel, with organ by Mr. Walker (the chapel decorations being the work of Messrs. Clayton & Bell), the recreation-hall, the commodious dining-hall and kitchen, the latter being intended for the purpose of a school of cookery; the spacious museums and libraries, with beautifully-designed ceiling ornamentations, and handsome oak fittings; pianoforte practising and music rooms, gymnasium, racquet-court, lecture theatre, and other rooms, &c.

The notable pictures in the Recreation Hall





A SKETCH IN BIDSTON VILLAGE, CHESHIRE. by F. U. Holme

were collected by Mr. Martin-Holloway at a cost of upwards of 90,000*l.*, and include such celebrated works as Millais's "Princes in the Tower" and "Princess Elizabeth in Prison at St. James's"; Landseer's "Man proposes, God disposes"; Frith's "Railway Station"; Long's "Babylonian Marriage Market" and "The Suppliants"; Luke Fildes's "Applicants for Admission to a Casual Ward," &c.

The College contains in all nearly 1,000 rooms, and provision is made for 250 students and for an ample staff.

On the four façades of the building there is a great deal of sculpture, and in the quadrangles, in the four pediments, some figures, designed and partly completed by Signor Facigna, who also entirely designed and modelled the chapel ceiling.

The fittings and furniture are most substantial and comfortable.

A subway leads from the engineering and other detached buildings to the inside stores.

There are all modern and sanitary appliances, and complete systems of electric and gas-lighting and steam-heating. The electric lighting has been carried out by Messrs. B. Verity & Son. Mr. R. B. Skirrat, of London and Newcastle, has carried out the engineering works connected with the heating, cooking, &c.

The curriculum is left to the discretion of the governing body. Applicants for admission must have attained the age of seventeen, and those who have neither matriculated nor passed senior local examinations are required to pass an entrance examination.

It was the founder's desire that power should be ultimately sought to enable the College to confer degrees.

The College is to be conducted as an orderly Christian household, where the students shall be made to feel, in the words of the Founder, "their individual responsibility and their duty to God."

We will say more about this remarkable building on a future occasion.

**Chester-le-Street (Durham).**—Extensive alterations are about to be carried out at "The Hermitage," near Chester-le-Street, for Mr. Lindsay Wood, from designs by Mr. H. T. Graddon, architect, of Durham, under whose superintendence the work will be carried out.

#### A SKETCH IN BIDSTON VILLAGE, CHESHIRE.

This sketch shows part of a very characteristic bit of English village architecture, and has some additional value as it is feared that in the course of building extension and the new laying out of the neighbourhood it may before long be altered out of all recognition. The village is just below Bidston Hill, a picturesque hill two or three miles from Birkenhead, from which a fine view of the Mersey and Liverpool is obtained in one direction, and in the other direction a view over the flat plain which divides the estuaries of the Mersey and the Dee. Much of the land in the neighbourhood of Bidston has for long existed as picturesque open common, covered with furze and heath, and only dotted with a house here and there; but the extension of Birkenhead suburbs and the laying out of new roads and building land are fast altering all this.

Mr. Holme's sketch represents very faithfully the character of the village, with its substantial old stone houses.

#### ARCHITECTURAL ASSOCIATION.

##### VISIT TO WALTHAM ABBEY AND CROSS.

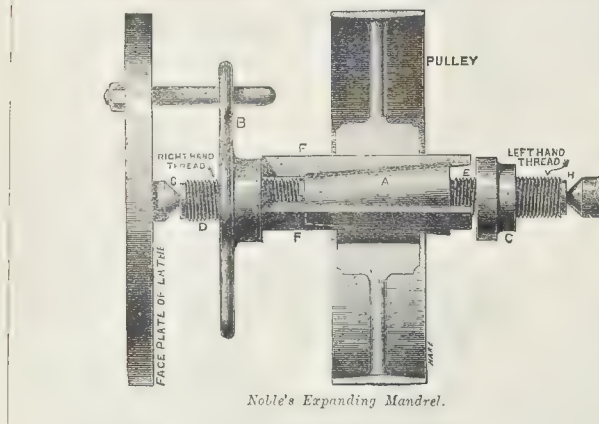
THE Architectural Association made its first summer vacation visit this year on Saturday last, to Waltham Abbey, under the guidance of Mr. Reeve, who gave a brief description of the foundation of the Abbey, and discussed the question of the claim of Harold to the foundation of the existing church, referring to the well-known controversy between Mr. Parker and Mr. Freeman in the *Gentleman's Magazine*. Mr. Reeve, who acted as clerk of the works to Mr. Burgess when he restored the church in 1860, made careful measured drawings of the nave arcade, and he arrived at the conclusion that the two first bays of the arcade from the east end were built in the reign of Henry I., the remainder of the arcade belonging to Harold's church. Mr. Reeve explained the various features in the work which led him to this conclusion, the principal points being connected with the second pier from the east on the south side, which was rebuilt by Mr. Burgess. After examining the beautiful Lady Chapel, the new stained-glass window recently inserted in the tower from the designs of Mr. Burgess repre-

senting the four periods in the day, the ruins of the abbot's house, and the gateway to the abbey, the members passed on to Waltham Cross and saw the drawings prepared by Mr. Postling for the restoration of the Cross, and the interesting collection of drawings and documents relating to the Cross which were shown and described by Mr. Tydeman, the hon. secretary for the restoration fund.

#### NOBLE'S PATENT EXPANDING MANDREL.

EVERYTHING which gives convenience in the workshop is of practical service to the mechanic, and as the lathe is the machine-tool most commonly in use, any invention which adds to its efficiency deserves attention. We have been asked to inspect some expanding mandrels exhibited by the Britannia Company, of Colchester, at their London show-room in Fenchurch-street, and the visit has impressed us with a high opinion of the practical value of these appliances. The ordinary method of the shops in fitting a pulley or bush, or other like object on a mandrel to be turned is to turn down any odd piece of metal slightly conically to fit the central bore or interior hole of the object to a tight fit; and then to hammer and drive it in with the risk of splitting the boss or object into which it is driven. Much work is spoiled in this rude way. The term, expanding mandrel, sufficiently expresses at once the nature of the new invention. It is intended for any class of lathe-work, and consists of a central shaft, E, tapped with a left-handed screw for nearly its entire length; the remainder being cut with a right-handed screw, D, of smaller dimensions, for the purpose of fitting on the carrier. A cone, A, works over the left-handed screw. In its surface are cut three equi-distant grooves, F, into which are placed three corresponding wedges or slides, which are dovetailed into the grooves, and are thus held in position. The bases of these wedges abut against the carrier-collar, B, so that when the mandrel is inserted in the bore or hollow of the bush or pulley, or other article to be turned, the screwing-up of the carrier tightens the wedges by driving them forward within the hollow, and so the object is firmly held. The mandrels are made of various dimensions,





Noble's Expanding Mandrel.

according to the size of work required to be done. Each set is of course of its respective minimum size, but extra wedges to fit are also supplied to suit the same mandrel for dealing with increased sizes of work. The merits which the makers claim for these mandrels are that any article can be fitted on in a moment without fixing in a vice or hammering; that the slides expand automatically with the action of the lathe, the lever of the carrier being brought into contact with a pin on the face-plate of the lathe, and consequently the deeper the cut of the tool the tighter the mandrel holds, as the driver correspondingly tightens up; and that the mandrels always expand parallel to centres, thus assuring true work. They further claim economy of time to the extent that in a few weeks the cost of the new mandrels will be repaid. We do not consider these claims in any way exaggerated, but regard these mandrels as very useful adjuncts to the lathe, and as supplying a want in that branch of their application in which most waste of time and material now in the common practice ordinarily occurs.

#### A BUILDER'S CLAIM: ST. PATRICK'S CATHEDRAL, DUBLIN.

FILE P. DEAN WEST.

THIS case came before Lord Chief Baron and a special jury of the city of Dublin a few days ago. It was an action in which (according to the *Irish Times*) the plaintiff, who is a builder and contractor, sought to recover 4,700*l.*, balance due for sundry works and repairs executed at St. Patrick's Cathedral. It will be remembered that in September, 1883, one of the flying buttresses of the cathedral fell, and in consequence it became necessary to do a much larger amount of work than at the time had been contemplated by the Cathedral Board. The plaintiff carried out the necessary works under the direction of Mr. J. F. Fuller, Architect to the Board, and the work was afterwards measured by Messrs. Patterson & Kempster, building surveyors. A question then arose as to the amount which the Cathedral Board should pay the contractor. The defendants lodged in court 1,000*l.* in settlement of the plaintiff's demand, and they disputed the rest of the account, their defence as to which involved a very large amount of evidence.

Lord Ardilaun and Sir Edward Cecil Guinness, Bart., D.L., were sued as two of the former members of the Board, and they filed separate defences denying their liability.

When the case was called, Mr. Holmes, one of the counsel for the Cathedral Board, stated to the Lord Chief Baron that a conference had taken place between counsel for all parties concerned, and the terms of a settlement had practically been arrived at, and these terms would be considered at a meeting of the Cathedral Board at two o'clock. He would therefore ask his lordship to allow the case to stand till half-past two o'clock.

The Solicitor-General and the other counsel concerned agreed to this course.

The Chief Baron allowed the case to stand till the hour mentioned.

Later in the day counsel attended and stated that in the morning they would ask his lordship to make a consent in the case a rule of court.

The Chief Baron.—Very well. It is stated that by the consent the defendants agreed to pay plaintiff another 1,000*l.* in addition to that lodged in court, and 450*l.* costs.

#### WESTMINSTER ABBEY.

SIR,—An Act has just been passed empowering the Ecclesiastical Commissioners to advance the necessary funds for restoring the exterior of the Abbey. We may, therefore, reasonably expect that the work will now be pushed on with vigour, but seeing that this is somewhere about the tenth more or less important restoration of this great national edifice, it would be satisfactory to the public to know whether the best possible security has been taken that it shall be the last. It is not a very creditable spectacle that the country should be required to keep restoring restorations. Can it not be avoided in future?

As, I believe, the words "restorations and improvements" were, on the motion of Mr. Cavendish-Bentinck, struck out of the Bill, and only the words "substantial repairs" retained, the intended work will be of such a comparatively simple nature that it would perhaps be only reasonable to leave it, without comment, in the hands of the Abbey architect, for whose genius all who know his beautiful works must have the greatest admiration. But though simple from an architectural point of view, it will be a very important practical work, and Mr. Pearson is not, I believe, responsible for the selection of the stone, for it was in use at the Abbey when he received his commission.

The decay of improper stone has led to these repeated restorations,—ten or a dozen of which are historically recorded,—and as there is some doubt about the matter it may very properly be asked, What guarantee is there that the stone in use for this present restoration,—already commenced,—is of such a nature as to put an end to the lamentable failures for the future? I venture to say there is none. Chemical tests, as we know too well, are dangerously mis-leading. The absence of any injurious effect of time upon the stone of the buildings of manufacturing towns is the only safe monitor, and such buildings are sufficiently numerous.

Chilmark stone,—the stone in use at the Abbey,—is a very beautiful material, and if it were about to be used on Salisbury Plain instead of at Westminster, it would be unnecessary to question its suitability for the purpose. But it is a limestone, and costly experience has proved that all limestones, whether oolites or dolomites, are destroyed sooner or later by the noxious gases which contaminate the air of Westminster. As well may we expect water to mix with oil as carbonate of lime to remain unchanged in the presence of muriatic acid, carbonated hydrogen, ammonia and the dozen other destructive gases and fuliginous compounds of our atmosphere. If it had hitherto been so accommodating, British tax-payers would not now be compelled to spend 2,500*l.* a year upon the external repairs of an adjacent national edifice, and which amount a late First Commissioner of Works has stated would be required as a permanent expenditure. Lambeth Palace has been restored twice in living memory. Only recently the mason's scaffold was removed from the Treasury Buildings. At Buckingham Palace the lives of the sentries were in danger from falling stones, immediately after the east front was completed. Now, as the material used for these buildings (and for many more) was derived from some well-known limestone quarry, and has so lamentably failed, common sense and actual experience,—to say nothing of chemical science,—seem, I think, to demand that stone of a different nature should be used for the "substantial repairs" of the Abbey.

There is no difficulty in the matter, except it be that of overcoming a pernicious local custom. There is no excuse; for in these days railways, shipping, and quarries yielding the most durable stone abound. In the northern towns, if lime-stone is used at all, it is only to throw it into a

furnace for the reduction of ores, and for other useful economic work, but never for a building of any importance. Their atmosphere is much the same as that of London.

The additional cost, at the outset, of proper stone for the restoration of the Abbey would be trifling in comparison with that of the repeated repairs rendered necessary by the injudicious use of a material quite unsuited to the local circumstances. URBANUS.

#### PROVINCIAL NEWS.

**Handsworth.**—The new Drill-hall for the 1st V.B. South Staffordshire Regiment of Volunteers, just opened at Soho-road, Handsworth, has been designed by Messrs. Osborn & Reading, architects, of Birmingham, the size being 102 ft. by 75 ft. The front block of accessory buildings comprise orderly-room, armoury, clothes store; meeting or lecture room, 43 ft. by 20 ft.; and sergeant-instructor's house, gateway, &c. Messrs. Barnsley & Sons are the builders.

**Repton (Derbyshire).**—An important addition to the school buildings was opened on Thursday, the 17th, by Mr. Justice Denman (an old Reptonian). The new buildings occupy the site of the old Priory Church nave, and have been so arranged as not to disturb any of the remains *in situ*. The old wrought stone found during the excavations has been built up by Mr. G. W. Haswell, the clerk of works, as a wall on the north side. The new buildings are from designs of Mr. A. W. Blomfield, M.A., and are of the Perpendicular period, harmonising with the adjoining priory house. The west gable is flanked by embattled turrets, and the south side is broken up by four large arches leading to the cloisters, off which run the class-rooms, lavatories, &c. The main staircase and entrance to hall above are at the east end, over the class-rooms, &c. One large hall has been built (101 ft. by 40 ft.) in memory of the late Dr. Pears, head master. It is a room of grand proportions, and is roofed with an open hammer-beam roof, springing off stone corbels, and the room is lined round with oak panelling, 7 ft. high, and at the west end is an orchestra capable of holding a full band and chorus; on it is built a three-manual organ (with oak case specially designed by Mr. Blomfield), with Brindley & Foster, of Sheffield. The buildings have been built throughout with Coxenbeck (Derbyshire) stone. The pavements and staircases being built with Stuart's granolithic stone. The heating and ventilation have had special attention paid to them, and these important matters have been admirably carried out by Mr. R. Crittall, Manchester-square. The whole of the buildings have been carried out by Messrs. Walker & Slater, of Derby, under the direct superintendence of Mr. Geo. W. Haswell, of Chester.

**Swanage, Dorset.**—A marine drive, of great beauty, is being made round Durlstone Head, at the expense of Mr. George Burt, of Westminster. It commands views of the rock-bound coast (including Tilly Whyne), which is very fine here, consisting of Portland stone cliffs, against which the green seas wash, it being several fathoms deep close under the cliff without any shore whatever. The works, which are intended for the public use, consist of a drive encircling the headland, and working spirally up to the summit, where a pavilion is to be erected. A large circle is formed of large stones, which are placed in such a position as to denote the points of the compass, and serve for seats. The whole will, when complete, form an admirable pleasure park for the inhabitants of the town.

**Church at Cae-Gurwen, Carmarthen-shire.**—A new church, built by Mr. C. Edwards, of Leominster, from the plans and under the superintendence of Mr. E. H. Lingen-Barker, has just been opened at this place. It consists of a nave 50 ft. by 24 ft., with a well-developed chancel, commodious vestry, and south porch. The walls are of local stone, and the wood-work is principally of pitch-pine. The floors are laid with Webb's Worcester tiles, and the church is warmed by Porritt's heating apparatus. The cost has been 638*l.*, which, for 200 persons, is only 3*l.* 4*s.* per head.



## The Student's Column.

## OUR BUILDING STONES.—XVI.

## ARTIFICIAL STONES (continued).

## Ransome's Artificial Stone.

**S**TONE bearing this title has been before the public for many years. It is made of clean sand artificially dried, mixed into a paste with silicate of soda, to which a small quantity of ground-up or powdered stone is added. The whole is thoroughly mixed together in a mill, being subsequently pressed into moulds and turned out as blocks when dry. A cold solution of chloride of calcium is then poured over them, after which they are placed in a hot solution of the same chemical. In order that the pores of the material shall become thoroughly filled, in particular cases the chemical is introduced under pressure. A cross combination, or double decomposition ensues; chloride of sodium is washed out, and silicate of lime is formed within the stone. When this process is completed, and the material has dried, the excess of chloride of sodium which has formed on its exterior is wiped off.

It would be difficult to imagine an artificial method of producing stone, the result of which more closely resembles the one which in nature produces a sandstone with a calcareo-siliceous matrix. For the artificial stone now under consideration is nothing more nor less than a sandstone with a matrix of silicate of lime, with a little powdered foreign matter in it.

We have repeatedly observed that natural sandstones of this description are amongst the most durable stones, and we should expect to find that this artificial product, which is so similar to them, is almost as durable. The principal matters, perhaps, upon which the actual durability of Ransome's stone to a great extent depends, are the purity of the chemicals used, and the nature and amount of foreign powdered matter added to the sand in mixing, at the commencement of the process.

The material has been found in moulds, in imitation of decorative carving; a use of it which cannot be too strongly deprecated, and which is fatal to true artistic feeling and workmanship. We do not, however, see the slightest objection to the use of this homogeneous stone for walls and dressings of buildings in districts where it can be used as economically as natural stone, other things being equal. Moreover, like the average limestones and sandstones, it can be worked with the chisel whenever necessary. In this respect it has an advantage over some other artificial stones, where the removal of the outer layer of the material is a source of decay.

Many experiments on Ransome's stone are recorded in Gwilt's "Encyclopædia," p. 485.

It is generally admitted that it absorbs about 61 per cent of water, although as high as 12 per cent. has been recorded (see Wray "On Stone"). It weighs between 110 lb. and 120 lb. per cubic foot, whilst its resistance to crushing, per inch, is about 2 tons.

Mr. Ransome has made several improvements on his original stone, and in 1870 he invented a superior variety, called

## Aponite.

This material can be made on the works where it is intended to be used. It consists in mixing Farnham stone, or soluble silica, with silicate of soda or of potash, together with lime, sand, alumina, or other convenient materials in proper proportions. The alkaline silicate is then decomposed, the silica combining with the lime to form an insoluble silicate of lime, and also forming, with some of the materials, a silicate of alumina, whilst the caustic alkali, set free by the decomposition, seizes upon the soluble silica of the Farnham stone, and forms a fresh silicate, which in turn is decomposed by more lime.\*

The stone is said to absorb from about 5½ to 12 per cent. of its weight in water, and weighs from 130 lb. to 140 lb. per cubic foot.

It is used for balustrades, steps, landings, &c.

## Victoria Stone.

Many forms of Portland cement are employed in building operations. It would be out of place here to describe any of the ordinary kinds of that cement, as well as those which do not rank as building stones, and although Victoria stone is principally formed of it, an

important part of the process of the manufacture of the stone is a decided departure from the ordinary methods of making that cement.

The stone is made somewhat in the following manner:—Granite, obtained from Groby Quarries, near Leicester, is pulverised and subsequently washed. This washing frees it from any soft or foreign substance which might prove detrimental to the uniform character required in the stone. It is then mixed with the best Portland cement. If desired to make slabs for pavements, it is then moulded in frames, which are lined with metal, so that both sides of the slab are equally level, and the edges being true, enable the different slabs to be evenly joined together, thus causing the pavement to present a symmetrical appearance. The next stage of the process is to take the slabs of cemented material out of the moulds about a week after, and immerse them in baths of silicate of soda, where, according to the trade circular, they are allowed to remain about eight or ten days.

The silica is obtained from under the chalk deposits of Farnham in Surrey, and prepared in a solution.

The lengthened immersion causes the slabs to become impregnated with silica, and produces a chemical change. The silicate combines with the lime in the cement, the mass being made hard by the silicate of lime so formed.

How far the silicate renders the stone impervious to water, appears from experiment to be uncertain. We will not inquire into the causes of this variability in structure, and, indeed, no result of practical value would be obtained by it, for, as the stone only absorbs from 2 to 7½ per cent. of its weight in water in twenty-four hours, it will be seen that if we take the highest of these figures as the ordinary absorption power, even then it would be tolerably compact, and, in this respect, compare favourably with many of the natural stones used for the same purpose.

Wray says that the thinner flags are less compact and more absorptive than the thicker ones.

When the stone is taken out of the silica tanks it is exposed to the air for rather more than a month before being utilised.

The process of manufacture of the material when not made into slabs is nearly the same, allowances being made under certain conditions.

The quality of the Victoria stone was not so uniform when it was first made, because too much reliance was placed upon the immersion in silicate of soda. It was thought that this chemical would render durable almost anything it bound together in the shape of concrete, but it was found necessary to use only the better quality of cement, and also to wash the crushed granite, which was not previously done.

The crushing-weight of the stone is stated to be 6,440 lb. per cubic inch, and its weight from 140 lb. to 160 lb. per cubic foot. An average of ten briquettes of Victoria stone showed that it was capable of bearing a tensile strain of about 794 lb. per square inch.

It is used principally for paving, but in a lesser degree also for window and door sills, balustrades, landings, tanks, sinks, &c. The clock tower and chimney-stacks of Messrs. Peek, Frean, & Co.'s factory, Bermondsey; and at Fresh Wharf, London Bridge, are examples of the stone when built up.

**Sorel Stone** is made of calcined magnesite, mixed with sand or powdered marble, and wetted with a liquor containing a considerable amount of magnesium chloride. The whole is then forced into moulds of different materials. In three or four days it becomes hard enough to handle. Its crushing-weight is very high.

**Patent Petrammite and Rust's Vitified Marble** are other examples of stone artificially made.

**Mortomley.**—On Whit Sunday the new Roman Catholic Church and Schools erected by the Duke of Norfolk at Mortomley, near Chapel-town, were formally opened. The foundation-stone was laid on the 26th July, 1886. The buildings, which occupy a site near Mortomley Hall, consist of church, school, Presbytery, and house, provision being made for future extensions. The church, which is dedicated to "Our Lady, Refuge of Sinners," has cost upwards of 1,000l. Mr. Edward H. Lloyd, of London, was the architect.

## RECENT PATENTS.

## ABSTRACTS OF SPECIFICATIONS.

5,445, Chimney Cowl. H. G. Burson.

The improvements are effected by the arrangement of the parts which form the chimney-cowl. Special apertures and air-pressure or deflecting plates for increasing draught are so arranged that the mouth always faces the wind as it revolves upon its spindle. As the air blows upon a deflecting plate, it causes a greater pressure as it reaches the centre of the shaft, and creates a partial vacuum assisted by the inlets discharging the smoke through the mouth of the cowl, rendering a down-draught impossible.

4,618, Dovetailing Machines. John Anderson.

This is an improvement on a former invention for use in machines having vertical cutters, dove-tailing wood joinery, boxes, drawers, &c. It is capable of being used for any required size of dove-tails by simply changing the cutters, as there are no teeth to obstruct the variation as is the case, with carriers hitherto in use.

5,413, Window-Sashes. J. Carter.

The window, when shut, has an ordinary appearance, without cords, weights, or boxes. At the lower part of the stiles of the sash is a third bracket of brass or iron, with a screw passing through it into the window-frame. This forms the fulcrum on which the sash revolves, and they can be completely reversed, and opened and let down for cleaning, painting, or repairing. The upper sash has a latch on the top rail latching into the window-frame, and the lower sash shuts close against the top sash and against the woodwork.

8,066, Manufacture of Plaster. R. Stone.

First the raw materials,—chalk, limestone, and analogous materials,—are immersed in tanks, or otherwise, and soaked with vitriol as they are taken from the quarries. They are then loaded into furnaces or kilns, mixed with fuel, such as coke, coals, &c., suitable for producing a very high temperature, which has the effect of reducing the materials so as to prevent contraction. In order to assist in raising the heat, and producing such temperature, a reservoir is filled with compressed air, and a continual supply is forced amongst the materials until thoroughly exhausted. Special mixtures are specified, and also special grinding-machines and crushing-rolls, with annular grooves or corrugated surfaces for grinding and disintegrating the material.

## NEW APPLICATIONS FOR LETTERS PATENT.

June 11.—7,827, J. Shaw, Cooking Ranges.—7,863, P. Hoppe, Raising or Hoisting.—7,866, J. Banks, Door Bolts and Staples.

June 12.—7,871, J. Peacock, Window-sash Fastener.—7,873, S. Harrison, Notched Blocks for Building Walls Downwards.—7,880, J. Armstrong, Water Waste-preventing and Regulating Cisterns.—7,882, C. Coutts, Corrugated Water Supply Pipes.—7,921, G. Walker, Laying Wood Flooring.—7,924, J. Carpenter, Cleaning Floors, &c.

June 15.—7,841, J. Hill, Saw-sharpening Apparatus.—7,954, H. Tryford, Water-closets, &c. Flushing same.—7,955, T. Tryford, Water-closet Basins.—7,985, E. Hughes, Hoisting Machinery.—7,991, E. Edwards, Air-tight Cover for Water-Closets, &c.

June 16.—8,000, J. & A. Wallwork, Traps or Sinks for Drains and Water Waste-pipes.—8,025, J. Gough, Apparatus for Cleaning Chimneys.

June 17.—8,067, P. Milligan, Manufacture of Bricks.—8,081, F. Morgan, Casement Fasteners.—8,085, R. Bowman, Electrical Thief-proof Lock.—8,086, J. Haswell and J. Boswell, Chimney or Ventilating Cows or Tops.—8,090, R. Ash, Ventilation.

## PROVISIONAL SPECIFICATIONS ACCEPTED.

5,638, J. Russell, Cooking Ranges.—5,678, J. Mitchell, Water Regulating and Waste-preventing Apparatus.—6,680, J. Jackson, Flushing Cisterns for Water-closets.—5,706, J. Macleish, Water Fittings for Baths.—5,710, G. Porter, Dust Bins.—5,927, J. Strick, Steps or Ladders.—5,991, J. & J. Edge, Dies for Tiles, Bricks, &c.—6,007, T. Harby, Party-wall Doors for Fireproof Buildings, &c.—6,012, H. Owens, Adjustment for Fanlights or Casements.—6,106, J. Fryer, Chimney Cowl.—6,269, A. Clark, Stoves.—6,352, J. Wilson, Securing Door Handles or Knobs to Spindles.—6,328, A. Huxley and Others, Syphon Flushing Cisterns.—5,381, R. Rastriek and G. Hughes, Cutting Mitres, &c.—5,627, C. Jordan, Self-fastening Metal Letters and Figures.—5,723, J. and A. Lake, Mortising Machine.—5,891, E. Verity and Others, Dead Weight Latch and Stay for Regulating and Securing Fanlight Windows, &c.—5,921, R. Mason, Sanitary Dust Bin.—5,942, F. Stent, Door Spring.—6,058, W. Potter and R. Papineau, Door Closers.—6,379, D. Frew, Hinges, &c.—7,232, E. Hatton, Hopper Ventilators.—7,396, H. Heath, Ventilators.

## COMPLETE SPECIFICATIONS ACCEPTED.

Open to opposition for two months.

9,370, J. Wailes, Cutting Drains, Tranches, &c.—14,113, J. Honeyman, Ventilators.—69, R. Stevens, Dry Glazing.—5,556, J. Smith, Stoves, Fire-grates,

\* See "Guide to Museum of Prac. Geol.," p. 45.



&c.—9,278, M. Stephenson, Pipe Couplings.—3,358, A. Lovekin, Blow Pipes.—4,558, W. Lennon, Counterblances for Window-sashes, &c.—6,685, J. Cooper, Metallic Fences.

### RECENT SALES OF PROPERTY.

#### ESTATE EXCHANGE REPORT.

JUNE 16.

By A. & A. FIELD.	
Kingsland—69 and 61, Hertford-road, and a ground-rent of 1. a year, term 31 years, ground-rent 71. 1 s.	2,680
36, Ball's Pond-road, 66 years, ground-rent 61. 10s.	410
North Bow—134, Arnaugh-road, 76 years, ground-rent 31.	285
131, Usher-road, freehold	400
63, Libra-road, freehold	380
By FULMER & FULMER.	
Kennington—Profit rental of 881. 4s., term 33 years	970
Profit rental of 301. 1s., term 15 years	225
Wandsworth—Ground-rents of 391. 16s., reversion in 54 years	1,110
Ground-rents of 261. 10s., reversion in 58 years	840
Ground-rents of 201. s., reversion in 44 years	640
Ground-rents of 2381. 18s., reversion in 73 years	6,940
Ground-rents of 341. 4s., reversion in 40 years	900
Ground-rents of 521. 1s., reversion in 66 years	1,240
Numerous ground-rents amounting to 6081. 13s. 7d. sold for	12,440

JUNE 17.

By Mr. LUCKHURST.	
Clapham—7, Hazell-road, 76 years, ground-rent 61. 10s.	330
Brixton—69 and 106, Milkwood-road, 80 years, ground-rent 101.	500
By J. SHILLOCK.	
Seven Sisters-road—53, Durham-road, freehold	330
By GLANIER & SONS.	
Putney—73, High-street, 92 years, ground-rent 231.	1,920
By NEWSON & HARRING.	
Islington—10, Queen's Head-street, 50 years, ground-rent 61.	405
363, Liverpool-road, 33 years, ground-rent 101.	500
54 and 56, Copenhagen-street, 67 years, ground-rent 241.	555
Stoke Newington—11, Millard-road, 66 years, ground-rent 61. 10s.	240

By R. TAYLOR & CO.	
East Dulwich—41, Ady's-road, 89 years, ground-rent 61. 10s.	320
Kennington—Improved ground-rents of 241. 10s., term 54 years	410
Improved ground-rents of 181. s., term 54 years	255
Holloway, Fairmead-road—Chester villa, 81 years, ground-rent 91.	400
Clapham Park—139, 141, and 143, Bedford-road, 37 years, ground-rent 251.	600

By R. STIMSON.	
Peckham—13 to 23 odd, Shard-road, 50 years, ground-rent 121.	1,070
Bermondsey—43, Grange-road, freehold	400
103, Abbey-street, freehold	375
64, Larnaca-road, freehold	400
Wandsworth-road—No. 225, and 3 and 4, Wilcox-road, 37 years, ground-rent 101.	1,300
6 to 14 even, Wilcox-road, 37 years, no ground-rent	1,200
2 and 4, Simpson-street, 37 years, no ground-rent	300
18 to 22 even, Wilcox-road, 34 years, ground-rent 161. 10s.	880
1 to 11 odd, Simpson-street, 34 years, ground-rent 81.	900
21 and 23, Neptune-street, and 3 and 4, Cape cottages, 32 years, ground-rent 81. 10s.	410
28, Hartington-road, 32 years, ground-rent 41. 6s.	330

By FULMER & FULMER.	
Clapham, 5 and 5a, the Pavement, freehold	3,350
6, 7, and the Pavement, freehold	9,890
Kilburn—97, 101 to 109 odd, Malvern-road, 671 years, ground-rent 591. 4s. 6d.	2,980
Wandsworth-road—Ground-rents of 2901. 16s., reversion in 81 years	6,060
Ground-rents of 611. 3s., reversion in 58 years	1,620
Several ground-rents amounting to 1721. 12s., sold for	4,735

JUNE 18.

By W. PABISH.	
Forest Gate—The residence, Elm Cottage, freehold	1,400
By W. B. MAY.	
South Norwood, Avenue-road—A plot of garden land	370

By HORNE, SON, & EVERSFIELD.	
East Dulwich—Whitburn Lodge, 33 years, ground-rent 301.	810

By BAKER & SONS.	
Liverpool, West Derby—Copyhold land, 4s. 2r. 39p.	1,000
By F. LEWIS & CO.	
Chelsea, Flood-street—Ground-rent of 91. s., term 33 years	131
College-street—Ground-rent of 61. s., term 22 years	75

### MEETINGS.

SATURDAY, JUNE 26.  
St. Paul's Ecclesiastical Society.—Visit to Ely. Train from Liverpool street, 11 a.m.

TUESDAY, JUNE 29.  
British Museum.—Mr. John A. P. MacBride on "The Tomb of Mausolus and Greco-Roman Art." 2.30 p.m.

Statistical Society.—Anniversary Meeting. 4 p.m.

WEDNESDAY, JUNE 30.  
Society of Arts.—Annual General Meeting. 4 p.m.

Dundee Institute of Architecture.—Visit to Tay Bridge. 12 noon.

THURSDAY, JULY 1.  
Royal Archaeological Institute.—Professor Bunsell Lewis on "The Antiquities of Siam." 4 p.m.

Society for the Encouragement of the Fine Arts.—Morning Meeting.

SATURDAY, JULY 3.  
Architectural Association.—Visit to Harrow (see advt. for particulars.)

### Miscellaneous.

**A New Laundry at Aberdeen.**—The formal opening of the Bon-Accord Steam Laundry took place on the 9th inst. The new buildings, which are situated at Craighaw, in the parish of Nigg, on the rising ground on the south side of the Dee, opposite the Duthie Park, are of granite; and the river front being of fair-picked ashlar work, the triple-roofed structure presents a prominent and pleasing aspect as viewed from the park or the riverside esplanade at present in course of construction on the north bank. The designs were furnished by Mr. Duncan McMillan, architect, Aberdeen, while the whole of the machinery has been supplied by Messrs. Thomas & Taylor, of Stockport. The Ironing and Calendering Room contains a patent steam mangle (with reversible motion), two calendering machines, starch-boiler, starch-washer, rinsing-machine, and tables for ironing and folding on. At the north end is an airing-chamber, with a patent iron-stove, which is stocked in the usual way, but from which the irons can be taken without entering the chamber. Off this, to the east, are the drying-closets, with coils of galvanised steam pipes around and under the sliding frames, which run on grooves in the floor. Above the drying-closets is the Curtain Room, for drying and stretching window-curtains, fitted up with the latest improvements. South of these is the Public Wash-house, furnished with four eccentric-motion washing-machines, and blasing, wringing, and rinsing machines. There is also a hydro-extractor, the frame of which is of cast-iron, and the perforated cage of copper and brass: it works up to 1,000 revolutions a minute. Opening from the public wash-house is a private wash-house for ladies' underclothing, &c., similarly provided with smaller machines, and the washers having cold-water spray apparatus attached. The water used is taken from the Craighaw Burn. It is stored in a trapezoid-shaped reservoir, from which it is conducted to a sunk well under the engine-house (on the east side of the building), from which it is lifted by a double-action steam-pump as wanted. There are two Galloway boilers (27 ft. by 7 ft. 6 in. each), and in the boiler-house is a patent heater. The engine is a horizontal one of 12 h.p., and at the top of the building near the centre is a patent filter, hot-water tank, and cold-water tank. The Receiving and Issuing Rooms are fitted up in the usual way.

**The Wesleyan Chapel, Studley-road, Clapham-road,** has been recently redecorated and altered, and was opened last week with special services. The window openings have been entirely reconstructed and filled in with traceried frames, with coloured ornamental lead glazing, with new moulded strings and labels to the windows outside. The interior of the chapel has been reconstructed and entirely coloured in the Renaissance style, with quiet tints of green, Pompeian red, and gold. The lighting arrangements have been entirely altered, and a new sunburner fixed in the ceiling, with specially-designed brass gas fittings under galleries. The school and class-rooms have also been altered and redecorated. The interior decoration has been carried out by Messrs. Heaton, Butler, & Bayne, of Garrick-street; the gas arrangements and ventilation by Messrs. Z. D. Berry & Sons; the coloured lead glazing by Mr. Odell; the builder was Mr. F. Higge, and the whole of the works have been carried out from the designs and under the superintendence of Mr. Sidney R. J. Smith, and Mr. Arthur Catt, architects, of Furnival's Inn.

**Colonial and Indian Exhibition.**—Arrangements have been made for the examination in the Indian Court of certain commercial products, which are believed to be insufficiently known or to be suitable for new purposes. Among the substances which will be examined are fibres, silk and silk substitutes, drugs, tobacco, gums and resins, minerals, oils, oil-seeds and perfumery, dyes, mordants and pigments, timbers, tanning materials and leather, and food-stuffs. Any visitors to the Exhibition, who are interested in the subject, will be permitted to attend these examinations of products, which will take place in the Commercial-room attached to the Economic Court, where all further information may be obtained. Should the results of this examination render such a course desirable, conferences of a formal character will probably be held at a later date.

**The Metropolitan Sewage Sludge.**—At the meeting of the Metropolitan Board of Works this Friday, the 25th of June, the Works and General Purposes Committee will present a report stating that the Committee have considered the designs, specifications, and tenders for a vessel capable of conveying 1,000 tons of sewage sludge out to sea, and are of opinion that the design sent in by the Barrow Shipbuilding Company (Limited) is, with certain modifications which they have agreed to make, best suited for the Board's requirements, and recommending that one vessel be ordered from the Company in accordance with such design, and that the Solicitor be instructed to prepare the necessary contract. And further recommending that Mr. J. Casey be informed that the Board are not prepared to adopt his suggestion to throw open to the public the designs which they have received for sludge-vessels, and that all the designs which are not accepted will be returned.

### PRICES CURRENT OF MATERIALS.

TIMBER.	£.	s.	d.	£.	s.	d.
Greenheart, B.G. ....ton	6	5	0	7	0	0
Teak, B.L. ....load	11	0	0	16	0	0
Sequoia, U.S. ....foot cube	3	4	0	2	9	0
Ash, Canada ....load	3	0	0	4	10	0
Birch " ....load	2	10	0	4	0	0
Elm " ....load	3	10	0	4	10	0
Fr. Dantic, &c. ....load	1	10	0	4	0	0
Oak " ....load	2	10	0	5	0	0
Canada " ....load	4	0	0	6	10	0
Pine, Canada " ....load	2	10	0	4	0	0
" yellow " ....load	3	0	0	5	0	0
Lath, Dantic " ....fathom	3	10	0	6	0	0
St. Petersburg " ....load	4	0	0	6	0	0
Wainscot, Russ. crown "log	2	15	0	4	0	0
" Odessa, crown "log	1	7	0	8	0	0
Doals, Finland, 2nd and 1st, std. 100	7	0	0	8	0	0
" 4th and 3rd "std. 100	6	0	0	7	0	0
Riga "std. 100	6	0	0	7	0	0
St. Petersburg, 1st yellow	8	0	0	14	0	0
" 2nd "std. 100	7	0	0	8	0	0
" white "std. 100	7	0	0	10	0	0
Deals, Swedish "std. 100	6	0	0	15	0	0
White Sea "std. 100	7	0	0	17	0	0
Canada Pine, 1st "std. 100	17	0	0	30	0	0
" 2nd "std. 100	12	0	0	17	0	0
" 3rd, &c. "std. 100	6	0	0	19	0	0
" Spruce 1st "std. 100	8	0	0	11	0	0
" 3rd and 2nd "std. 100	6	0	0	7	10	0
New Brunswick, &c. "std. 100	5	0	0	7	0	0
Battens, all kinds "std. 100	4	0	0	12	0	0
Flooring Boards, sq. 1 in. Prepared, first	0	9	0	0	13	0
" second "std. 100	0	7	0	0	8	0
Other qualities "std. 100	0	9	0	7	0	0
Cedar, Cuba, "std. 100	0	0	3	0	4	0
Honduras, &c. "std. 100	0	0	2	0	4	0
Australia "std. 100	0	0	2	0	3	0
Mahogany, Cuba "std. 100	0	0	5	0	0	7
St. Domingo, cargo average	0	0	5	0	0	7
Mexican "std. 100	0	0	3	0	0	4
Tobacco "std. 100	0	0	4	0	0	4
Honduras "std. 100	0	0	4	0	0	8
Maple, Bird's-eye "std. 100	0	0	6	0	0	8
Rose, Rio "std. 100	7	0	0	10	0	0
Balsa "std. 100	8	0	0	10	0	0
Box, Turkey "std. 100	5	0	0	17	0	0
Satin, St. Domingo "std. 100	0	7	0	0	11	0
Porto Rico "std. 100	0	0	8	0	1	2
Walnut, Italian "std. 100	0	0	4	0	0	5

METALS.	£.	s.	d.	£.	s.	d.
IRON—Pig in Scotland ....ton	0	0	0	0	0	0
Bar, Welsh, in London ....ton	4	10	0	4	17	0
" in Wales "std. 100	4	5	0	4	10	0
" Staffordshire, London ....ton	5	0	0	8	0	0
Sheets, single, in London ....ton	6	15	0	8	19	0
Hoops "std. 100	5	0	0	7	0	0
Nail-roads "std. 100	5	10	0	6	10	0
COPPER—						
British, cake and ingot ....ton	42	10	0	43	0	0
Best selected "std. 100	43	10	0	44	0	0
Sheets, strong "std. 100	48	0	0	50	0	0
" India "std. 100	46	0	0	47	0	0
Australian "std. 100	0	0	0	0	0	0
Chili, bars "std. 100	40	0	0	40	0	0
YELLOW METAL—						
"std. 100	0	0	4	0	0	4
LEAD—Pig, Spanish ....ton	13	0	0	0	0	0
English, common brands ....ton	13	10	0	0	0	0
Sheet, English "std. 100	14	0	0	14	5	0
STEELS—						
Silesian, special ....ton	14	0	0	14	2	0
Ordinary brands "std. 100	13	15	0	14	0	0
TIN—						
Banca "std. 100	0	0	0	0	0	0
Billon "std. 100	0	0	0	0	0	0
Straits "std. 100	101	0	0	0	0	0
Australian "std. 100	101	0	0	0	0	0
English ingots "std. 100	106	0	0	0	0	0
ZINC—						
English sheet "std. 100	18	0	0	18	5	0

OILS.	£.	s.	d.	£.	s.	d.
Linseed "std. 100	21	0	0	21	10	0
Cocconut, Cochiti "std. 100	32	0	0	0	0	0
Ceylon "std. 100	26	0	0	0	0	0
Copa "std. 100	0	0	0	0	0	0
Palm, Lagos "std. 100	24	0	0	0	0	0
Palm-nut Kernel "std. 100	0	0	0	0	0	0
Rapeseed, English pale "std. 100	23	0	0	23	5	0
" brown "std. 100	21	15	0	0	0	0
Cottonseed, refined "std. 100	18	5	0	19	5	0
Tallow and Oleine "std. 100	25	0	0	45	0	0
Lubricating, U.S. "std. 100	8	0	0	10	0	0
" Refined "std. 100	8	0	0	13	0	0
TURPENTINE—						
American, in casks ....cwt.	1	4	6	1	5	0
Tar—Stockholm "std. 100	0	17	0	0	17	6
Archangel "std. 100	0	10	6	0	11	3



## CONTRACTS AND PUBLIC APPOINTMENTS.

Extrane of Advertisements in this Number.

## CONTRACTS.

Nature of Work, or Materials.	By whom required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
New Church of St. Peter, Accrington.	The Building Com. ....	H. Ross .....	June 28th ..	i.
Additions &c., to Owens College, Manchester	do. ....	A. Waterhouse .....	do. ....	ii.
Asphalte Paving .....	City of Liverpool .....	F. U. Hulme .....	July 2nd ..	xviii.
New Vicarage and Church, Llanwddyn	School B'd for London	Official .....	do. ....	ii.
Painting and Repairing Schools .....	Bermundsey Vestry .....	do. ....	July 5th ..	ii.
Aberdeen Curb .....	do. ....	do. ....	do. ....	ii.
Broken Guernsey Granite .....	do. ....	do. ....	do. ....	ii.
Stone Paving .....	Gt. Eastern Ry. Co. ....	do. ....	do. ....	ii.
New Station, Hereford .....	L. B. and S. C. Ry. Co. ....	do. ....	do. ....	ii.
Renovation and Repairs to Buildings .....	Westminster Bd. of Wks	G. R. W. Wheeler .....	July 7th ..	ii.
Wood Paving .....	Paddington Vestry .....	do. ....	do. ....	xviii.
Erection of Workshops .....	Gloucester Vagon Co	McLellan & Son .....	July 10th ..	ii.
Old York Paving .....	Maidstone Local Board	Official .....	July 12th ..	ii.
Wood Paving .....	West Ham Local B'd.	Lewis Angell .....	July 13th ..	ii.
Electric Light and Gas-Fitting .....	Eastbourne Town Cnd.	W. T. Foulkes .....	July 15th ..	ii.
Brick Sewer and Subway, &c. ....	Met. Board of Works .....	Official .....	July 22nd ..	ii.
Six Houses and Stable, Waltham Green	do. ....	W. Connock .....	Not stated ..	xviii.
Block of Buildings, Landport .....	Prudential Assurance Co.	A. Waterhouse .....	do. ....	xviii.

## PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page.
Assistant Surveyor .....	Hackney Board of Wks	180 <i>l</i> . .....	July 6th ..	xvi.
Surveyor .....	Stockton U. S. A. ....	350 <i>l</i> . .....	July 10th ..	xvi.

## TENDERS.

BUCKHURST HILL.—For laying a sewer in the Hoeback-lane, Buckhurst Hill, for the Epping Rural Sanitary Authority. Mr. Edmond Egan, surveyor, Loughton:—

Bendall, Walthamstow .....	£3,870 0 0
Barton, Newcastle-on-Tyne .....	2,154 0 0
Wood, Cheshamford .....	2,094 0 0
Cumfrie, Barking .....	2,070 0 0
Bottoms, Battersley .....	1,992 0 0
Neave, Woodford .....	1,869 0 0
Dunmore, Crouch End .....	1,863 0 0
Whellam, Weymouth .....	1,845 0 0
F. & J. Wood, Mile End .....	1,826 10 0
Nicholls, Wood Green .....	1,825 0 0
Eae, Wimbeldon .....	1,807 0 0
Wells, Woodford .....	1,809 0 0
Egan, Buckhurst Hill .....	1,804 0 0
French, Buckhurst Hill .....	1,831 10 0
Jones & Wood, Birmingham .....	1,815 0 0
Kallett & Wright, West Kensington	1,797 0 0
Potter, Clapton .....	1,769 0 0
Fors & Co., Westminster .....	1,659 0 0
Young, Ingatestone .....	1,620 0 0
Cornish, Loughton .....	1,495 0 0

CAMBERWELL.—For additional stabling, &c., at the Vestry's depot, Peckham Park-road, for the Camberwell Vestry:—

Clarke .....	£270 0 0
Walker .....	259 0 0
Stayer .....	227 0 0
Richardson .....	223 0 0
Stevens .....	222 0 0
Parker .....	205 0 0
Holloway .....	190 0 0
David Brown & Co. (accepted) .....	190 0 0

CLACTON-ON-SEA.—For completing villa residences, Ellis-road. Mr. E. C. Homer, architect:—

Gillingham .....	£263 0 0
Derry (accepted) .....	637 0 0
Taylor .....	645 0 0

DEPTFORD.—For repairs to eleven houses in Alvar street, Deptford, for Messrs. Green & Son, 28 and 29, St. Swinburn-lane, Mr. Arthur W. Saville, architect, Strand:—

B. Cook .....	£218 0 0
Royal & Co. ....	268 0 0
J. Heath (accepted) .....	217 0 0

EARL'S COURT.—For decoration of drawing-room and sundry repairs, No. 43, Longridge-road. Messrs. Morley & Lettis, surveyors, Earl's-Court-road:—

W. T. Foll, Putney (accepted) .....	£216 11 0
-------------------------------------	-----------

EARL'S COURT.—For sanitary and decorative repainting at 32, Longridge-road, for Madam Kennett. Messrs. Morley & Lettis, surveyors:—

Brown & Sons, Earl's Court .....	£218 0 0
William Bradford, Richmond .....	132 0 0

FINSBURY PARK.—For additions, alterations, and repairs to 161, Queen's-road, Finsbury Park, for Mr. J. Arnold. Messrs. E. A. Mason & Sons, architects:—

Grover .....	£378 0 0
Shenton .....	355 0 0
Stephens .....	334 12 0
Lidstone (accepted) .....	310 3 0

FOREST HILL.—For alterations and additions to two villa residences, Brockley Park, for Mr. G. Heywood. Mr. Kingwell Cole, architect. Messrs. Baitam & Co., surveyors:—

G. Lemon, Sydenham .....	£238 0 0
W. Marriage, Croydon .....	685 0 0

FRINTON.—For bungalow, Station-road. Mr. E. C. Homer, architect:—

Gillingham .....	£278 0 0
A. Waterman (accepted) .....	688 0 0

FRINTON.—For drainage, Harrold-road. Mr. E. C. Homer, surveyor, Mansion House-chambers, E.C.:—

Dixon & Co. ....	£13 0 0
Rash .....	393 0 0
A. Waterman .....	381 0 0
Gillingham (accepted) .....	343 0 0

FULHAM.—For finishing sixty-one houses at Stinkley Park Estate, Fulham, for the British Mutual Banking Co.:—

Jones Bros., Wandsworth .....	£8,900 0 0
-------------------------------	------------

GODALMING.—For new house, Hambledon. Mr. Ralph Nevill, F.S.A., architect, Guildford:—

R. Pink .....	£1,195 16 3
J. Bottrill .....	1,178 0 0
F. Milton .....	1,130 0 0
H. Brown .....	1,120 0 0
Chapman Bros. ....	1,119 15 0
Tompsett & Kingham (accepted) .....	1,031 0 0

GREAT MARLOW (Bucks).—For villa residence and stabling at Great Marlow for Mr. E. Riley. Mr. Francis Newman, architect, Hyde. Quantities supplied:—

F. Saunders, Dorset-square, N.W. ....	£2,614 0 0
Silver & Sons, Maidenhead .....	2,513 0 0
W. Woodbridge, Maidenhead .....	2,474 0 0
John S. Carter, Great Marlow .....	2,456 19 0
Young J. Lovell, Great Marlow .....	2,436 0 0

HINCKLEY (Leicestershire).—For erecting fourteen houses in Druid-street, Hinckley, for Mr. John Smith. Mr. William Langley, architect, Coventry:—

Foxon, Hinckley, Leicestershire .....	£2,030 0 0
Randle, Folehill, Warwickshire .....	1,860 0 0
Harrold, Hinckley, Leicestershire .....	1,946 2 6
Garlick, Coventry, Warwickshire .....	1,850 0 0
Barnes, Hinckley, Leicestershire .....	1,833 17 0
Raynes, Barwell, Leicestershire .....	1,827 0 0
Lockley, Barwell, Leicestershire .....	1,825 0 0
Clarke, Folehill, Warwickshire .....	1,700 0 0

ISLINGTON.—For reinstating the premises Nos. 638, 638, 640, 642, Holloway-road, Islington, for Mr. Thomas Kayler. Mr. W. W. Smith, architect:—

Mattcock Bros. ....	£1,858 0 0
Larks & Son .....	1,670 0 0
Say .....	1,660 0 0
Killingbeck .....	1,660 0 0
Hovell .....	1,450 0 0
Dunford & Lanham .....	1,407 0 0
Clarke Bros. ....	1,395 0 0
Baylis .....	1,346 0 0
Steel Bros. ....	1,245 0 0
Ward & Lambie .....	1,237 0 0

LONDON.—For pulling down and rebuilding the Queen's Head, City-road, St. Luke's, for Mr. Alfred Job:—

Jackson & Todd .....	£1,747 0 0
Steel Bros. ....	1,610 0 0
Dearing & Son .....	1,400 0 0
Burman (accepted) .....	1,239 0 0

LONDON.—For additions, alterations, and repairs to 30, Albion-road, St. John's Wood, for Mr. E. E. Keale. Mr. R. Walker, architect:—

Lidstone (accepted) .....	£289 0 0
---------------------------	----------

LONDON.—For repairs and decorations for Mr. F. C. Moullet. Mr. J. Scott, architect:—

Griffins Taverna .....	£108 .....	289
A. Tower Taverna .....	123 .....	32
Three Jolly Butchers Taverna .....	32 .....	26

LONDON.—For repairs and painting to 13, St. John's Wood-park, for Mr. Lewis Davis. David Brown & Co. (accepted) .....

David Brown & Co. (accepted) .....	£175 0 0
------------------------------------	----------

LONDON.—For house in Mount-street, London, for Mr. A. Tait. Mr. J. T. Smith, architect, Argyle-street. Quantities supplied by Mr. Griffiths, Walbrook:—

		fixing terra cotta.
Lawrence .....	£5,850 .....	£230
Morris .....	5,800 .....	300
Mattock Bros.....	5,777 .....	114
Shaw .....	5,538 .....	48
Stephens & Bastow*	5,499 .....	70
	* Accepted.	

LONDON.—For alterations and additions to 24, Baker-street. Mr. Mark J. Lansdell, architect:—

S. Godden .....	£205 0 0
Mattcock Bros. ....	193 0 0
David Brown & Co. (accepted) .....	169 0 0

LONDON.—For alterations and additions to No. 15, Hill-street, Berkeley-square, for Her Grace the Duchess of Newcastle. Messrs. Taylor & Locke, architects and surveyors:—

T. Boyce .....	£3,879 0 0
T. Green .....	3,636 0 0
Steel Bros. ....	3,519 0 0
David Brown & Co. (accepted) .....	3,445 0 0

LONDON.—For supply of road materials for the nine months ending March 25th, 1887, for the Vestry of Hammer-smith:—

Guernsey broken Granite delivered at the Vestry Wharf.	Per cube yard.
R. Trickett & Sons .....	s. d.
Tomes & Wimpey .....	11 8
R. & I. Feunung .....	11 6
John Mowlem & Co. ....	11 5
Nowell & Robson (accepted) .....	10 4

Leicestershire broken Granite delivered at London Railway Stations. Per cube yard.

John Mowlem & Co. ....	s. d.
Margerson & Co. ....	11 11
S. Trickett & Sons .....	11 3
Tomes & Wimpey .....	11 2
W. C. Cost .....	10 9
Nowell & Robson (accepted) .....	10 9

Leicestershire broken Granite delivered on the Parish Roads. Per cube yard.

John Mowlem & Co. ....	s. d.
Margerson & Co. ....	13 6
S. Trickett & Sons .....	12 11
Tomes & Wimpey .....	12 7
W. C. Cost .....	12 3
Nowell & Robson (accepted) .....	12 0

MANCHESTER.—For residence to be erected at Crow Hill, for Mr. E. Woods. Messrs. Robinson & Son, architects, Chesterfield:—

Chadwick .....	£1,750 0 0
Greenwood .....	1,630 0 0
Oldenham .....	1,620 0 0
Vallance .....	1,619 0 0
Moss .....	1,663 0 0
Frisby .....	1,639 10 0
Shaw .....	1,610 0 0
Allopp .....	1,600 0 0
Fisher Bros. (accepted) .....	1,470 0 0
Cudby .....	1,415 0 0

MILL HILL (Hendon).—For heating apparatus, hot-water supply, baths, lavatories, gas mains and services, fire mains, cooking apparatus, &c., at the Orphanage, St. Vincent de Paul, for the Sisters of Charity:—

Purcell & Nobbs, Cleveland-street .....	£1,047 0 0
---	------------

NORWICH.—For the erection of a Sunday-school, consisting of lecture-hall with gallery and twenty-five class-rooms, at Queen's-road, Norwich. Mr. A. F. Scott, Castle meadow, architect and surveyor, Norwich. Quantities supplied:—

Hurn, Norwich .....	£2,697 0 0
Dann, Wrampham .....	2,689 12 0
Dawes, Norwich .....	2,468 0 0
Younge & Son, Norwich .....	2,449 0 0
Curtis, Norwich .....	2,272 0 0
Chapman, Norwich .....	2,235 0 0

READING.—For alterations and additions to premises. Broad-street, Reading, for Messrs. Wellsted, Son, & Co. Mr. W. Ravenscroft, architect, Reading. Quantities supplied by Messrs. Cooper & Sons, Maidenhead and Reading:—

J. C. Cook (too late) .....	£2,538 0 0
J. H. Margate .....	2,558 1 0
H. Higgs & Sons .....	2,400 0 0
F. E. Woodroff .....	2,345 0 0
G. Searle .....	2,238 0 0
W. H. Simonds .....	2,183 0 0
J. Bottrill .....	2,175 0 0
S. East (accepted) .....	2,111 0 0

SALISBURY.—For restoring a wing of Trafalgar House, near Salisbury, for the Right Hon. the Earl Nelson. Mr. Henry Hall, architect, Douglass-street. Quantities by S. J. Thacker:—

Brook & Bruce, Bristol .....	£2,998 0 0
Dobson, Colechester .....	2,835 0 0
Foster & Dickson, Rugby .....	2,785 0 0
Kingletts, Oxford .....	2,726 0 0
Eastcourt, Gloucester .....	2,691 0 0
Leslie & Knight, Kensington .....	2,438 0 0
Mitchell, Woodfalls, Salisbury .....	2,476 0 0
Abley, Salisbury .....	2,450 0 0
Barber, Salisbury .....	2,350 0 0

SOUTH KENSINGTON.—For sanitary and decorative repairs at No. 65, Earl's-court-square, for the Life Association of Scotland. Under the superintendence of Messrs. Morley & Lettis, surveyors, Earl's-court-road:—

Richardson, Halfey-street .....	£368 0 0
Toten & Son, Gloucester-road .....	369 0 0
E. K. Wilson, Sussex-place .....	367 18 6



**SOUTHWARK.**—For granite carriageways and York stone footways, &c., for the new line of thoroughfare from Southwark-bridge-road to Great Dover-street, Borough, for the Metropolitan Board of Works:—

Williams, Son, & Wallington	£16,100 0 0
C. Wall	13,387 0 0
J. W. & J. Nave	13,339 0 0
W. F. Chadwick	13,029 0 0
W. Webster	13,000 0 0
G. G. Rutty	12,900 0 0
Turner & Son	12,652 0 0
H. F. Snow	12,593 0 0
Trehearne & Co.	12,282 0 0
J. Mowlem & Co.	12,280 0 0
W. Stubbs	11,894 0 0
R. Mayo	11,880 0 0
Hindle & Morriah	10,540 0 0

\* In lieu of the list published last week.  
† Accepted provisionally.

**SOUTHWARK.**—For taking down and rebuilding the London and South-Western Bank, Borough. Mr. J. S. Edmonstone, architect. Quantities supplied:—

Mark Rodman	£5,175 0 0
Hall & Rix	4,990 0 0
W. Shepherd	4,743 0 0
J. & C. Bowyer	4,675 0 0
J. Smith & Sons	4,667 0 0
J. & E. Johnstone	4,600 0 0
Atherton & Latta	4,599 0 0
J. Wood	4,542 0 0
A. B. Baird	4,350 0 0
C. Kynoch & Co. (accepted)	4,320 0 0

**WANSTEAD.**—For the erection of new school for 820 children in Downhill-road, for the Wanstead School Board. Messrs. Bessy & Liddon Walters, architects, Bishopsgate-street Within. Quantities by F. Lee, Great College-street, Westminster:—

John Allen & Sons, Kilburn	£8,890 0 0
James Catterly, Wanstead	8,580 0 0
J. I. Robson, Woodford	8,248 0 0
J. & C. Bowyer, Upper Norwood	8,188 0 0
Staines & Son, Great Eastern-street	8,174 0 0
E. C. Howell & Son, Lambeth	8,131 0 0
G. Parker, Peckham	8,080 0 0
J. L. Glascock & Son, Bishop	7,975 0 0
D. C. Jones & Co., Gloucester	7,954 0 0
Harris & Wardrop, Eimhouse	7,844 0 0
Walter J. Hack, Poplar	7,873 0 0
G. & L. Green, Hackney	7,845 0 0
John Brockell, Little Ilford	7,760 0 0
Joseph Holland, Poplar	7,756 0 0
North Bros., Stratford	7,750 0 0
A. Reed, Stratford (accepted)	7,720 0 0
Friedly & Gurney, Hammersmith	7,549 0 0
Sahey & Son, Islington (withdrawn)	7,497 0 0
William Gregar, Stratford (withdrawn)	6,987 0 0

**WESTGATE-ON-SEA.**—For the erection of vicarage for Rev. A. A. Culin, Westgate-on-Sea, Kent. Messrs. Beazley & Dunn, architects, Delahay-street:—

Martin Ramsgate	£2,154 0 0
Frostick, Westgate-on-Sea	2,034 0 0
Sarubene, Faversham	1,968 0 0
Corbett & Co., Westgate-on-Sea	1,900 0 0

**WEST HAM.**—For making the North Woolwich-road, Victoria Docks, for the West Ham Local Board. Mr. Lewis Angell, C.E., surveyor to the board:—

J. G. B. Marshall	£16,760 0 0
B. Cooke & Co.	15,954 0 0
J. W. & J. Nave	15,842 0 0
Mowlem & Co.	15,241 0 0
G. G. Rutty	15,247 0 0
Trehearne & Co.	14,870 0 0
G. Bell	14,830 0 0
J. J. Griffiths	14,798 0 0
J. Jarraon (accepted)	14,940 0 0
Hindle & Morriah	14,600 0 0
Turner & Son	14,424 0 0
Woodham & Fry	15,698 0 0

**WOOLWICH.**—For alterations and additions to three shops in Wellington-street, Woolwich, for Mr. J. C. Bonnett, Mr. H. H. Church, architect, Woolwich:—

Russell	£600 0 0
Combs	530 0 0
Covill	505 0 0
Johnson (accepted)	503 0 0

**WOOLWICH.**—For alterations to shop, No. 38, Powis-street, Woolwich, for Messrs. S. W. Guff & Co., Mr. H. H. Church, architect:—

Covill (accepted)	£150 0 0
-------------------	----------

**WOOLWICH.**—For two shops in Hereford-square, Woolwich, for Mr. Geo. Lawrence, Mr. H. H. Church, architect:—

Combs	£670 0 0
Walker	562 0 0
Covill	545 0 0
Loneragan Bros. (accepted)	500 0 0

**WOOLWICH.**—For alterations and additions to shop, No. 95, Powis-street, Woolwich, for Mr. Wm. Keating, Mr. H. H. Church, architect:—

A. J. Penn	£107 0 0
Palframan	105 10 0
Covill (accepted)	100 0 0

**WOOLWICH.**—For thirteen private dwelling-houses in William-street, Bull Fields, Woolwich, for the Home Counties Property Investment Co. Mr. H. H. Church, architect:—

Fenn	£4,940 0 0
Johnson	4,100 0 0
Bull	3,850 0 0
Combs	3,835 0 0
Chick (accepted)	2,890 0 0

**SPECIAL NOTICE.**—Lists of Tenders frequently reach us too late for insertion. They should be delivered at our office, 46, Catherine-street, W.C., not later than Four p.m. on THURSDAYS.

#### TO CORRESPONDENTS.

Registered Telegraphic Address, "THE BUILDER, LONDON."

H. T. C. L. "Wales" (it is not our business to make such recommendations).—E. S. H. (shall have consideration).—C. & S.—G. W. H.—C. & M. D. E. (the report of this case is very meagre, and we do not see, on the face of it, how it bears on the subject of our former remarks to which you refer).—C. P. R. (we have made some inquiry, but can give you no definite information. It may be presumed that the trade referred to is not very large, as, if it were, it would probably be a direct communication).

All statements of facts, lists of tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication. We are compelled to decline pointing out books and giving addresses.

Note. The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications beyond mere news items which have been duplicated for other journals, are NOT DESIRED.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; all communications relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

#### PUBLISHER'S NOTICES.

Registered Telegraphic Address, "THE BUILDER, LONDON."

**CHARGES FOR ADVERTISEMENTS.**

**SITUATIONS VACANT, PARTNERSHIP ADVERTISEMENTS, TRADE, AND GENERAL ADVERTISEMENTS.**  
Six lines (about fifty words) or under ..... 6s. 6d.  
Each additional line (about ten words) ..... 1s. 6d.  
Term for Series of Trade Advertisements, also for special Advertisements on front page, Competitions, Contracts, Sales by Auction, &c., may be obtained on application to the Publisher.

**SITUATIONS WANTED.**

FOUR Lines (about thirty words) or under ..... 2s. 6d.  
Each additional line (about ten words) ..... 0s. 6d.

**PREPARATION IS ABSOLUTELY NECESSARY.**

\*\* Stamps need not be sent, but all small sums should be remitted by Cash in Registered Letter or by Money Order, payable at the Post-office, Covent Garden, W.C. to

**DOUGLAS FOUNDRY, Publisher.**

Addressed to No. 46, Catherine-street, W.C.

Advertisements for the current week's issue must reach the Office before THREE o'clock on THURSDAY.

The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c., left at the Office in reply to Advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

**SPECIAL.—ALTERATIONS IN STANDING ADVERTISEMENTS.**

Must reach the Office before TEN o'clock on WEDNESDAY morning.

**PERSONS Advertising in "The Builder," may have Replies addressed to the Office, 46, Catherine-street, Covent Garden, W.C. free of charge.** Letters will be forwarded if addressed envelopes are sent, together with sufficient stamps to cover the postage.

**TERMS OF SUBSCRIPTION.**

"THE BUILDER" is supplied gratis from the Office to residents in any part of the United Kingdom at the rate of 10s. per annum.

Foreign, To all parts of Europe, America, Australia, and New Zealand, 26s. per annum. To India, China, Ceylon, &c. 30s. per annum.

Remittances payable to DOUGLAS FOUNDRY, Publisher, No. 46, Catherine-street, W.C.

#### Best Bath Stone.

**WESTWOOD GROUND,**  
Box Ground, Combe Down,  
Corsham Down, And Farleigh Down,  
**RANDELL, SAUNDERS, & CO., Limited,**  
Corsham, Wilts. [ADVT.]

#### Bath Stone.

**BEST QUALITY OF ALL KINDS.**

**PICTOR & SONS,**  
Box, Wilts. [ADVT.]

**Douling Freestone and Ham Hill Stone** of best quality, in blocks, or prepared ready for fixing. An inspection of the Douling Quarries is respectfully solicited; and Architects and others are CAUTIONED against inferior stone. Prices, delivered to any part of the United Kingdom, given on application to CHARLES TRASK & SONS, Norton-sub-Hamdon, Ilminster, Somerset.—Agent, Mr. E. WILLIAMS, No. 16, Craven-street, Strand, W.C. [ADVT.]

**Douling Free Stone** For prices, &c., address S. & J. STAPLE, Quarry Owners, Stone and Lime Merchants, Stoke-under-Ham, Ilminster. [ADVT.]

**Asphalte.**—The Seyesal and Metallico Lava Asphalte Company (Mr. H. Glenn), Office, 88, Poultry, E.C.—The best and cheapest materials for damp courses, railway arches, warehouse floors, flat roofs, stables, cow-sheds, and milk-rooms, granaries, tun-rooms, and terraces. [ADVT.]

**Asphalte.**  
Seyesal, Patent Metallico Lava, and White Asphaltes.  
**M. STODART & CO.**  
Office:  
No. 90, Cannon-street, E.C. [ADVT.]

**"TIME IS MONEY."**  
All Builders and Decorators should use **ASPINALL'S LIQUID PRIMING,** For new Wood, loose Distemper, or Stained Ceilings. Stops all suction. Dries immediately.

**WASHABLE WATER PAINT**  
Took HIGHEST AWARD, INVENTIONS EXHIBITION, 1885.

Mixes with cold water. No oil, no turpentine required, double the bulk of lead, 1 cwt. covers 1,000 square yards, dries beautifully fast, supercedes Wall Paper for all PUBLIC or PRIVATE BUILDINGS. Now being used at the COLONIAL AND INDIAN EXHIBITION, Address—Hollydale Works, PECKHAM, S.E. [ADVT.]

**MICHELMORE & REAP,**  
Manufacturers of

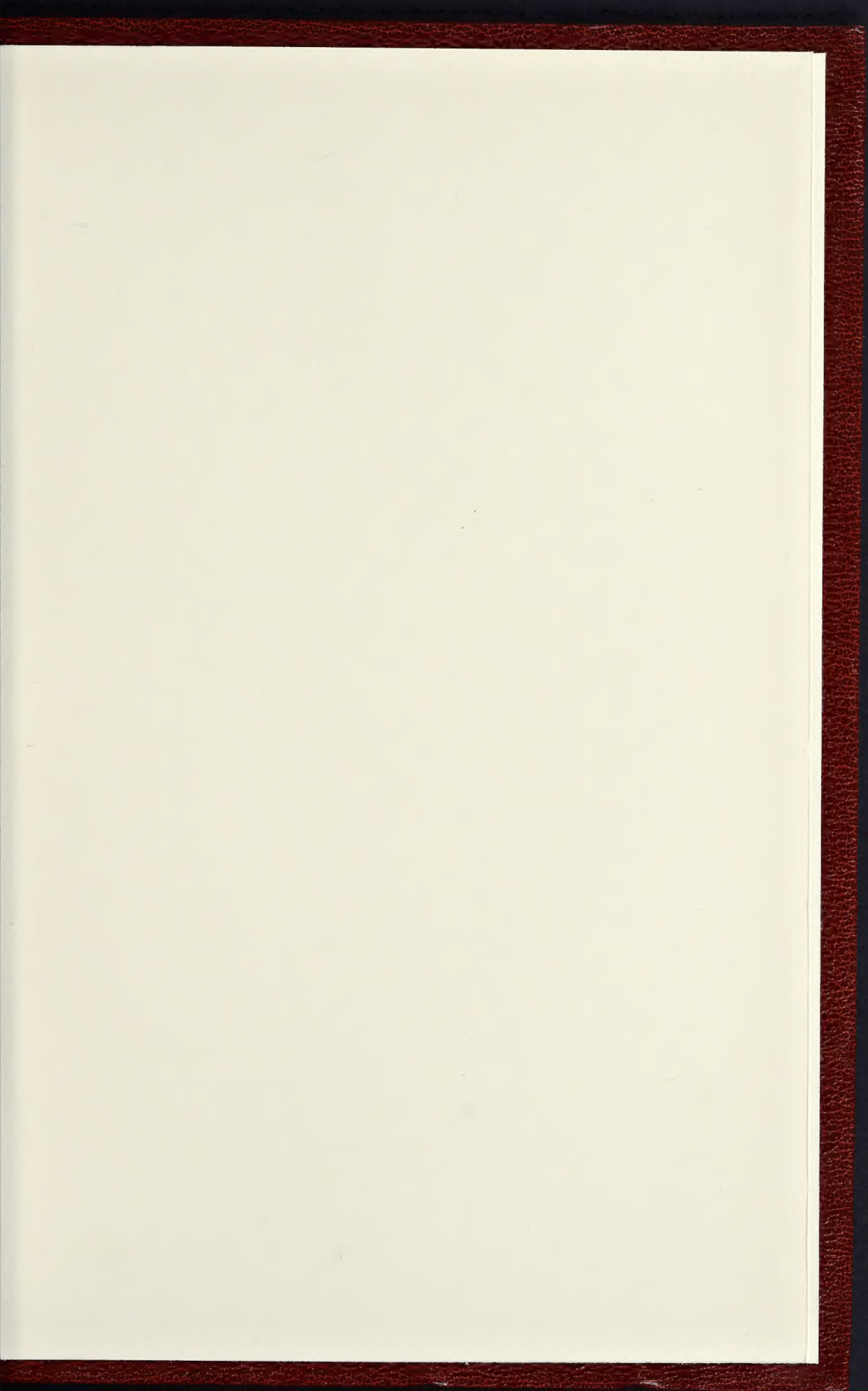
**CHARLES COLLINGE'S PATENT.**

**COLLINGE'S PATENT HINGES, LEVER, SCREW, & BARREL BOLTS,**

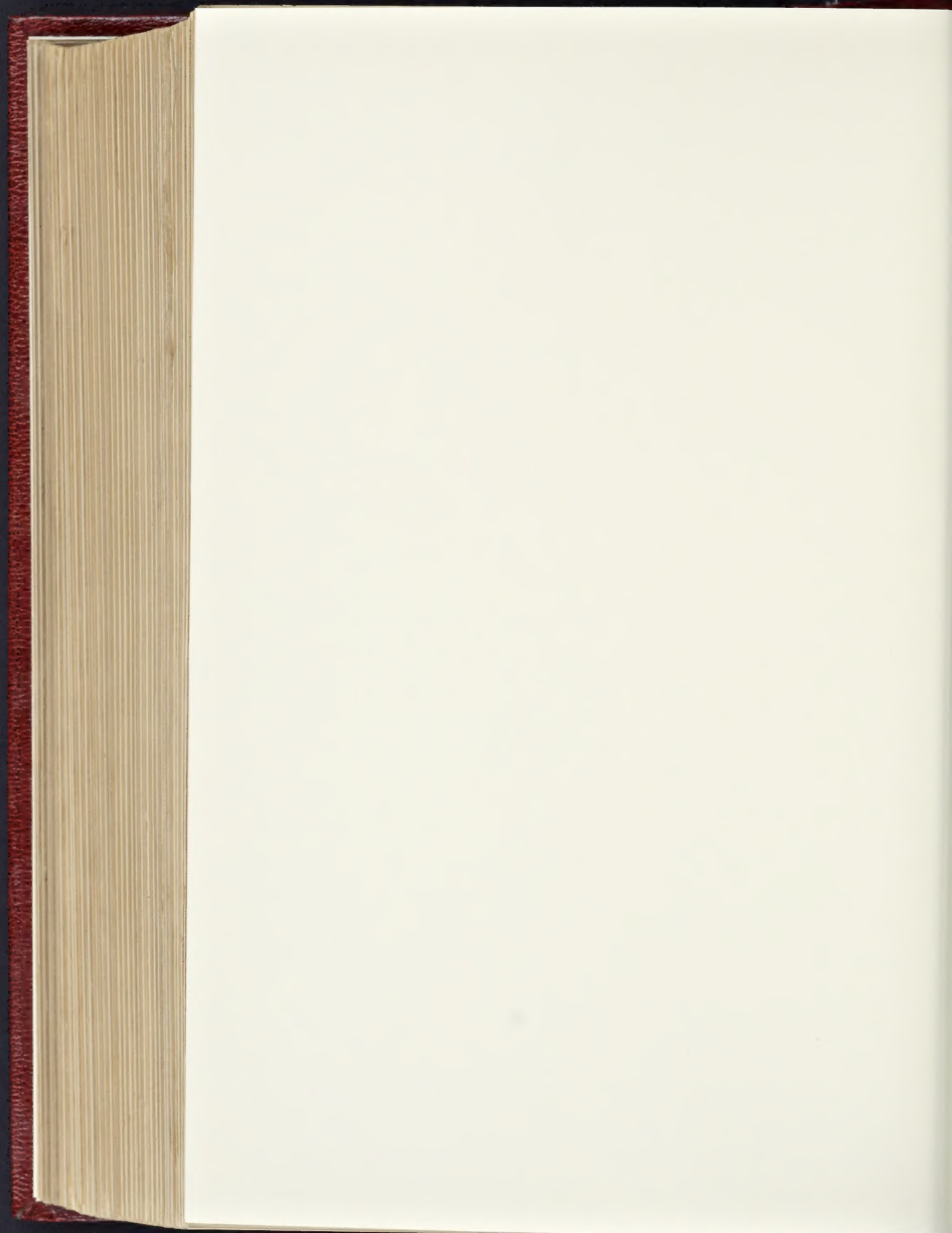
Self-Acting "PULL DOWN" GATE STOPS, and IMPROVED GATE FITTINGS of every Description

36A, BOROUGH ROAD, LONDON, S.E.

**GOLD AND SILVER MEDALS AT AMSTERDAM EXHIBITION.**  
**ZINC BRAY & CO.**  
**LONDON. \*\* LIVERPOOL. \*\* GLASGOW.**  
**VIELLE MONTAGNE SOE MANUFACTURING AGENTS.**  
**NO SOLDER. NO EXTERNAL FASTENINGS.**  
Particulars on Application. Chief Offices:—352 to 364, EUSTON ROAD, LONDON, N.W.







GETTY CENTER LIBRARY



3 3125 00702 3142



